

**The Third
National Biodiversity Strategy
of Japan**

Outline of
The Third National Biodiversity Strategy of Japan

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— For "Building a Sustainable Society Coexisting with Flourishing Biodiversity"
where Human and the Nature Live Together in Harmony —

【Importance of Biodiversity】

Biodiversity Supports Life and Livelihood

- ①Basis for existence of all life on earth — eg. oxygen supply, forming rich soil —
- ②Use value including future options —eg. food, timber, medicine, breeding,
uninterpreted genetic information —
- ③Basis for enriching culture —eg. cultural diversity fostered by local natural environment,
Japanese traditional attitude toward nature: cherishing all life on earth—
- ④Security of livelihood — eg. disaster reduction, food security —

【Challenge】

- Crisis 1 •Species and habitat degradation due to excessive human activities
- Crisis 2 •Degradation of *satochi-satoyama** due to insufficient level
of management
(*Rural landscapes formed by sustainable use of natural resources)
- Crisis 3 •Ecosystem disturbances caused by the introduced alien species
and chemical contaminations

Crisis caused by Global Warming — inevitable and serious—

•Huge potential for species extinction and ecosystem collapse

【Long-term perspective】

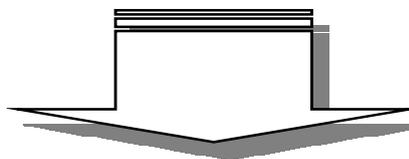
Grand Design, targeting 100 years ahead

•Grand design of the national land from the viewpoint of biodiversity is presented as the "Centennial Plan", which aims to recover the nation's ecosystem over the next hundred-year period

【Involvement of various stakeholders】

Involvement of local governments and the private sector

•Needs for efforts by local governments and businesses are emphasized with a view to linking biodiversity conservation to local activities



※National Biodiversity Strategy is a plan to describe the basic ideas and the government's measures on the conservation and sustainable use of biological diversity in a comprehensive way in accordance with the Convention on Biological Diversity

FOUR "BASIC STRATEGIES"

Four "Basic Strategies"

1 Mainstreaming Biodiversity in our daily life

- ① Launching "Our Life on Biodiversity" project which aims to enhance the involvement of local governments, businesses, NGOs and the public
 - Guidance for strategies at local levels
 - Development of guidelines for private sector
 - Proposal for a biodiversity-friendly lifestyle
- ② Hands-on nature experiences for school kids, and primal experiences to "feel with the five senses"

2 Re-building sound relationship between man and nature in local communities

- ① Selecting "Important *satochi-satoyama* areas have to be inherited by next generation"; developing management models as commons
- ② Developing communities coexisting with wildlife through separating habitat and capacity building
- ③ Promoting sound activities of agriculture, forestry and fisheries which contribute to the conservation of biodiversity
- ④ Managing habitat for endangered fauna and flora; combating alien species issues

Four "Basic Strategies"

3 Securing linkages among forests, countrysides, rivers and the sea

- ① Realizing the ecological network at national scale
- ② Promoting a comprehensive review of National and Quasi-National Parks, and promoting nature restoration
- ③ Studies on marine protected areas to secure sustainable fishery activities

4 Taking action with global perspective

- ① Hosting COP10 of the Convention on Biological Diversity
- ② Conducting a country-wide comprehensive ecosystem assessment (Japan Biodiversity Outlook)
 - Developing biodiversity indicators
 - Mapping of states of crisis; selecting "Hot Spots"
- ③ Proposing the "SATOYAMA Initiative" to the world
 - to realize a society in harmony with nature
- ④ Consideration of mitigation and adaptation measures for global warming in the context of biodiversity
(Conserving forests and wetlands;
Forming ecological networks resistant to global warming)

Background of the National Biodiversity Strategy Review

■ The Convention on Biological Diversity - adopted in May 1992

Came into effect
in Dec. 1993

Parties :
189 countries and EC
(as of July 2007)

(Article 6 of the Convention)

"Each Contracting Party shall develop national strategies, plans or programmes for the conservation and sustainable use of biodiversity."

■ The National Strategy of Japan on Biological Diversity - decided in October 1995

The Ministry of the Environment
- established in January 2001

■ The National Biodiversity Strategy of Japan - decided in March 2002

(2002)

- Enactment of the Law for the Promotion of Nature Restoration
- Amendment of the Natural Parks Law
- Amendment of the Wildlife Protection and Hunting Law

■ 2010 Target (COP6, 2002)

(2003)

- Enactment of the Cartagena Law

Cabinet approval on Japan's offer to host COP10 (2010) (January 2007)

(2004)

- Enactment of the Invasive Alien Species Act

G8 Environment Ministers Meeting in Potsdam, Germany (March 2007)

(2006)

- Amendment of the Wildlife Protection and Hunting Law

- Informal Committee on the Review of the Strategy (August 2006 ~ March 2007)
- Deliberation at the Central Environment Council (April ~ November 2007)

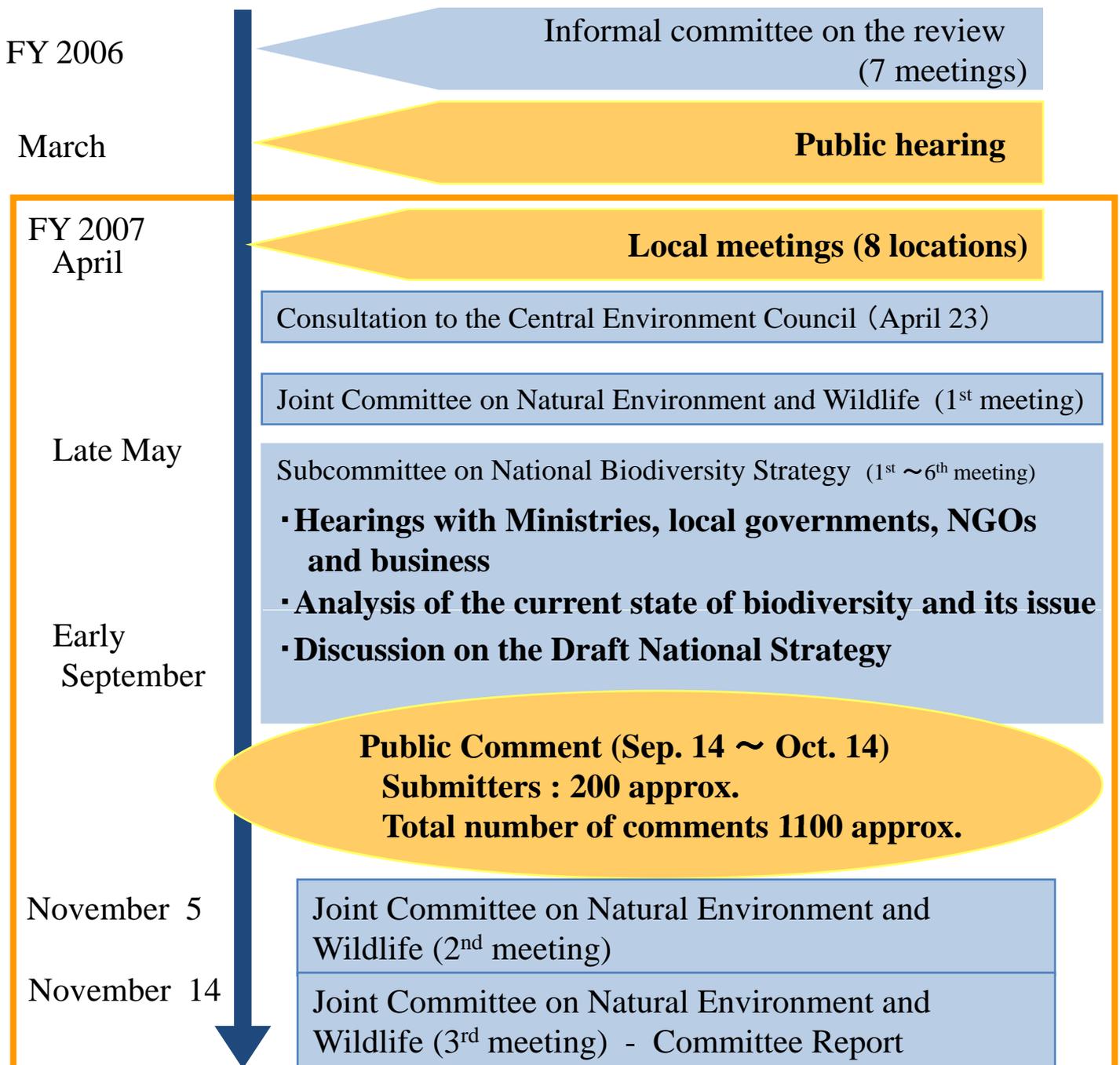
■ IPCC Fourth Assessment Report Working Group II Report : "Impacts, Adaptation and Vulnerability" (Published in 2007)

■ Cabinet Decision on The Third National Biodiversity Strategy of Japan - November 27, 2007

Time-line of the Review of the National Biodiversity Strategy

March, 2002

The Second National Biodiversity Strategy of Japan



November 27, 2007

Cabinet Decision on

“The Third National Biodiversity Strategy of Japan”

The Third National Biodiversity Strategy of Japan

November 27, 2008

Cabinet Decision

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Preamble

Over four billion years since the birth of the earliest form of life, life on the earth has evolved through adapting to diverse environments into a great variety of life. The number of the species is estimated at approximately 30million including the unknown ones. Each of these numerous lives, having its own individuality, is interconnected in varied ways to form complex web of life. This is what biodiversity looks like. The Environment of the planet where we are living is the result of vast and diverse interconnection and flourishing interaction of living things over the years.

We, mankind, belong to life. We live linked with other living things. Without living things around us, we humans can not live. With the benefits of biodiversity we can get by.

We have regionally different traditional cultures and accumulation of knowledge that are essential to our good life. It may be said that such diverse cultures have arisen from rich biodiversity in the regions and are now their indigenous essential assets.

The birth of mankind is a recent event in the light of the long history of earth. Mankind, who had hitherto obtained great power, increased in number, which has greatly influenced global ecosystem.

We, mankind, supported by various living things on the one hand, have extinguished a lot of living things on the other hand. It is said that these several hundred years mankind has accelerated the average extinction rate to 1,000 times the past rate. With all progress in science and technology, life can not be created today and moreover, even creature-to-creature relationship remains mostly unknown. We have to humbly recognize the fact that our lives coexist with every life on the earth. We are further obliged to protect biodiversity and take sustainable approaches to its utilization so as not to cause immense effects on it.

Since the Meiji Restoration in the 19th century and then over the postwar period, our country has achieved economic development, while the otherwise rich biodiversity was lost in the country that is long in the north-south direction and is surrounded on all four sides by the sea. It was often forgotten that richness of biodiversity leads to our good life.

In Japan, through the long history of agriculture, forestry and fishery activities in the coastal areas, we have built up its indigenous culture in which we have been coexisting with varied living things and enjoying bountiful nature. However due to its fusion with Western civilization and progress in science and technology in recent years, Japanese people's close relation with nature has been being lessened, causing its specific climate to gradually disappear, in which cultures and nature are closely connected with each other in regions. As opposed to continued increase in world's population, the population of our country, according to some demographic estimation, will turn into decrease until it will be reduced by half in 2107, 100 years from now. The expected number is almost the same with that of the population at the end of the Meiji era, 100 years ago. Our country, having enjoyed remarkable economic progress over these 100 years, will have to strive to attain both of economic development and rich biodiversity instead of either of them in the next 100 years. In our country, over these 100 years when the population has continued to increase, the ecosystem of its national land has been deteriorated because of various reasons. From the biodiversity aspect, we should recover the damaged ecosystem according to so-called a "Centennial Plan" based on the anticipation that a long time will be required for recovery of natural ecosystem.

The Third National Biodiversity Strategy of Japan is the government's plan to promote conservation of

biodiversity and sustainable use of its components, aiming at “Building a Sustainable Society Coexisting with Flourishing Biodiversity”. The nation nurtures rich biodiversity through coexistence of man and nature and by secured better balance between man and nature. Realistic and steady activities in local communities are thus most essential to attainment of this aim and at the same time cooperation among various entities including local governments, private enterprises and the Japanese people is required for this purpose. Under the grand policy of this National Strategy, each of the people, irrespective of age or sex, has to move forward to open a prosperous future of the nation abounding in life.

Convention on Biological Diversity and the National Strategy

In time for United Nations Conference on Environment and Development (The Earth Summit) held in Rio de Janeiro, Brazil in 1992, United Nations Framework Convention on Climate Change (UNFCCC) and Convention on Biological Diversity (CBD) were adopted. Japan concluded the CBD as the 18th contracting state in May, 1993. The Convention entered into force in December of the year. Parties to the Convention are 190 countries as of July, 2007. The Convention was drawn up out of the motives of our sense of crisis over rapid reduction of tropical rainforests, ongoing extinction of species and loss of biological resources essential to the survival of mankind to set up a comprehensive international framework for conservation of overall life. As the objectives of the Convention, the themes “Conservation of Biodiversity”, “Its Sustainable Use” as well as “Fair and Equitable Sharing of Benefits Arising out of the Utilization of Genetic Resources” was employed.

Under Article 6 of the Convention, individual governments are required to formulate their national strategies aimed at conservation and sustainable use of biodiversity. With conclusion of the Convention, Japan formulated the first National Biodiversity Strategy of Japan in October, 1995 and then established the 2nd National Biodiversity Strategy of Japan, a drastic revision of the first Strategy, in March, 2002. The main body that provided the strategies is the Council of Ministers for Global Environment Conservation.

The National Biodiversity Strategy and the 2nd National Biodiversity Strategy of Japan

The National Biodiversity Strategy of Japan formulated in 1995 has the features as follows; 1. It was provided promptly in response to CBD in less than 2 years after it took effect; 2. Using the keyword “biodiversity”, ministries concerned worked together; 3. In line with the makeup of the Convention, actions to be taken by the ministries were coordinated leaving nothing to be desired; and so on. In the meanwhile, what needs to be improved in is as follows; 1. Measures and policies to be taken were described in parallel, but no attention was paid to cooperation among ministries; 2. Path toward the objectives is not so clear, measures and policies not so concretely proposed; 3. Neither any socio-economic frame of reference, nor thorough analysis of biota or ecosystem is given; and 4. The ministries formulated the Strategy without fully consulting the relevant experts or other conservation groups; and so on.

In the 2nd National Biodiversity Strategy of Japan of 2002, our National Strategy was set up as a comprehensive plan for the government as a whole to put “Society in Coexistence with Nature” into practice. The 2nd Strategy has the features as follows; 1. The current status of biodiversity in our country was organized into “3 Crises”; 2. “5 Rationales” were employed as principles for conservation and sustainable use of biodiversity, “7 Main Themes” as the concrete measures and so on. In the meanwhile, the 2nd National Biodiversity Strategy of Japan has turned out to be a National Strategy drastically revised in the following respects; 1. Restoration of nature as well as conservation of the remaining nature was suggested to enhance the quality of nature in the overall national land; 2. Approaches reflecting cooperation among ministries in

restoring nature as well as conserving Satochi-Satoyama areas (rural landscapes formed by sustainable use of natural resources) were promoted at the level of measures or plans; 3. In present data analysis, special attention was paid to the socio-economic aspect as well as biota and ecosystem analysis; 4. Ministries tried to consult a wide range of expert and conservation groups during the process of formulation of the Strategy. Improvements, however, are required in the following respects; 1. Neither the objectives nor indicators are concretely given, path toward actions is not clearly shown; 2. Some of the measures and policies to be taken by ministries were still described in parallel; 3. The content of the Strategy is too stiff and formal to be appealing to the Japanese public; 4. The Strategy provides little of a long-term outlook or a global view as to biodiversity; 5. The Strategy focuses on approaches at national level but does not intend to encourage local governments or private organizations to participate in the activities.

The background to the formulation of the Third National Biodiversity Strategy of Japan

In April, 2002, after the 2nd National Biodiversity Strategy of Japan was established in March of the year, the 6th meeting of the Conference of the Parties (COP6) to the Convention on Biological Diversity adopted a strategic plan showing “the 2010 target” that “the parties commit themselves to achieve by 2010 a significant reduction of the current rate of biodiversity loss”. And Millennium Ecosystem Assessment (MA) announced by the United Nations in 2005 conducted a comprehensive assessment of global ecosystem for the first time. Out of 24 ecosystem services (benefits from ecosystem) examined, only 4 services improved, but 15 services were degraded, revealing biodiversity loss. Furthermore, Global Biodiversity Outlook 2 (GBO2), announced by the secretariat of Convention on Biological Diversity at the 8th meeting of the Conference of the Parties (COP8) of the Convention on Biological Diversity of 2006, assessed the state of biodiversity by 15 indicators, revealing that the 2010 target was difficult to attain, because 12 indicators showed biodiversity was in decline.

In respect of global warming, the Kyoto Protocol came into force (2005) and actions are already under way at home and abroad, with scientific knowledge as to the global warming accumulated. The Fourth Assessment Report of Intergovernmental Panel on Climate Change (IPCC) has just revealed that biodiversity has been affected by global warming and will be more significantly affected by warming expected to continue.

After provision of the 2nd National Biodiversity Strategy of Japan, various efforts took place within the country. They are institutional actions concerning biodiversity such as enactment of Law for the Promotion of Nature Restoration (2002), Law Concerning the Conservation and Sustainable Use of Biological Diversity through Regulations on the Use of Living Modified Organisms (Cartagena Law, 2003), Landscape Law (2004), Invasive Alien Species Act (2004) and National Spatial Planning Act (drastic revision of Comprehensive National Land Development Act, 2005), and revision of Natural Parks Law (2002), Wildlife Protection and Appropriate Hunting Law (2002, 2006) and Law for Protection of Cultural Properties (2004).

Although rapid development has been calming down during the postwar economic growth, the area of agricultural and forestry lands converted to urban use and the area of reclaimed lands in the coastal areas have remained at the same level, continuing to affect biodiversity. The population of our country that turned into decrease in 2002 currently remains at the same level, but is projected to significantly decrease in the future. A change in relation between man and nature, typified by increased serious conflicts between man and wildlife causing damage to agriculture and forestry or causing other troubles, the reduced number of people engaged in agriculture or forestry, accelerated demographic aging and other situations around biodiversity of our country are reaching a turning point. With increased globalization of economy, increase in cross-border distribution of goods or transnational movement of people was followed by invasion of alien species into Japan or other

phenomena that may affect biodiversity of our country, while due to increased population of the world and high economic growth in India and China may possibly change the circumstances surrounding our country that has long been depending on overseas natural resources.

Every year since provision of the 2nd National Biodiversity Strategy, Inter-Ministerial Committee on the National Biodiversity Strategy of Japan has checked the implementation of government measures to announce the result 4 times, in which the status of the implementation of the measures of the ministries concerned as well as of the actions taken by local governments, corporations and private entities as to a conservation and sustainable use of biodiversity was also reported. In the comments on a series of check results, the Central Environmental Council highly evaluated the progress of the measures at the respective levels, but often suggested further promotion of biodiversity education and popularization activities as well as encouragement of efforts at the level of regions.

In January, 2007, Nagoya City's (Aichi Prefecture) bid to host the 10th meeting of Conference of the Parties of the Convention on Biological Diversity (2010) was approved at a Cabinet meeting. Now that the main agenda at G8 Environment Ministers' Meeting held in Germany in March of the year included biodiversity as well as climate change, and the declaration by leaders at the G8 Summit contained the critical importance of biodiversity as well as intensification of efforts to achieve the 2010 target, biodiversity draws a higher-degree of attention than ever from all over the world.

In June, 2007, "Becoming a leading Environmental Nation in the 21st Century: Japan's Strategy for a Sustainable Society" was decided upon by the Cabinet. The Strategy suggests that as the approach consolidating the 3 aspects of a sustainable society, Low-Carbon Society, Sound Material-Cycle Society and Society in Harmony with Nature, is now required, we should create a "Leading Environmental Nation, Japan" and transmit the concept to Asia and the world. The Leading Environmental Nation realizes economic growth or vitalization of regions starting from tackling environmental problems by means of our knowledge and tradition securing coexistence with nature and by world class environment energy technology. And in the environmental policy to be taken in 1 or 2 years to attain an "Leading Environmental Nation", 8 strategies such as "Conservation of Biodiversity for the Sustainable Use of Nature's Blessings for the Current Generation and Generation to come", "Creation of Vibrant Local Communities that Utilize the Blessing of Nature" and so forth were given as guiding principles.

In order to provide the 3rd National Biodiversity Strategy of Japan to cope with the changing situations at home and abroad, Ministry of the Environment summoned the informal committee on the review of the National Biodiversity Strategy during the period of August, 2006 to March, 2007 to organize the points for discussion. On the points for discussion provided by the committee, opinions were solicited from the public and local meetings were held at 8 locations around Japan.

In April of the same year, the Ministry convened the Joint Committee on Natural Environment and Wildlife which was established under the Central Environment Council, and requested a report on the review of the National Strategy from the Council. It also set up a Subcommittee on National Biodiversity Strategy to launch deliberations on the review of the National Strategy. The subcommittee solicited the public comments on its draft compiled after conducting 6 times of deliberations through hearings conducted with ministries and agencies on their measures and policies including the ministry of agriculture, forestry and fisheries biodiversity strategy (established in July) as well as hearings with local governments, corporations, NGOs, academic communities. Then, in accordance with the report submitted in November of the year by the Central Environmental Council, the 3rd National Biodiversity Strategy of Japan was decided. In respect of review, the

Inter-Ministerial Committee on the National Biodiversity Strategy (consisting of 9 ministries and agencies) proceeded with the work, Ministry of the Environment worked as a coordinator, and ministries and agencies share the writing according to the tasks they are responsible for. During the review period, the Ministry solicited the public comments, participated in symposiums or discussion sessions, held the aforementioned committee or deliberations sessions with open door and publicized the contents of the discussions or data on the internet. The Ministry proceeded with the review in such an open way.

Character and role of the Third National Biodiversity Strategy of Japan

5 years have passed since the 2nd National Biodiversity Strategy of Japan was formulated. While measures and policies have been steadily developing, 3 crises are getting worse and the rate of biodiversity loss is not significantly reduced in our country. Therefore in formulating the Third National Biodiversity Strategy of Japan, we again employed in it the crises revealed and rationales employed in the 2nd National Biodiversity Strategy and include therein our willingness to advance and enhance our efforts to cope with the changing situations at home and abroad.

The Third National Biodiversity Strategy of Japan has the following features. 1. It was set up as an action plan that included as many targets and indicators of individual efforts as possible so as to represent clear path toward implementation of the Strategy; 2. To list the tasks of individual ministries as clearly as possible, the Strategy arranged them in groups under the categories such as coastal area, oceanic area according to the respective roles of ministries; 3. It described biodiversity in relation to the human life to help the public easily understand the concept; 4. It provided the image of a long-term target for ecological management of nation land under so called a “Centennial Plan”, in particular referring to its relation to global biodiversity; 5. It suggested that local governments, private enterprises, NGOs and the people should be encouraged to participate in the activities.

The Strategy consists of 2 parts, “Part 1: Strategy for Conservation and Sustainable Use of Biodiversity” and “Part 2: Action Plan on Conservation and Sustainable Use of Biodiversity”. Part 1 gave a new description of the importance of biodiversity that supports life and livelihood and biodiversity’s relationship with global warming that may significantly affect the biodiversity; 5 fundamental frames of reference including performance of a comprehensive assessment of biodiversity in our country, grand design as a future vision of the national land from the aspect of biodiversity, “Scientific Recognition and Preventive and Adaptive Attitude” and so forth; 4 basic strategies including mainstreaming biodiversity in our daily life; and orientation for the period of the coming 5 years of activities to promote conservation and sustainable use of biodiversity in the light of the situation at home and abroad. Part 2 systematically described all of our measures and policies on biodiversity as practical action plans and itemized particular measures and policies to show the path toward their implementation.

The Third National Biodiversity Strategy of Japan can be positioned as the fundamental plan to build up a “Society in Harmony with Nature” that secures our enjoyment of the benefits of nature for many years to come in consideration of 4 long-term targets of the Basic Environment Plan, “Environmental Sound Material Cycle”, “Harmonious Coexistence”, “Participation” and “International Activities”, in order to create a “Sustainable Society” as well as “Low-Carbon Society” responding to a global warming issue and “Society with an Environmentally-Sound Material Cycle” minimizing the burden on the environment caused by extraction and disposal of resources.

Roles of Entities

The Strategy is the plan that put together the principles and government's measures and policies concerning conservation and sustainable use of biodiversity. As conservation and sustainable use of biodiversity closely relates to the life of the people, the Strategy should be not only implemented by the Nation but also addressed by local governments, private enterprises, NGOs, the people and other entities voluntarily and cooperatively in concert with each other. Each entity is asked to play a role in carrying out the following tasks.

The nation systematically implements measures and policies set forth in the Strategy, promoting collaboration among ministries and agencies. It also provides proper systems and guidelines, enhances economic measures, builds up data base and secures its sharing and provides appropriate information to progressively help regions promote the efforts according to their respective roles. Furthermore the nation encourages each entity to voluntarily engage itself in activities by evaluating and introducing its outstanding efforts in regions.

Local governments are expected to follow the guiding principles set forth in the Strategy to systematically and comprehensively implement the measures conforming to the national policies or their own policies in accordance with natural and social conditions of their regions. In particular it is important to develop plans aimed at formulation of basic strategies on biodiversity in localities and ecological networks to promote the efforts in accordance with the features of their respective regions. To successfully implement the efforts, cooperation and participation in them of a wide range of experts and residents in regions is required. School education offered to children of regions also plays an important role in teaching that life is irreplaceable as well as in putting them through contact with living things there.

Employers of private enterprises or others are asked to secure biodiversity-friendly raw materials, procure, produce and sell biodiversity-friendly products, conserve rich biodiversity in their lands or the sites of their factories or business offices, give consideration to conservation of biodiversity through investing and financing activities and disclose information concerning conservation of biodiversity. The important assignments expected of employers also include contribution as social contribution activities to conservation of biodiversity in forests or Satoyama at home and abroad, support to NGOs engaged in activities aimed at conservation of biodiversity with funds of private enterprises and public-interest corporations and so forth. Moreover they are expected to take an interest in such information on biodiversity as provided by international organizations including the national government, the Conference of the Parties of the Convention on Biological Diversity or others, encourage domestic or overseas enterprises to address conservation and sustainable use of biodiversity using the networks formed through their business activities and promote it in cooperation with such enterprises.

NGOs and citizen's groups are expected to carry out a variety of activities to conserve biodiversity specific to regions, provide programs or formulate systems to invite a wide range of individuals to participate in the efforts. Individuals are also asked to make use of their respective expertise and experiences to support and promote the efforts in cooperation with educational institutions including private enterprises, museums and so forth. They are further expected to give a wide range of people in the region opportunities of participating in work-study programs.

We, citizens, with awareness of close relationship between conservation of biodiversity and our daily lives, have to try to conduct ourselves moderately, contact and appreciate nature and realize rich biodiversity through experiences in a natural environment. We are expected to participate in activities toward conservation of biodiversity or survey activities by civic participation as well as contribute to conservation and sustainable use of biodiversity through our choice and purchase of appropriate products. It is also very important for each of

the people to understand activities toward conservation of biodiversity or for instance, to support such activities through soliciting contributions or making a contribution. Additionally we are expected to assume the roles of local residents or parents to hand natural riches of the region down to the children who will lead the next and organize opportunities for the children to experience in bountiful nature or study nature in schools or during outdoor activities or local community activities. Specifically elderly people are asked to tell children about the manner or style how man used to coexist with nature, convey to them traditional knowledge, culture, play, custom or skills nurtured by biodiversity. Middle-aged and older retired persons are expected to play a major role in conserving biodiversity in the region through returning to the farm after retirement or carrying out activities based on rich experience, knowledge, skills that they have accumulated in societies.

Check and review of the implementation of the Strategy

To ensure steady implementation of measures and policies under the National Strategy, the Inter-Ministerial Committee on the National Biodiversity Strategy of Japan annually checks the implementation of the Strategy to report the result to the Central Environmental Council so that it will be reflected in the report to the Conference of the Parties submitted according to the provisions of the Convention.

In checking the implementation, to most objectively follow up the progress in implementation of measures and policies from the biodiversity aspect, each of the ministries concerned conducts a voluntary check based on the action plan described in Part 2 using indicators which show the progress of measures and policies of that action plan and indicators to be developed in comprehensive assessment of biodiversity. After putting together the check results by the ministries, the Committee solicits the comments on them from a wide range of the public to submit the report to the Central Environmental Council. At that time, the Central Environmental Council checks the implementation of measures and policies of the ministries based on the National Strategy from the biodiversity aspect and expresses its views on the directions of the measures and policies, when necessary.

To flexibly and appropriately respond to the changing situations at home and abroad around biodiversity, the National Strategy shall be reviewed in about 5 years.

Part 1 Strategy toward Conservation and Sustainable Use of Biodiversity

Chapter 1 Importance of Biodiversity and its Rationales

Section 1 Diversity of life on the earth

(Origin of the earth and the birth of life)

The earth was born 4.6 billion years ago. It is thought to be 4 billion years ago that a primitive form of life was produced out of an organism in the primitive sea. It is believed there was no oxygen in the atmosphere of early earth, but with emergence of blue green algae or the like that photosynthesizes, oxygen in the atmosphere began to increase. Out of the oxygen, ozone layer surrounding the earth was formed and it prevented harmful intense ultraviolet rays from the sun so that the atmosphere was composed as it is and climate was kept stable, leading to creation of environment that enabled life to emerge on the land. Then, plants got on shore to create ancient forests, where animals landed, resulting in start of creation of land ecosystems. Thus, innumerable lives and their interconnection formed the atmosphere or soil of the earth; the next generation lives evolved in the environments created by the preceding generation of lives in sequence.

In the meantime, a variety of changes occurred in the environment. Species that could not adapt themselves to the changes were extinguished, while a lot of other species were born to create an estimated 30 million species of lives and their link, the web of life. Biodiversity around us is something irreplaceable, nurtured over time in the long history of the earth.

(Mass extinction and human activities)

The present age, we might say, is “the 6th Age of Mass Extinction”. Since the earliest form of life was born on the earth, the earth is said to have undergone 5 major extinctions, during which a large number of organisms were extinguished. Mass extinction at the present age has a feature that the rate of extinction is so high and the main factor of extinction is human activities. Species Homo sapiens to whom modern humans belong is quite a new species that was born just about 300 thousand years ago in the light of a long history of billion years of life. Humans, just one species of life, are yet possessed of an enormous power that may change the environment.

In the case of the United States, 60 million bison estimated early in the 19th century significantly decreased to just a thousand ones (a 60 thousandth of those in the 19th century) in less than 100 years. Passenger pigeons were estimated at 5 billion early in the 19th century. Due to excessive hunting, they are extinguished early in the 20th century when the last one of them died. While the status in the sea still remains almost unknown unlike that on land, populations of atlantic cods rapidly decreased in number in 1992. The decrease is regarded to be due to human fishing activities. Although human power may be much more enormous than we think it is, humans, without being aware of the fact, have a significant affect on the complex world of living organisms.

And then, humans have developed science and technology to obtain even more enormous power. But nonetheless humans themselves are indeed one of species as a component of biodiversity. Nature’s world or the world of “Biodiversity” is in fact based on a complicated balance among various factors. There are not a few things we don’t understand about. Continued existing rate of biodiversity loss could early or late result in “extinction” of us, human beings. There is nothing sillier than annihilation of mankind as a corollary of deterioration of environment caused by human actions.

(What is biodiversity?)

The Convention on Biological Diversity formulates a definition that considers biodiversity as existence of differences among all living organisms. It provides that biodiversity is found at 3 levels, on ecosystem, among species, within species (on genes).

In respect of biodiversity on ecosystem, it relates to various types nature including Tideland Tokyo Bay, the coral reef of Okinawa Islands, natural and Satoyama (Japanese traditional rural landscapes formed by sustainable use of natural resources) forests, artificial or other forests, Kushiro and Oze wetlands, large and small rivers. Diversity of species refers to the situation where, because our national land extending in north-south direction has complex topography, the Japanese enjoy swolleness with a volume of water due to wet climate together with four definite seasons, and numerous species of animals live with a variety of plants growing. Biodiversity at gene level refers to, for example, difference between the west and east sides of the Central Mountain Area in cycles in which "Genji fireflies "(*Luciola cruciata Motschulsky*) emit light, a variety of decoration patterns on the surfaces of clam-shells and so forth. So, it should be noted that in the natural world, as above described, a variety of differences are found at various levels. And it is of a particular significance that the differences should appear as impartially and comprehensively maintained diversity of organisms that represent the results of inheritance in the long history of evolution.

However it is said that partly because a jargon "biodiversity" is so abstruse, importance of the problem is still not fully understood by people. Thus we can translate "biodiversity" into to two concepts "interconnection" and "character" to enhance their awareness of the problem. "Interconnection" refers to a food chain, an ecological link or the relation between living things or the inheritance of life among generations. It also refers to a large scale link, for instance, that between Japan and the world; among regions; that through hydraulic cycle and so forth. In respect of "character", it should be noted that within the same species, characters vary a little among individuals and that regions have their specific nature respectively that are linked with the indigenous cultures to form the specific climates. "Interconnection" and "character" is the result of accumulation in the long history of evolution. "Biodiversity" that has such aspects supports "life" on the earth and "livelihood" through providing a variety of its benefits.

Section 2 Biodiversity that supports life and livelihood

1 Atmosphere and water produced by living things

Oxygen that we breathe in accounts for 20% of the atmosphere of earth. That is not the case with other planets. The oxygen has been produced from the photosynthetic activity by various plants over several billion years. Plants in forests or other habitats absorb carbon dioxide (CO₂) and release oxygen. Such release allows animals and plants to respire normally. Stabilized temperature brings abundant water, followed by cloud generation and rainfall that gives rise to hydraulic cycle. The good cycle that nurtures a lot of living things supports the environment of the earth. We should become aware that the environment of the planet is based on oxygen produced by plants and that humans themselves could by no means create atmosphere including oxygen.

Fertile soil is produced from decomposition of dead animals and leaves of plants. For circulation of water indispensable to maintenance of life and nutrients such as nitrogen and phosphoric acid indispensable to the sea abounding in living things, groundwater recharge function and supply of nutrients play significant roles. Besides, temperature and humidity are regulated by circulation of atmosphere or transpiration by plants in forests. Thus, environment on which all life including man relies is ensured by a good maintenance of biodiversity based on natural material circulation.

2 Basis for human life

(Food and timber)

Those that are indispensable to our daily life such as rice, vegetables, fish and meat we eat every day are got from paddy fields, forests, sea or other sources through agricultural, forestry, fishing or other activities.

Japan is a narrow country but rich in fertile soil and has abundant supplies of fresh water. So a variety of agricultural products have been produced in the country. These products are grown through linkage with beneficial or harmful insects or other various living things. Beneficial insects such as spiders, living on harmful insects in farmlands, support production of agricultural products. There are a variety of living things in the farmlands including paddy fields. In the fields we produce agricultural products through nurturing animals and plants, making use of the circulation functions that involve them.

Food we gather in the forests is also vital. We used to live making use of benefits from forests such as mushrooms, edible wild plants, nuts and so forth. At present, with changing life styles, they are not so vital for our diet. But it may be said that forests are still also a treasury of foodstuff suitable for Japanese cooking, products of the local climate.

Since the Jomon Era fish and seafood has been very precious foodstuff that the Japanese rely on for their dietary life. Japan, an island country, is blessed with bountiful seas having many converging points of warm and cold currents. In addition to these oceans, seaweed beds in the coastal areas, tidelands, rivers or lakes almost everyday bring us benefits from nature, numerous kinds of fish and seafood such as fish, cuttlefishes, octopi, seaweeds and so forth. We Japanese never miss a day without fish.

In the area from the north-eastern district and Hokkaido of Japan, there are salmon and trout shoaling toward the rivers. In spring, ayu, sweetfish are seen sailing up the streams. Eels and tunas, essential to the Japanese food culture, are not always raised on farms throughout the process from ovum collection to adult fish production, but are often artificially raised using caught glass eels and small-sized tunas. A large portion of them are in fact natural products.

To ensure a stable supply of marine resources, it is essential that diversity of living organisms in the ocean

should be rich and sound. Humans should conserve biodiversity of marine organisms, while striving to implement a sustainable use of marine resources.

Timber has often been used in Japan. Horyuji Temple, the first World Heritage in Japan, and other traditional architectural structures are built of wood. Timber used to be indispensable not only to our residence but to our life, because various tools and utensils including farm equipment are also made of wood. Wood used to be essentials in our country. Thus, in Japan, people have long been taking advantage of the environment bounding in forests to create “Wood Culture” in which timber is incorporated into our life in varied ways according to its kind and type.

Before fossil fuel became widely used, the main energy resources had been fuelwood in our country. But the amount of wood regularly used as fuel for cooking, bath-heating, heating and so forth significantly decreased due to increased use of oil or other fossil fuel and so forth.

Even today large amounts of timber are used to build housings, because it has come to be recognized as an important factor for creation of place of relaxation. It is also seen in a new light as fuel for heating in some areas where stoves for burning solid pellet fuel made from wood chips are getting widely used. And besides, today paper is consumed in large quantity so that volume of wood is used for producing it. For our daily lives, we unavoidably need timber, one of the benefits from the forest that remains a component of biodiversity.

Since we Japanese import 60 % of food and 80 % of timber from overseas, it may be said that we live on the benefits arising from the utilization of biodiversity of the world. However globally, biodiversity loss is increasing as is seen in land degradation due to resource-stripping production activities including excessive cultivation or grazing, deforestation and forest degradation caused by excessive or illegal deforestation and wildfires, and decrease of living marine resources due to excessive fishing. Therefore, most importantly, each of us, Japanese should become aware that our lavish consumption supported by natural resources of foreign countries is in fact based on the benefits from biodiversity in these exporting countries. Now that biodiversity loss concerns us globally, it is necessary for our country, relying upon imports for a greater part of its food and timber demand, to strive to realize a sustainable use of natural environment and resources from the international perspective incorporating the aspect of material balance including nitrogen cycle.

In respect of fisheries products landed in Japan, all of them are not caught in the country’s exclusive economic zone where we have priority use of the resources but some of them are caught in the high seas or in other nations’ exclusive economic zones in accordance with the agreements with the relevant countries.. More than a half of the fishery products consumed in our country are imported from other countries. And seas of the world are linked to one another. So, large numbers of fish freely move around. So we indeed depend upon the global ocean biodiversity.

(Functions and shapes of living things)

• Medicines

Functions and shapes of living things are things specific to individual species. Such features are inherited by the next generations. Genetic information encoded in DNA of individual species has been created in over 4 billion years of history of organic evolution. We humans make use of information regarding functions and shapes of various living things, backed with the long history, in varied ways.

One of the familiar examples of humans’ use of the functions of living things is a medicine. Traditionally a

variety of organisms including plants have been used as medicines. For instance, aspirin was synthesized from ingredients of willow barks which had an analgesic antipyretic effect. Ingredients of Oseltamivir Phosphate (marketed as Tamiflu) used for influenza treatment are extracted from star anise (seeds of *illicium verum*) which is used as foodstuff for Chinese cooking. Without these plants, we should have suffered from such ill. Research and development projects of new medicines synthesized from ingredients of living organisms containing rich genetic information are being implemented quite actively to continue to support our life.

● **Breeding**

The basic foodstuffs for Japanese dietary life are just a few crops such as rice, wheat, buckwheat or the like. As for vascular plants (grass and trees), there are supposedly 7,000 species within our countries. It may be said that progress in agriculture means the history of breeding of most useful organisms for humans selected among numerous wild species. Indeed humans have attained a good life through streamlining of food production by breeding of specific living organisms. But breeding, on the other hand, has sometimes brought about some negative effects of “unification” (species concentration), as opposed to diversification (diversity). To broaden the choice available to breeders, we should secure sound maintenance of closely related wild plants as rich genetic resources. In the future when the crops undergoing unification can not respond to changed environments, they will need additional genetic resources for further improvements. Biodiversity is thus an important factor that serves as a basis for production of effective as well as efficient agricultural products.

● **Application of functions and shapes**

Living things have evolved over an extended period of time, adapted to environments and got so excellent functions as may be far beyond human arts and skills. Silk spun from cocoons of silkworms is excellent in breathability and hygroscopicity, and has a soft touch as well as functions to filter out UV rays. Any other textile synthesized chemically with advanced technology is not comparable to silk. Moreover worn-out silk goods themselves become decomposed to add no burden to ecosystem. And as migratory birds fly long distance using less energy, so can aircrafts not do.

By mimicking shapes or functions available in the world of nature and taking a cue from them, the problems in the human world can sometimes be resolved and some epoch-making technological innovation can often be realized. It is called “Biomimicry”. By the terminology man implies that man studies nature’s best ideas and then imitates the designs and functions to solve human problems. For instance, the shape of a bill of common Indian kingfisher was applied to the designing of the first car of Shinkansen bullet train with a low air resistance; by mimicking of the surface structures of a lotus leaf, stain-resistant paint finish method was successfully developed.

Rich Biodiversity possessed of a lot of hidden functions and performances of living things built up in their history is therefore a treasury of technologies to be potentially developed in the future.

3 Diversity of living things and cultures

(Japanese wisdom and tradition that has not conflicted but been coexisting with nature)

Japan, an island country, is blessed with bountiful seas having many converging points of warm and cold currents. The people enjoy swolleness with large amount of rainfall due to wet climate together with four definite seasons, and numerous species of animals live there with a variety of plants growing. Since the ancient times, Japan has been called “Toyoashihara-mizuho-no-kuni”, a country abundant in golden ears of rice with

green reeds growing on watersides. In such country where all life has been growing richly, we, Japanese, have nurtured a culture in which humans live in accordance with changing seasons, while we have been forced always to live with the fear of natural disasters such as earthquakes, volcanic eruptions, landslides and so forth.

Thus in the face of rich but violent natural environment, we, Japanese, have cultivated our wide range of knowledge, skills, characteristic arts, great sensitivity, and beauty sense that do not conflict with but adapt to nature. After that we have created diverse culture in which our traditional view of nature, that is, coexistence with nature, is thought to have been formed.

In particular, in Japan people have developed dry fields, paddy fields, ponds or others for the production of agricultural products for a long period of time. At that time, they used to build a tutelary shrine dedicated to multitudinous gods which was embosomed in a grove. It reflects a certain fear of nature among them. The view that all resources should not be used up represents Japanese attitude, “Coexistence with Nature”. In utilization of Satochi-Satoyama, local people used to formulate their specific systems or rules so that the areas might not be used up. Even today many of them tend not to pick up all wild vegetables to set aside a portion of them untouched for the next year. Therefore, to build up a society or a life style in coexistence with nature, we have to learn much from such traditional wisdom or such attitude toward nature that has placed a great deal of importance on nature or resources.

(Climate with rich regional characteristics)

There is a word “climate” representing integration of nature and culture in Japan. The characteristic climate in the region relates closely to its specific biodiversity and has nurtured diverse food culture, crafts, performance arts and so forth. For instance, food culture is created by cooking vegetables, fish, mushroom and so forth produced in the region according to the recipe specific for the region. “Zoni”, rice cake boiled with vegetables on a New Year’s Day, is one of Japanese traditional foods. It varies in characteristic features according to its recipe, foodstuff and shape of rice paste. Besides, due to high temperature and a wet climate of Japan, a variety of food products have developed, including pickles, “narezusi” (sushi made of rice and fish fermented with salt in a barrel), “miso” (soybean paste), soy sauce and “sake”(Japanese alcoholic beverage). These kinds of food are produced from complicated combination of microorganisms, climate, water, ingredients and so forth suitable for regional characteristics. Currently there are mass production of food and large-scale distribution of food products going on, leading to loss of traditional knowledge and skills as well as decreased population of endemic organisms that are to be supplied as foodstuff. And what is worse, traditional food cultures well representing regions respectively are consequently thick and fast being lost.

In the meanwhile, in the cities where biodiversity is degraded, more citizens are yet eager to contact and appreciate nature in immediate environments or to participate in the experiential activities in natural districts, while more children do not know how to get along with nature, because they have had no opportunities of regularly contacting it. It is pointed out that growing up without any experience in playing in natural environments and in intimately contacting nature contributes to causing mental instability to more children. Exactly in this period, offering opportunities of contacting rich nature to get something to learn is required for promotion of sound growth of children who will lead the next. Cultural diversity ensured by rich biodiversity is a basis for our good life and itself serves as an indigenous asset to deepen culture in the region.

4 Our life secured by nature

Our life is secured by a sound ecosystem. In particular, appropriate conservation of forests, promotion of

thinning and conversion to broadleaf forests or long rotation forest management facilitates effective maintenance of diverse and sound forests that contribute to creation of rich nature including nurturing of numerous animals and plants. And creation of rivers abounding in living things or conservation of riverside forests contributes to prevention of mountain disasters or soil flowage and securing of safe water to drink. It is also reported that during the big tsunami caused by the South Asia Earthquake and Tsunami, the damage from the tsunami was lessened in the areas where natural coastlines were maintained. Moreover in Japan, rich forests served to control of damages from Typhoons. Such rich biodiversity contributes to decrease of the damage from disasters.

Since improvement of residential environment in line with the natural landscape also contribute to a safe living, the people of the past time when large scale civil engineering works were not available used to utilize lands according to the natural terrain. Making use of such wisdom is so vital to an efficient safety ensuring.

From the standpoint that agriculture is an activity of not only producing food products but creating diverse living things, instead of inappropriate use of pesticides or excessive dependence on chemical fertilizers in farming, proper use of environment-friendly agrichemicals or fertilizers as well as sustainable agriculture managements including organic agriculture is recommended. Such approach will contribute to both conservation of biodiversity and ensuring of safe food products. Thus, conservation of biodiversity containing soil microbes or endemic natural enemy insects in agricultural surroundings will elicit a pest-controlling potential in agro-ecosystem.

Based on the previous description, it can safely be said that thinking highly of biodiversity to consider the safety in our life has the merit of enhanced economic efficiency of investment as well.

Section 3 The rationales of conservation and sustainable use of biodiversity

On the basis of the statement given in section 2 “Biodiversity that supports life and living”, we here employ the following 4 rationales that represent the significance of conservation and sustainable use of biodiversity.

Conservation and sustainable use of biodiversity;

1 “prepares the basis of all life’s existence”

Living organisms on the earth are closely related to each other within a link, ecosystem. They live, linked with each other. Basic requirements for the existence of the entire life at present and in the future are prepared through functioning including oxygen release and CO₂ absorption by plants or forests, climate control or circulation of atmosphere through transpiration, creation of soil by decomposition of dead animals and leaves and others.

2 “has a useful value for humans”

We, human beings, rely on food, timber, medicines or diverse organisms for our daily life. Biodiversity allows for us to apply the functions and morphology of living things to industry’s use and to indirect or potential utilization including breeding of farm products in the future. Such value leads to a good life at present and in the future.

3 “becomes a fountain of rich culture”

Since ancient times, Japanese have had an attitude toward nature that believes all living things are interconnected and mutually supportive. We have thought highly of and co-existed with nature to cultivate enriched sensitivity as well as beauty sense that has led to the creation of diverse culture in Japan. Biodiversity has built up a basis of such spirit. Moreover it provides a fountain for such cultures as should be called indigenous assets such as foods, crafts, festivals and so forth fostered by local natural environment.

4 “insures safety of life for many years to come”

Proper conservation of forests to create diverse and sound forests and abstention from inappropriate conversion of landscape contributes to prevention of sediment discharge and disruption and ensuring of safe water to drink. From a long-term perspective, it leads to efficient ensuring of safety of life over generations.

The Environment of the planet and biodiversity on which it is based is irreplaceable, as they have been developed and created in the long history of life. The life is so diverse, including human beings. Such long-established biodiversity is valuable in itself and is a basis of human life and culture in each region.

Chapter 2 Status and Problems of Biodiversity

Section 1 Structure of biodiversity crisis

The crisis of biodiversity in Japan is classified as follows based on the analysis of its causes and results. Various measures and policies have been taken against these three crises, but the crises are still in progress.

First crisis: Decrease/extinction of species that is directly brought about by human activities or development, or reduction/loss of habitats through destruction, fragmentation, and deterioration of ecosystems

Second crisis: Changes in environmental quality in Satochi-Satoyama areas (rural landscapes formed by sustainable use of natural resources), decrease in species, and habitat status change due to reduced or discontinued human approaches to the nature, with the change in society and economy such as changes in lifestyle and industrial structure and decrease in population

Third crisis: Disturbance of ecosystems caused by artificially-introduced factors including alien species

In recent years, progress of global warming has been seriously affecting the global biodiversity. It is predicted that global warming will cause various problems, including extinction of many species and disruption of fragile ecosystems. Global warming is presumably an inevitable grave problem to biodiversity.

These three crises are still serious because of the following reasons: (1) Many citizens have not become aware of the significance and value of biodiversity, and are reluctant to participate in environmental activities considering global warming as their own problem. (2) The state of biodiversity formed by vast and diverse interconnection and character is not well understood, and fundamental knowledge for assessment and countermeasures based on scientific recognition is lacking. (3) Though biodiversity conservation activities including nature restoration and conservation of Satochi-Satoyama areas are in progress, they are still sporadic. In addition, interdisciplinary approaches as measures against the biodiversity crises are not very progressive.

1 Three crises

(1) First crisis (brought about by human activities and development)

The first crisis is the effects on biodiversity due to negative factors generated by human activities and development. Specifically, the negative factors are direct collections of life such as overexploitation of populations, illegal digging, and excessive collection for ornamental use and commercial use, as well as destruction of habitat and deterioration in habitat environment due to land reclamation/development in coastal areas and changes in land use such as changeover of forests. Vast floodplains and the loss of grasslands and wetlands caused by straightening/immobilization of rivers and development of agricultural lands are also negative factors.

It can be said that these effects are being stabilized because the total area of lands converted from forests/agricultural lands to urban land use and the reclamation area in coastal areas have decreased recently compared to those during the high economic growth period and bubble economy period. However, these effects are still continuing although their level has been blunted.

For these problems, it is necessary to properly avoid or reduce the effects caused by human activities according to the characteristics and importance of the object. It is also important to strengthen the conservation of virgin nature and thoroughly consider whether alteration of nature ecosystems is truly necessary or not. Furthermore,

it is necessary to positively promote the resotation of already lost or deteriorated ecosystems based on the scientific knowledge.

(2) Second crisis (brought about by reduced human activities)

Contrary to the first crisis, the second crisis is the effects caused by reduced or discontinued human approaches to the nature. Secondary forests (fuelwood forests, farm forests, etc.) and secondary grasslands (meadows, etc.) had been maintained as necessities for economic activities. Such human-made areas had grown a variety of living things specific to each environment. With a decrease in areas that have suffered natural disturbances including floodplains, it is considered that such areas are positioned as alternative habitats.

However, in Satochi-Satoyama areas where the forms of agriculture and lifestyles are rapidly changing with a decrease in population and the aging of people, a crisis caused by reduced human activities is continuously expanding. Ecosystems that were intricate like a mosaic pattern with the levels of various disturbances by humans have lost their diversity because they have been free from such disturbances. Thus many animals and plants that have lived in Satochi-Satoyama areas are designated as threatened species.

With respect to artificial forests, deterioration in their functionings including water conservation and prevention of soil spillage and in their quality as a habitat of living things concerns us deeply because of insufficient thinning and care due to decrease in profitability and stagnant forestry production activities.

On the other hand, the number of large and medium mammals (including deer, monkeys, and wild boars) have increasd significantly with their distribution expanding, which is causing serious damage to the agriculture and forestry and is affecting ecosystems.

To address these problems, structuring of a more effective conservation/management system must be promoted according to the natural and social characteristics under the current socioeconomic conditions. Approaches for these problems have already started in many parts of Japan, but they are still sporadic approaches in local areas and have not developed to a nationwide extensive approach.

(3) Third crisis (brought about by artificially-introduced factors)

The third crisis is brought about by factors introduced by humans in the age of modern life. The first factor is disturbance of ecosystems caused by alien species. Beyond the travel capacity of wildlife such as small Indian mongooses, raccoons, and largemouth basses, alien species introduced intentionally or unintentionally by humans from foreign countries or other areas in Japan have become a great threat to regionally-specific biota and ecosystems. Especially in isolated islands where many endemic species are living, such alien species may significantly change the existing biota and ecosystems. With respect to the alien species problem, control of import and feeding based on the Invasive Alien Species Act started already, but it takes a good deal of time and effort to eliminate the alien species that have settled in Japan.

Living things introduced unintentionally into Japan with materials or other animals/plants and those introduced into islands or environmentally important regions from other regions in Japan are also a great threat as it is difficult to control them by the Invasive Alien Species Act. Appropriate measures must be taken in each step of (1) prevention of invasion, (2) detection of invasion and action at an early stage, and (3) control of settled alien species.

There is another threat of impact on ecosystems caused by chemical substances whose effects are not well known. Chemical substances were developed and spread rapidly from the beginning of twentieth century.

Ecosystems are currently exposed to many kinds of chemical substances for a long period. There are some chemical substances whose impacts on ecosystems have been pointed out. There still remain other chemical substances whose impacts on ecosystems have not been clarified, which may have effects on ecosystems while we are not aware of it. For this reason, it is necessary to make positive efforts to catch changes in wildlife and their signs and to promote risk management through proper risk assessments on the impacts of chemical substances on ecosystems.

2 Crisis brought about by global warming

In addition to these three crises, effects of global warming must be considered as a big problem. The Fourth Assessment Report (2007) of the Intergovernmental Panel on Climate Change (IPCC), which makes comprehensive assessments on scientific knowledge and observation of climate change in terms of artificially-generated climate change, its effects, and adaptive/mitigation measures, from the scientific, technical, and socioeconomic perspectives, concluded that global warming has occurred in the climate system, and almost concluded that the increase of greenhouse gas emissions through human activities has caused global warming.

The Report says that the average temperature of the Northern hemisphere in the second half of the twentieth century is probably the highest in the past 1300 years. The global average temperature increased by 0.74°C on a long-term basis in the past 100 years, and the pace of increase in the average temperature in recent 50 years is about twice that of the past 100 years. The increase in the average temperature at the end of this century will be about 1.8°C (1.1 to 2.9°C) in the society where global coexistence of environmental conservation and the development of economy is assumed. However, the increase in the average temperature is estimated to be about 4.0°C (2.4 to 6.4°C) in the society that is expected to attain high economic growth while depending on fossil fuels.

Biodiversity is particularly weak against climate change. The Report predicts that, when the increase in the global average temperature exceeds 1.5 to 2.5°C, 20 to 30% of animals and plants that have been assessed will be at an increased risk of extinction. If the increase exceeds 4.0°C, there will be a grave global extinction of 40% or more of all species.

When living things cannot adapt to environmental changes, they will be extinct unless they can “adapt by progress at the place” or “move to an inhabitable place.” Scientific knowledge on the prediction of effects on the life and ecosystems in Japan in case global warming advances has not been sufficiently accumulated, but it is considered that there will be serious impacts on the biodiversity in Japan, centering around areas that are subject to environmental changes, such as islands, coasts, subalpine zones, and alpine zones.

For this reason, it is necessary to grasp the impacts of global warming on biodiversity, reduce them, and pursue adaptive measures from the perspective of biodiversity.

Section 2 Global warming and biodiversity

1 Impacts of global warming on biodiversity

There is concern that there will be serious effects on biodiversity, including disturbance of ecosystems and extinction of species, with the increase in global warming. A change in temperature will change the blooming time and fruiting time of each plant, as well as the distribution of plants. Since the speed of such changes differs depending on species and taxa, the correlation of living things, such as predation, pollination by insects, and seed dispersion by birds, will more probably get out of order. In Europe, it is reported that the bird breeding period has differed much from the time of generation of insects as food for birds, which has reduced the successful breeding rate of birds and the population of birds in some areas.

With the advance of global warming, it is predicted that many species will be at an increased risk of extinction, and an increase in the sea surface temperature by about 1 to 3°C will cause coral bleaching and extinction in wide areas.

Furthermore, there are new reports of global warming impacts on the inhabitation of individual life. For example, it is an essential condition for polar bears to live that the sea is covered with ice because they catch seals that emerge from the water for breathing on the ice. According to the research on the Hudson Bay in Canada, however, polar bears living there, both male and female, are in a poor state of health (decreased weight per area of body surface) and the number of childbirth is also on the decrease. This is because the time when ice starts melting has gradually become earlier since 1975 and the available period for catching seals has been reduced, which may prevent sufficient accumulation of nutrition in polar bears. In 2006 the International Union for Conservation of Nature and Natural Resources (IUCN) designated polar bears in the Red List as species at an increased risk of extinction.

There is another prediction in Japan on grouses that live in high mountains and are considered as one of the animals most susceptible to global warming, that they may be extinct with the reduction of alpine zones if the annual average temperature increases by 3°C. It is not certain that this prediction is only due to global warming, but various cases that may be related to global warming have been observed. The blooming date of someiyoshino (a kind of cherry tree) that marks the beginning of spring has become earlier by about 4.2 days in the past 50 years since the Japan Meteorological Agency started the phenological observation in 1953.

According to the investigation on the breeding ecology of Chestnut-cheeked Starling in Niigata city, the egg-laying time has become earlier (by 0.73 days per year) since 1978. This may be related to the temperature increase in Niigata city and Naha city, Okinawa-ken located on their travel route. With respect to greater white-fronted geese and bean geese that depend mainly on fresh-water wetlands, their wintering places have greatly move northward since 1990s. Their beviess for overwintering can be seen regularly in Hokkaido, and the distribution is expanding. Furthermore, the distribution of deer is spreading in recent years, which is affecting the natural vegetation. It is considered that snow accumulation relates to the inhabitation of deer, and the possibility that the expansion of the distribution of deer has connection with global warming is also indicated.

2 Effects on human lives through changes in biodiversity due to global warming

It is predicted that global warming will greatly affect human lives and socioeconomy through changes in biodiversity.

Globally, the potential producible amount of food will increase within the range of increase in the regional average temperature of 1 to 3°C, but it will turn to decrease if the temperature exceeds this range. Extreme weather phenomena such as drought and heat wave will increase with the climate change, and the possibility that these phenomena may have significant effects on grains and other foods in the world is indicated.

With the increase in the concentration of carbon dioxide in the air, the amount of carbon dioxide that dissolves in the sea water also increases and the sea water is gradually acidified. This prevents the calcification that forms the skeleton of coral made of calcium carbonate and the shell of plankton. If the acidification of the sea water progresses to a certain level, the probability that some species may not be able to form their own skeleton or shell is pointed out. If these living things that support the marine biodiversity are lost, the marine biodiversity will be greatly affected and this may also have great effects on the amount of fish catches available through fishery.

With respect to effects on the health of humans, it is predicted that the number of mosquitoes that transmit infectious diseases (*Aedes aegypti*, *Anopheles gambiae*, etc.) will increase and their habitats will move northward.

As for Japanese food, effects on rice due to an increase in temperature are indicated. If global warming continues, the yield and quality of rice may decline in areas except Hokkaido, the number of harmful insects (*Chilo suppressalis*, *Nephotettix cincticeps*, etc.) may increase, and their generation areas and period may change, which may affect the growth of rice. With respect to fruits, the situation of lands suitable for growing satuma mandarin may move northward. Thus there is a possibility that most of the current main production areas will not be suitable for the growth of satuma mandarin.

With respect to fishery, it is indicated that fishing grounds and fishing season may change as the habitats of target species go up north. According to the investigation on fish catches of sea urchins in the coastal areas of Hokkaido since 1985, Northern sea urchin that had been caught mostly in Southern Hokkaido is now caught much in Soya District in Northern Hokkaido. In addition, Longheaded eagle rays usually live in coastal areas in the subtropical to tropical zones, but a good deal of longheaded eagle rays live also in the Ariake Sea and Seto Inland Sea, and fishery damage to Japanese littleneck and pen-shells has been reported. Thus it is also pointed out that living things that adversely affect fishery have come to north.

With respect to effects on the health of Japanese people, a large-scale epidemic of infectious disease due to global warming is not predicted, but the risk of infection is considered to increase because of the expansion of distribution of vectors caused by global warming. Furthermore, poisonous redback spiders that are not native insects have been found in areas centering Kansai District, and brown widow spiders have been found in Okinawa Prefecture and other areas. The distribution of these insects may expand with an increase in temperature.

3 Mitigation of global warming and adaptation to its effects

from the perspective of biodiversity

The climate change has already been obvious. Even if greenhouse gas emissions and the amount of greenhouse gas absorption by the nature are in a balanced relation, it is considered that the climate change is caused by already emitted greenhouse gas for a certain period. Since species and ecosystems experienced environmental changes including the climate change, they are considered to have adapted to such changes and

have made further progress. But the currently-occurring rapid climate change due to an artificial increase in greenhouse gas emissions exceeds the speed that the species and ecosystems can catch up with. Therefore, it is predicted that this rapid climate change will have enormous effects on species and ecosystems, including the extinction of many kinds of species.

Mitigation of global warming by reducing greenhouse gas emissions to decrease the impacts and slow down the speed of the climate change is very important for the conservation of biodiversity because this allows species and ecosystems to have time to adapt to the climate change.

It is important, from the perspectives of biodiversity conservation and mitigation of global warming, to prevent the deterioration and decrease of forests that have a lot of carbon in their trees and soil, maintain grasslands and wetlands that store carbon in peat and soil, and perform a farming method, such as agriculture without cultivating fields that reduces greenhouse gas emissions. Plant biomass generated by proper management of ecosystems, including thinning of artificial forests, management of Satochi-Satoyama, mowing in waterside areas, and grass collection in secondary grasslands can be used as the alternative energy of fossil fuel such as pellet stove fuel, bioethanol fuel, and power generation using grass resources. This will reduce greenhouse gas emissions generated by fossil fuels. Furthermore, the use of wood as housing materials will lead to accumulation of carbon in the long run. These measures for both biodiversity conservation and prevention of global warming must be promoted from a comprehensive perspective, while paying attention not to focus on only short-term efficiency.

In addition to measures for reducing global warming, we must consider the action against the effects to be generated by global warming. Specifically, the progress of global warming may seriously affect vulnerable ecosystems in islands, coasts, subalpine and alpine zones. It may also affect agriculture, forestry, and fisheries, as well as the biodiversity in urban areas. There is a limit for a variety of species and ecosystems to adapt to global warming and change their lifestyles and distributions. Therefore, it is important to study measures for conservation of biodiversity, which can mitigate the impacts of global warming as much as possible, as measures to adapt to global warming.

To this end, continued monitoring to grasp impacts of global warming on the biodiversity in Japan and the establishment of a research system are important. To respond to the grasped impacts and estimated impacts, we must promote the conservation and regeneration of good ecosystems that are specific to each region and highly adaptive to environmental changes. Since the weakness to the impacts and adaptability differ depending on species and ecosystems, it is important to make wide-ranging efforts so that a variety of species and ecosystems can adapt to global warming on a long-term basis. To this end, it is necessary to secure the layout and connection of regions full of large-scale biodiversity according to regional characteristics, including floodplains, wetlands, and managed secondary grasslands/forests for species that like bright environment to live. In particular, it is essential to take measures for building an ecological network, etc. considering north-south directions and elevation aspects in the same mountain chain.

Section 3 Background of three crises

1 Drastic development for 50 years after the war

Japan has dramatically changed for 50 years since the end of World War II. The gross domestic product (GDP) was 48 trillion yen in 1955 after the special procurement boom of the Korean War, but it has rapidly increased to 481 trillion yen in 1995, which is more than 10 times of 48 trillion. For example, product shipment in the industrial statistics has expanded to 309 trillion yen (1995) from 15.5 trillion yen (1960), indicating a 20-fold increase for 35 years, and the amount of investments in construction/civil engineering industries shows a 30-fold increase for the same 35 years. According to the trend data of housing land area from the Meiji Period, the annual increasing rate is more than 10 times in 1960s, about 20 times in 1970s compared to the average of 50 years up to 1940, indicating a sharp increase in the housing land area since 1960.

Thanks to the industrialization and the following development at a pace without parallel anywhere in Europe and the United States, the area of tidal flats that were most affected by the formation of coastal industrial regions has decreased by about 40% since 1945 until 1994. The tidal flats in Tokyo Bay were found in almost all areas along Tokyo Bay, but now only small Sanbanse and Banzu tidal flats are left in Chiba Prefecture and others were already reclaimed. It is considered that such development had been made in various ecosystems. More than 60% of wetlands were lost according to the contour maps of Meiji Taisho Period and of 1975 to 1997. In addition, a large area of natural forests and secondary forests decreased during a period from 1955 to 1974, and more than 50% of natural coasts were lost in Japan proper. These facts show a rapid damage and loss of biodiversity.

At present such rapid development is settled. The GDP is on a slight increase and the product shipment and the construction investment are on the decrease since 1995. However, the reclamation area of coastal areas remains at the same level of 800 hectares per year, and the total area of lands converted from forests/agricultural lands to urban land use also remains at the same level of 17 thousand hectares per year. Although the development pace has become slower, but new development still continues. Once biodiversity is lost through the conversion of land use, it cannot be restored easily.

Although the GDP is estimated to increase slightly, if it is possible to make development centering the redevelopment of already developed lands in the face of decreasing population, the total pressure of rapid development will be reduced. However, blue tide is generated continuously in enclosed coastal seas due to oxygen-deficient water mass. It is necessary to improve circumstances while considering the effects on the valuable nature or fragile nature.

2 Decrease in population and change in usage of natural resources

in “Satochi-Satoyama” areas

Many Satochi-Satoyama (rural landscapes formed by sustainable use of natural resources) areas have experienced a big environmental change due to a decrease in population, advance of aging, industrial structure change, and less circulation of natural resources through the use of Satoyama forests and native grasslands (secondary grasslands).

According to percentage distribution of the number of employees by industry, that for the primary industry accounted for 50% or less of the total number for several years after World War II, but it drastically decreased to 6% in 1995 (50 years from the end of the war) and to 5% in 2000. During this period the number of core

persons mainly engaged in farming decreased from 11.75 million (1960) to 2.56 million (1995) and to 2.22 million (2005). The rate of senior citizens was nearly 20% until 1980s, but it greatly increased to 40% (1995) and to 57% (2005). Considering that the agricultural population did not change much during the period from Meiji Restoration until 1960 although the total population increased, the decrease in the agricultural population and advance of aging since 1960 were rapid and great.

Furthermore, during the period from the end of the war to 1980, energy source shifted to fossil fuels including oil, and fuelwood was driven out of use and the production of chemical fertilizers increased rapidly. Thus natural resources such as fuelwood and compost in rural areas have been less used and the connection to Satoyama forests and native grasslands has become less intimate. As a result, Satoyama forests and native grasslands that had been maintained by management such as regenerative branching and intentional burn are left uncontrolled and have rapidly decreased. Thus animals and plants that were found here and there in Satochi-Satoyama areas and grasslands are now threatened with extinction.

It is considered that there have been great impacts on the biodiversity in rural areas due to the use of inappropriate fertilizers and agricultural chemicals and the fragmentation of ecosystems in water areas during infrastructure development.

The Japan's total population peaked in 2005, and then will decrease gradually. It will be less than 100 million and the rate of senior citizens aged 65 and over will account for 40% in 2050. An advent of aging society with decreased population is predicted.

According to the population forecast by sphere, even in regional major metropolitan spheres such as Sapporo and Sendai where a population increase is estimated, the population will peak around 2015 and will then decrease, and it will be less than 90% of the maximum in 2050. In areas other than regional major cities and their surrounding areas, the population will decrease to 70% of the current population by 2050. Thus the depopulation will accelerate and some settlements may face fateful crisis. The conservation of biodiversity in Satochi-Satoyama areas, which has been maintained in relation to human activities over a long period of history, should be considered on the basis of the future of the Satochi-Satoyama areas.

3 Globalization of economy and society

The globalization of the economy and society had also advanced quickly for the postwar 50 years, and is expanding again in recent years with the economic development in China, India, and other Asian countries. Movement of both humans and materials is rapidly increasing due to the globalization of the economy and society. Accordingly, it is considered that living things that may affect biodiversity are increasing both intentionally and unintentionally.

The total value of imports tremendously expanded to 32 trillion yen in 1995, which is 91 times of 348 billion yen in 1950. Then it was stagnant for a few years, but it increased again to 57 trillion yen in 2005. This shows that connections to world countries have increased through the intermediation of materials in recent years. The import volume of goods involved has also increased from 10.5 million tons (1950) to 760 million tons (72 times) in 1995 and to 820 million tons in 2005. The number of people who went abroad also increased from 0.58 million in 1965 to 24 million (41 times) in 2004.

Furthermore, Japan is importing a large amount of pet animals and plants. We should recognize that such import of animals and plants may affect not only the biodiversity in Japan but also the biodiversity in partner countries as wild animals and plants are included. In 2006, among living animals, about 300 thousand

mammals (excluding livestock) including hamsters, about 40 thousand birds (excluding poultry), about 500 thousand reptiles including tortoises/turtles, and about 60 million insects were imported. In addition, over 60 million ornamental fishes were also imported.

It is predicted that, if the rapid economic development further continues in China, India, and other Asian countries, the globalization of the economy and society will progress for the time being. Accordingly, movement of both humans and materials, including import of living things, is considered to increase continuously. Therefore, it is necessary to reduce the effects on biodiversity both in Japan and foreign countries.

Section 4 Status of biodiversity

1 Biodiversity in the world

(Species in the world)

A variety of ecosystems exist on the earth ranging from tropical zones to polar zones, and from coastal/oceanic areas to mountainous areas, on which various living things rely. About 1,750,000 kinds of species are already known - mammals: 6,000, birds: 9,000, insects: 950,000, and vascular plants: 270,000. It is generally understood that the total number of kinds of species on the earth including unknown life is 5,000,000 to 30,000,000.

(Millennium Ecosystem Assessment)

The Millennium Ecosystem Assessment (MA) is a worldwide project that made an assessment on global biodiversity and ecosystems from 2001 to 2005. It was an unprecedented large-scale project with 1,360 participants from 95 countries. This ecosystem assessment project focused its attention on ecosystem services (benefits from ecosystem services such as food, water, and stability of climate) and clarified the relationship between biodiversity and human life. This comprehensive assessment proved that our daily lives are supported by various ecosystem services based on healthy ecosystems and that the freedom of selection and action is affected by changes in ecosystem services such as supply of food and fresh water.

(Status of ecosystem services and changes in biodiversity)

The MA assessed the status and the trend of changes for typical 24 ecosystem services on a global basis. The assessment revealed that only four items (grain, livestock, aquaculture, and climate adjustment) out of 24 ecosystem services have improved, and that 15 items (fish catch, woodfuel, genetic resource, fresh water, disaster control, etc.) have deteriorated or are used in an unsustainable form.

Furthermore, the MA showed that more than two-thirds of area of grasslands in the temperate zone and more than half of area of dry broadleaf forests in the tropical zone and broadleaf forests in the temperate zone had been altered by 1990. The MA showed the quantity of artificially altered ecosystems in the world for each land ecosystem type, indicating that the structure and function of global ecosystems changed in the second half of the twentieth century at an unprecedented rate in the human history. The MA also showed that humans have accelerated the species extinction rate to about 1,000 times in recent hundreds of years, and that humans are fundamentally changing the biodiversity on the earth. Based on the future outlook using data on these ecosystem services and biodiversity as well as the scenario analysis, the MA concluded as follows:

- A big irreversible anthropogenic change in biodiversity occurred in the past 50 years through human activities.
- Alterations of ecosystems have greatly benefited humans, but they also cause deterioration of many ecosystem services, increase of risk of accelerating and irreversible change, and resultant worsen poverty. If we fail to make efforts to solve these problems, our future generations will much less benefit from ecosystem services.
- Deterioration of ecosystem services will further progress in the first half of the 21st century.
- To reduce the deterioration of ecosystems while responding to increasing demands for ecosystem services, drastic review and reform of policies, systems, and practices are a must.

The Millennium Ecosystem Assessment sounds the alarm on the current human activities and social systems through the assessment on ecosystems and biodiversity, and emphasizes the importance of adaptive ecosystem management.

Some species of living things that have diversified in the course of evolution are threatened with extinction by human activities. It is predicted that 10 to 30% of known mammals, birds, and amphibian species are at the risk of extinction.

Living things decrease due to reduction of forests, loss or disturbance of ecosystems by alien species, and excessive use of living resources. The following describes forests and seas that are closely related to these causes.

(Global deforestation)

There are various types of forests on the earth, and they are vital ecosystems for conservation of biodiversity. According to the global forest resource assessment by the Food and Agriculture Organization of the United Nations (FAO), the total area of forests in the world is 3.95 billion hectares in 2005, which is nearly 30% of the world's total land area.

According to the millennium ecosystem assessment, the global wood production increased by 60% in the past 40 years up to 2000, and about 40% of the total forest area was lost in the period of industrialization. According to the said global forest resource assessment of FAO, forests (tropical forest in particular) are continuously decreasing by about 12.90 million hectares per year. The reduction of forest area is most terrible in Africa and South America. When the increased area achieved by planting, restoration of vegetation, and natural recovery of forests is deducted, the decrease of forest area is about 7.30 million hectares per year (about one-fifth of Japan's total land area).

(Marine biodiversity)

Nearly 70% of the earth's surface is covered by oceans. All living things were born in the sea and some of them got ashore over a long period of history. Although much is not known about sea, humans use fishes and seaweed as marine resources thanks to the rich biodiversity.

According to the millennium ecosystem assessment, however, coastal areas with rich biodiversity are suffering decreased underwater forests and coral due to the great effect of human activities. About 20% of coral reefs in the world were lost and another 20% of them deteriorated in the last tens of years of the twentieth century. In countries for which adequate data are available, nearly 35% of mangroves have been lost in recent 20 years. Against the backdrop of these facts, it can be said that that ecosystems in coastal areas are at a crisis of loss.

The fishery yield increased until the second half of 1980s, but remains at the same level after that, although fish catching technology has improved and fishing effort (in terms of number of fishing days, number of fishing boats, etc.) has increased. While world's demand for marine products is on the increase, it is considered that fish species corresponding to one-fourth of marine resources are terribly depleted. In particular, the fishery yield of most consumed fishes (tuna, codfish, etc.) positioned at a high rank of the food chain has decreased, which indicates the degradation of marine biodiversity.

With respect to impacts on the marine biodiversity due to environmental contamination in the sea, there are impacts on marine life caused by heavy metals, harmful chemical substances, and red tide, and cases that marine animals such as sea turtles swallow drifting wastes and wastes ashore (such as plastics) in mistake for food. Thus many cases of damage to marine wildlife have been reported.

2 Biodiversity in Japan

(Features of biodiversity in Japan)

The number of known species of Japanese living things is estimated to be over 90 thousand, and it exceeds 300 thousand when unclassified species are included. Japan with a small land area of about 38 million hectares has rich biotas. Japan also features a high rate of endemic species. Nearly 40% of land mammals and vascular plants, 60% of reptiles, and 80% of amphibian species are endemic species. Japan is rich in natural environment where wild monkeys (only in developed countries) and many other medium and large wild animals such as bears and deer live.

These features of biotas have been formed because diverse habitat environments have been made through the geological history including the Japan's land that is 3,000 km long in the north-south direction, four definite seasons due to monsoon, vertical drop from coasts to mountains, thousands of islands, and connection to and separation from the continent, and various disturbances such as eruption of volcanoes, flooding of precipitous rivers, and typhoon. These disturbances by the nature have been reduced by preventing floods with banks, while partly artificial environments have been made through agriculture and forestry, allowing living things (pasque flower, *shijimiaeoides divinus*, a kind of butterflies etc.) that live in such environments to exist.

In Japan, based on the result of the National Survey on the Natural Environment, the existing one-to-fifty thousand vegetation map that covers entire Japan land is being improved. With respect to the percentage of each vegetation type to the total land area, forests (natural forests, secondary forests close to natural forests, secondary forests, and plantations) account for 67%, which is as high as Northern Europe countries including Sweden (70%) and is overwhelmingly high among developed countries including the United Kingdom (12%) and the United States (33%). Natural forests account for 17.9% and natural vegetation (natural forests plus natural grasslands) accounts for 19.0% of the total forest area that is nearly two-thirds of the total land area of Japan. These natural vegetation areas are distributed mainly in regions that are hardly tampered by humans such as steep mountains, peninsulas, and islands. In flatlands and gently contoured mountains, percentages of secondary vegetation such as secondary forests and secondary grasslands, plantations and cultivated lands are high. Ecosystems at various levels exist in various latitudinal, altitudinal, and aqueous environments, providing very rich diversity of ecosystems. In particular, in order to allow many plants and insects that like bright environment to live in Japan with large amount of precipitation in the midst of nature transitions, it is important that ecosystems such as grasslands including wetlands and secondary grasslands, floodplains, and secondary forests retain bright environment. It can be said that such ecosystems are characteristically resulted from the life in good harmony with the climate, geohistory, and nature, but they are being lost over a wide range.

Diverse environments have been formed also in the sea, coupled with the landform that the Kuroshio Current, the Oyashio Current, and the Tsushima Current extend long north and south along the Japanese archipelago. In coastal areas, we can see diverse ecosystems with long indented coastlines with a length equivalent to three-fourth of the earth's circumference and tidal flats, underwater forests, and coral reefs that

are rich in biotas. Therefore, Japan also features its many sea fish species living in close seas compared to the Mediterranean Sea and the west coast of North America located at the same latitude. The seas close to Japan have rich diversity of species, including 50 species (40: whales/dolphins, 8: seals/sea lions, sea otters, and dugongs) out of 112 worldwide marine mammals, and about 3,700 species (25%) out of about 15,000 worldwide sea fish species.

(Area classification for conservation of biodiversity)

Japanese natural environment is full of variety in various aspects such as geohistory, climate, vegetation, fauna and flora. This makes it difficult to handle the nationwide conversation of biodiversity in Japan with unified standards and methods. For the conservation of biodiversity, the Japan's natural environment should be classified into several units according to differences in meteorological phenomena and land form.

In 2001, Ministry of the Environment provided the area classification for conservation of biodiversity (draft), which classifies the natural environment in the land area of Japan into 10 regions: Eastern Hokkaido, Western Hokkaido, Central-Northern Honshu Pacific side, Central-Northern Honshu Japan Sea side, Hokuriku/San-in, Central Honshu Pacific side, around Seto Inland Sea, Kii Peninsula/Shikoku/Kyushu, Ryukyu Islands, and Ogasawara Islands. Considering this area classification, site setting of Monitoring Site 1000 is made and monitoring of natural environment in the land area has been started.

The draft also formulated notable vegetation that shows characteristics of each region. As a result of the extraction and formulation through questionnaire survey on natural vegetation in the land area to nationwide researchers and local prefectural governments, 396 regions were extracted as regions where important vegetation (yezo spruce and todo fir forests in Eastern Hokkaido, beech forests in Northern Honshu, and *castanopsis cuspidata* forests in Central Honshu Pacific side) is widely distributed.

It is necessary for the conservation of biodiversity in Japan to take appropriate conservation measures such as conservation management policy, protection area setting, and consideration for conservation based on natural environment characteristics of each region.

We should also make efforts for conservation of coastal and oceanic areas according to regional characteristics such as ocean current and climate.

(Status of threatened wildlife)

The Red List issued by the Ministry of the Environment, which formulates species of threatened wildlife classifies more than 30% of reptiles, amphibia, and brackish/freshwater fishes, more than 20% of mammals and vascular plants, and more than 10% of birds living in Japan as threatened species. Many of these species live in island areas of the Nansei Islands and Ogasawara Islands, and efforts are being made for protection and proliferation of some species including Okinawa rail (*Gallirallus okinawae*) and Tsushima leopard cat (*Prionailurus bengalensis euptailurus*). As typified by killifish, many familiar species living in Satochi-Satoyama areas and those living in waterside areas are also designated as threatened species. Like bears in Shimokita Peninsula and the Western Chugoku region, some wildlife species are threatened regionally by fragmentation of habitats. Destruction and fragmentation of habitats, environmental changes due to decreased approach by humans, overexploitation, and alien species are indicated as the causes of the decrease in these wildlife species. On the other hand, there are also species that have become less threatened (primrose, water

fringe, etc.) through efforts for conservation. However, it is necessary to continuously conserve them.

(Review of the Red List)

The Ministry of the Environment started reviewing the Red List in 2002, and published the new Red List for four taxa (birds, reptiles, amphibia, and other invertebrates) out of 10 taxa in total in December 2006, and for six taxa (mammals, brackish/freshwater fishes, insects, shellfishes, plant 1, and plant 2) in August 2007. As a result, the number of threatened species increased to 3,155 from 2,694 (before review).

As for mammals, the number of threatened species excluding marine mammals (except dugongs that depend on neritic areas) decreased to 42 (minus 6). This is because the crisis rank of the 13 species out of 46 bat species (majority of assessed mammals) lowered due to increased data accumulation. Iriomote cats (*Mayailuras iriomotensis*) were ranked higher because they are decreasing. Dugongs depending on neritic areas were newly added to the assessment target species and were designated as threatened species. On the other hand, *Macaca fuscata yakui* [subspecies of Japanese macaque (*Macaca fuscata*); living in Yaku Island], and Shimokita populations of *Macaca fuscata fuscata* [subspecies of Japanese macaque; living in Honshu, Shikoku, and Kyushu (except Yaku Island)] that was listed as regional populations of species were put outside the rank because populations are on the increase.

As for birds, the total number of threatened species increased to 92 (plus 3). In more detail, there are 11 species that ranked lower than before, but 26 species (including 9 species that were newly designated as threatened species) ranked higher than before. Thus many species ranked higher than before. Many of higher ranked species live in grasslands, scrub forests, and island areas, and may be affected by the deterioration of habitat environments in these areas and alien species in island areas. As for birds of prey, for example, Grey-faced buzzard eagles (*Butastur indicus*) living mainly in Satochi-Satoyama areas were designated as threatened species, and accipiter gentilis shifted from threatened species to near threatened species.

As for reptiles, the number of threatened species increased to 31 (plus 13), and 30 species out of them live in Nansei Islands. Thus it can be said that many reptiles in Nansei Islands are at a crisis of extinction. Deterioration of habitat environments and effects of alien species have been indicated for many species, but some species may be affected by capture for pet animals.

As for amphibian species, the total number of threatened species increased to 21 (plus 7). Many of higher ranked species may be affected by small-scale development or alien species, and some of them may be affected by capture for pet animals. In particular, 11 species out of 19 salamander species living in Japan were designated as threatened species. Deterioration of habitat environments is considered to be the cause.

As for brackish/freshwater fishes, the total number of threatened species increased to 144 (plus 68). This is because many species living in Nansei Islands were assessed and Japanese bitterlings (*Pisces, Cyprinidae*) living in countrysides ranked higher than before. In addition, *carassius auratus grandoculis* and *carassius cuvieri* in Lake Biwa were newly designated. These species may be affected by deterioration of their habitat environment and alien species including largemouth bass (*micropterus salmoides*). Furthermore, musashi ninespine sticklebacks (*Pungitius pungitius*) and venus fishes (*aphycypris chinensis*) that live in limited habitats were designated again as threatened species.

As for insects, the total number of threatened species increased to 239 (plus 68). In particular, insects living in island areas of the Ogasawara Islands and Nansei Islands are facing a serious crisis due to effects of alien species, and many diving beetles ranked higher than before. This may be due to deterioration of their

habitat environments and effects of capture.

As for shellfishes, the total number of threatened species increased to 377 (plus 126). This is mainly because many of newly assessed species living in brackish areas such as river mouths were designated as threatened species, and the inhabitation status of terrestrial snails has deteriorated.

As for invertebrates, the total number of threatened species increased to 56 (plus 23). This is mainly because data has been accumulated and also due to deterioration of their habitat environments. For example, fiddler crabs (*uca arcuata*) living in tidal flats ranked higher than before. Horseshoe crabs (*Tachypleus tridentatus*) living in tidal flats in Western Japan were designated again as threatened species.

As for plant 1 (vascular plants), the total number of threatened species increased to 1,690 (plus 25). Specifically, many species ranked higher or lower than before as a result of increase in data accumulation. There are also species that were shifted from threatened species to near threatened species such as primrose (*Primula sieboldii*), water fringe (*Nymphoides peltata*), and white egret flower (*Habenaria radiata*), thanks to the efforts for conservation. In addition, yellow waxbell (*Kirengeshoma palmata*) was newly designated as threatened species due to feeding damage by deer mainly in Western Japan.

As for plant 2 (other than vascular plants), the total number of threatened species increased to 463 (plus 134). This is because some species were added to the assessment target species and many algal species living in lakes and ponds were designated as threatened species. This may be due to the deterioration of habitat environments of these species.

(Changes in distribution of medium and large mammals)

As a result of comparison between the mammal distribution survey in the Sixth National Survey on the Natural Environment conducted in 2000 to 2003 and the nationwide distribution in 1978, the distribution area of all seven assessed species (sika deer (*cervus nippon*), Japanese serow (*Capricornis crispus*), Japanese macaque (*macaca fuscata*), bears, wild boars, foxes, and raccoon dogs) was on the increase. Above all, the nationwide species occupation rate of *cervus nippon* increased to 42% from 24% and that of Japanese serow increased to 29% from 17%. Distribution to regions of more than 10% of the total national land area is expanding. This is because the increase in the cultivation abandoned land area resulting from depopulation and aging of settlements has produced an environment suitable for medium and large mammals, and decrease in snow accumulation in areas of heavy snowfall in Tohoku District, etc. It is predicted that a combination of several social and natural factors results in the expansion and change of distribution areas.

While the distribution is expanding, distribution areas of monkeys living in Northern Ou, Kitakami Plateau, and Mt. Kinka and bears living in Shimokita Peninsula, Western Chugoku region, Eastern Chugoku region, Kii Peninsula, Shikoku Mountains, and Kyushu District are isolated. These species are listed in the Red List as populations of threatened species.

(Changes in breeding distribution of birds)

As a result of comparison between the bird breeding distribution survey in the Sixth National Survey on the Natural Environment conducted in 2002 and the nationwide distribution in 1978, there was no significant change in the breeding distribution of nearly 80% of the surveyed 248 species, but some species expanded or reduced their breeding distributions to a certain level.

In particular, the breeding distribution of great cormorants (*Phalacrocorax carbo*) and gray herons

(*Ardea cinerea*) that eat river fishes expanded greatly. On the other hand, the breeding distribution of Japanese quails (*Coturnix japonica*), brown shrikes (*Lanius cristatus*), and tick-billed shrikes (*Lanius tigrinus*) that live in forest edge areas to grasslands and wetlands reduced greatly. The breeding distribution of some shorebird bred in wetlands, etc. in Japan also reduced. Furthermore, as for alien species, red-billed leiothrixes (*Leiothrix lutea*) and laughing thrushes (*Garrulax canorus*) expanded their breeding distributions, and red avadavats (*Amandava amandava*) reduced their breeding distribution.

Reasons for the significant expansion and reduction in the breeding distribution must be considered for respective species, and cannot be judged only by this survey result. It is considered that expansion or reduction in breeding distribution is greatly affected by the changes in habitat environments.

(Expansion of conflict with birds and animals)

As stated before, the distribution region of monkey, deer, wild boar, and bear species is expanding. It is considered that their distribution regions and populations are generally on the increase because of decreased approaches or actions to the nature due to depopulation and aging mainly in rural areas, increased cultivation abandoned land, neglect of unharvested crops, decreased hunters, and decreased hunting pressure due to aging. This causes great damage to and impacts on the agriculture and fishery industries and natural ecosystems.

Specifically, the amount of damage to farm produce caused by wild birds and animals is 19.6 billion yen in 2006. The capture amount by controlling harmful birds and animals such as deer and wild boars is on the increase, but damage caused by them does not decrease. Furthermore, impacts on natural ecosystems, including damage to rare alpine plants by deer and barking in forests in at least 15 national parks including the South Alps National Park and Nikko National Park, have been indicated. About 140 accidents resulting in injury or death caused by asian black bears (*Selenarctos thibetanus*) occurred in 2006, and about 4,300 asian black bears were captured and killed.

With respect to great cormorants, the population greatly decreased once, but now their distribution and population have rapidly increased due to improved water quality, increased available food resources, and protection of colonies. At the same time, great cormorants are causing fishery damage to sweetfishes, zacco platypus, etc. and are also killing trees with their dung.

To tackle these problems caused by birds and animals that conflict with human life and ecosystems with the recent rapid increase in distribution and population, it is essential to take comprehensive conservation and management measures to avoid the conflict, through population management, habitat environment management, and damage prevention, while responding to the decrease in hunters and developing leaders for regional conservation and management.

(Alien species)

In recent years, nonnative animals and plants have become a problematic entity. They cause impacts directly or indirectly on ecosystems in Japan and damage farm produce and humans. Specifically, small Indian mongooses was introduced into Okinawa main island in 1910 to control lancehead snakes and rats that damaged farm produce and was then introduced into Amami-oshima island around 1979. But they have expanded their habitats and now they are a great threat as a predator of rare wildlife such as Okinawa rail in the Yanbaru region of the Okinawa main island and Amami rabbits in Amami-oshima Island. Damage to poultry farming and farm produce has also been reported. Damage to farm produce and predation of native species

have been reported regarding raccoons (*Procyon*) that were introduced as pets and settled outdoors and have expanded their distribution. Largemouth basses have distributed all over the nation and their impacts on ecosystems and fishery, including predation of native species, are indicated. Large earth bumblebees used for pollination of farm crops may affect ecosystems through competition with native bumblebees over nest sites and inhibition of breeding of wildlife due to a habit of sucking nectar from flowers without contributing to pollination of plants. There is another concern about damage of bite by snapping turtles .

For example, like wild goats in Ogasawara Islands and feral cats in the Yanbaru region of the Okinawa main island, which are not animal/plant species living overseas, impacts may be caused by introducing nonnative life from other locations in Japan. In particular, alpine zones and islands that are important for the conservation of biodiversity may suffer great effects to be caused by introducing nonnative life.

There is another concern about effects caused by living things that are unintentionally introduced adhering to other living things or cargos such as imported grains or marine products. With respect to *Batrachochytrium dendrobatidis* detected in a foreign frog imported in 2006, the impact on amphibia in Japan must be investigated.

(Genetic diversity)

Even if living things belong to the same species, they have diversity at a genetic level. When an aggregation of species is genetically diverse, the survival probability is estimated to be high in case the environment changes. On the other hand, the decrease in the genetic diversity of the aggregation of species due to fragmentation of habitats and decrease in population may lower the capability to adapt to environmental changes in case the probability of genetic disorder by inbreeding is raised or disease of the aggregation goes around due to uniformity of character in the aggregation. Accordingly, genetic diversity is an important issue for the conservation of biodiversity.

Lately, it is pointed out that genetic diversity is deteriorated by human activities in various aspects. Once the genetic diversity of species whose population has significantly decreased is damaged, it is difficult to restore the genetic diversity even if the population is restored. For example, the number of Japanese red-crowned cranes living in Eastern Hokkaido decreased to several tens due to overexploitation and development of wetlands. Currently the number has increased to nearly one thousand thanks to feeding and protection of the habitat environments, but the genetic diversity still remains at a very low level.

In addition, the disturbance of genes due to artificial movement/introduction of species will disturb the genetic structure in the species. The light-emitting cycle of firefly differs between western Japan and eastern Japan. This difference is considered to be due to the difference in genetic characteristics. This is an example for easy understanding of genetic diversity. Many species that have genetic characteristics of central Japan and western Japan are found in the Tokyo district. This may be resulted from artificial introduction of such species. There is also a concern in the plant sector that genetic disturbance may be caused by greening plants (mugwort, *lespedeza bicolor*, etc.) introduced from abroad because of the same names as native species. Many local aggregations of species may facing a crisis at present with genetic diversity remains ungrasped. Therefore, it is necessary to grasp the status of the genetic diversity.

3 Japan's biodiversity connecting to the world

The history of connection to and separation from the continent formed specific biota such as relicts of the

glacial age. Wild animals such as migratory birds, sea turtles, and some marine mammals come to Japan from Asia Pacific Rim countries. In particular, the Japan's biodiversity has wide connections with Asian regions. Many kinds of greater white-fronted geese and whooper swans (typical winter birds that can be seen in Japan) breed in Siberia in summer and pass the cold winter in Japan or other countries. Swallows that come to Japan in summer pass the winter mainly in the Philippines, Indonesia, Malaysia, and southern Vietnam, and therefore Taiwan is an important stopping point for them. Shorebirds use tidal flats in Japan as a stopping point in spring and autumn. Black-faced spoonbills breed on remote islands in the Yellow Sea coastal area and winters in Japan. It is important to consider these connections to conserve biodiversity.

For example, summer birds that come to Japan can no longer live unless both habitats in Japan and wintering places in Asian countries are conserved. Schrenck's little bitterns, small herons, and fairy pittas with beautiful wings are threatened species. Not only changes in habitat environments in Japan but also destruction of wintering environments in Southeast Asia are pointed out as a cause of the threatened survival.

As for living things other than migratory birds, loggerhead turtles hatched in Japan grow much during migration to the coast of North America, and then return to Japan for egg-laying. It has been clarified that eels that are familiar to the Japanese food culture and run against the stream of rivers in Japan are hatched near the Mariana Islands in the North Pacific. Salmon hatched in Japan run in the Bering Sea, and humpback whales that breed in Japan use the coast of North Pacific as feeding ground. Thus, many migratory fishes and marine mammals use vast range of sea beyond borders. To conserve these animals traveling across borders, efforts in cooperation with foreign countries involved as well as domestic efforts are essential.

Section 5 Biodiversity conservation status

1 Overview of legal system for the conservation of biodiversity

The Japanese legal system for the conservation of biodiversity covers a wide range of sectors.

For usage of national land, the National Land Use Planning Act and the National Spatial Planning Act are provided, and the National Land Utilization Plan (nationwide plan) is established based on the National Land Use Planning Act.

From the perspectives of conservation and use of natural environment/landscape, the Natural Parks Law, Nature Conservation Law, the Law for the Promotion of Nature Restoration, the Landscape Act, and other laws are provided. The Law for the Promotion of Nature Restoration was enacted in 2002 as a legal framework to aim for the conservation, restoration, creation, and maintenance management of damaged natural environments. The Landscape Act was enacted in 2004 as a legal framework to promote the formation of good landscapes. The Natural Parks Law was revised in 2002, in which “Conservation of Biodiversity” is added to the responsibilities of the nation, and the scenic site protection agreement system and the use adjustment area system are introduced.

There are many laws that are related to the conservation and use of ecosystems. As for the forest ecosystem, the Basic Law for Forest and the Forestry and the Forest Law are provided. As for the agricultural land ecosystem, the Basic Law on Food, Agriculture and Rural Areas, Agricultural Land Act, the Law Concerning the Improvement of the Agricultural Promotion Area, and the Organic Agriculture Promotion Act are provided. As for the river/lake ecosystem, the River Law, the Water Pollution Control Law, the Law Concerning Special Measures for Conservation of Lake Water Quality, and the Erosion Control Act are provided. As for the coastal/marine ecosystem, Basic Act on Ocean Policy, the Fisheries Basic Act, the Fisheries Law, the Fisheries Resource Protection Law, the Seacoast Law, and the Port and Harbor Law are provided. And as for the urban ecosystem, the City Park Law and Act for Urban Green Space are provided.

As for the protection and management of wildlife, the Wildlife Protection and Appropriate Hunting Law, Law for the Conservation of Endangered Species of Wild Fauna and Flora, and the Invasive Alien Species Act are provided. The Wildlife Protection and Appropriate Hunting Law was revised in 2002 to add marine mammals including seals to the target of the law, and was then revised again in 2006 to establish the hunter approval system and conservation projects. The Invasive Alien Species Act was enacted in 2004 to control the import and feeding of specified alien species that damage ecosystems, etc, as well as to promote the protection of such alien species.

Based on the Cartagena Protocol on Biosafety to the Convention on Biological Diversity that decided the control for transboundary movement of living modified organisms, the Act on the Conservation and Sustainable Use of Biological Diversity through Regulations on the Use of Living Modified Organisms was enacted in 2003 to protect the impacts of living modified organisms on biodiversity. Measures for the use of living modified organisms and others are stipulated in the Act.

Furthermore, Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture, etc to protect impacts of chemical substances on ecosystems, the Environmental Impact Assessment Law, the Law for Enhancing Motivation on Environmental Conservation and Promoting of Environmental Education, the Ecotourism Promotion Law, and the Tourism-aspired Nation Promotion Basic Law are closely related to the conservation of biodiversity. Thus the legal system for the conservation of biodiversity covers a wide range of sectors. It is important to effectively use these laws in mutual cooperation. This national strategy assumes a role

to provide the basic policy.

2 Overview of area designation system for the conservation of Biodiversity

The conservation of biodiversity should be conducted centering the conservation within respective wildlife habitats. Since various protected areas have been specified in Japan based on the laws and regulations for conservation of the nature, Japan is making efforts to properly manage these protected areas considering the conservation of biodiversity and continuously secure habitats for wildlife while taking the linkage between protected areas into consideration so that biodiversity can be conserved. This protected area system covers nature conservation areas based on the Nature Conservation Law, nature parks based on the Natural Parks Law, natural habitat conservation areas based on Law for the Conservation of Endangered Species of Wild Fauna and Flora, and wildlife protection areas based on the Wildlife Protection and Appropriate Hunting Law and so forth. With respect to forests in particular, the protected area system covers protection forests based on the Forest Law, and protected forests based on the Management Rule of National Forest Land. For urban regions, the protected area system includes green conservation areas based on Act for Urban Green Space and so forth.

In addition, international protected areas include Ramsar sites based on the Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar Convention) and world natural heritage areas based on the Convention Concerning the Protection of the World Cultural and Natural Heritage. Conservation of important natural environments is also conducted on a global basis.

These protected area systems include those directly aiming at nature conservation and those that contribute to the nature conservation through action and control. Nature conservation areas, nature parks, natural habitat conservation areas, wildlife protection areas, and protected forests of national forests apply to the former. As for nature parks in particular, the total area of national parks, quasi-national parks, and prefectural nature parks is 5.4 million ha, which is nearly 14.3% of the Japan's total land area. Among nature parks, the area of special areas that require permission for the development is 1.5 million hectares (national parks), 1.27 million hectares (quasi-national parks), and 0.71 million hectares (prefectural nature parks). The total area accounts for about 8% of the Japan's total land area. These facts indicate that national parks and other nature parks play a considerable role for the conservation of biodiversity. On the other hand, wildlife protection areas consist of national wildlife protection areas and prefectural wildlife protection areas. The total area is 3.68 million ha, which accounts for about 9.6% of the Japan's total land area. The total area of special protected areas that require permission for the capture of wildlife and the development is 270 thousand ha, which accounts for about 0.7% of the Japan's total land area. With respect to nature conservation areas, the total area of wilderness conservation areas, nature conservation areas, and prefectural nature conservation areas is 100 thousand ha, which is about 0.3% of the Japan's total land area. The total area of the nine natural habitat conservation areas is 885 ha. With respect to national forests distributed around the mountains backbone, various types of forests in Japan are classified by area, and protected forests such as forest ecosystem protection areas to be conserved comprehensively are being specified. The area of the protected forests is 780 thousand ha, which accounts for nearly 10% of the area of national forests.

In relation to these areas, the conservation status of various ecosystems in the protected areas among them(including national parks, quasi-national parks, wilderness conservation areas, nature conservation areas, natural habitat conservation areas, and national wildlife protection areas) specified by the government directly for nature conservation is as follows: Nearly 25% of areas with very high degree of human disturbance of

vegetation out of natural forests and natural grasslands (degree of human disturbance of vegetation: 9 or 10) are designated as protected area, many of which are national parks. Nearly 35% of the important 500 wetlands selected from the perspective of biodiversity conservation are designated as protected area. They are mainly designated as national parks and quasi-national parks, and 7% of them as national wildlife protection area.

With respect to coastal/oceanic areas, 40% to 50% of underwater forests and coral reefs are designated as protected area (mainly national parks and quasi-national parks), most of which are loosely controlled normal areas of national/quasi-national parks. Only about 10% of tidal flats are designated as protected area. Since neritic areas such as tidal flats, underwater forests, and coral reefs are important for the conservation of biodiversity, further promotion of the conservation of these areas is a challenge.

As regards the relationship between rare species and conservation by means of protected area, the data on designation of protected areas where more than 10 threatened wildlife species (former Red List species) show that only 7% of plant distribution area and 8% of animal distribution area are designated as protected area. This raises an issue in the use of protected areas for habitats of rare wildlife.

The protected area conservation status in the Kyushu-Okinawa District is as follows: Nearly 39% of secondary laurel forests with a degree of human disturbance of vegetation of 8 (examination conducted by the Ministry of the Environment) and nearly 40% of natural vegetation with a degree of human disturbance of vegetation of 9 or 10 (except laurel forests) is designated as protected area. On the other hand, only 13% of natural laurel forests with a degree of human disturbance of vegetation of 9 are designated as protected area. Thus there is a difference in the conservation level of protected areas. In particular, most natural laurel forests that have large area in the Yanbaru region in the northern Okinawa main island and Amami-oshima island are not designated as protected area.

Under these circumstances, the government is making efforts in promoting and improving various area designation systems based on the rationales of the biodiversity convention, and also for national forests with an active leadership. Specifically, the government is making efforts for the conservation of biodiversity through proper control with actions such as promoting designation of protected areas such as national parks in areas where the nature should be conserved and controlling release of alien species by revising the Natural Parks Law. The government is also working on forming protected forests that conserve variable forest ecosystems as a core of the biodiversity in national forests and a network by setting up a green corridor, as well as promoting forestation according to regional characteristics. It is very important for the government to proactively tackle the conservation of biodiversity while maintaining the linkage with various entities.

3 Efforts by local governments

Protected areas designated by prefectural governments include prefectural nature parks, prefectural nature conservation areas, prefectural wildlife protection areas, and other protected areas uniquely designated by prefectural governments. A quasi-national park is designated by the Minister of the Environment after receiving an offer from a prefectural government, but after that they are managed and maintained by the prefectural government concerned.

Total 309 prefectural nature parks have been designated, and their total area is about 1.96 million hectares which is 5.2% of the Japan's total land area. Furthermore, 3,831 wildlife protection areas have been designated by prefectural governments, and their total area is about 3.1 million hectares which is 8.3% of the Japan's total land area.

As for the efforts for protecting rare wildlife at each prefectural government, creation of red list and red databook for species to be conserved regionally and conservation of rare wildlife according to the unique protection ordinance are included. Red list and red databook were created by 2005 by every prefectural government. In addition, unique protection ordinances for rare wildlife were established by 24 prefectural governments (as of March 2006). These efforts show that wildlife conservation systems are in progress in accordance with the situation in each region.

With respect to the wildlife protection management, 90 specified wildlife conservation and management plans have been created at 46 prefectural governments by November 2007 since it was established in 1999, which shows a steady progress in the scientific organized management of wildlife protection.

In respect of alien species, alien species lists were created at nine prefectural governments (as of September 2006), and ordinances that contain descriptions on alien species, including those that are contained in the nature conservation ordinance, the rare wildlife protection ordinance, and other applicable ordinances, have been enacted at 14 prefectural governments. Furthermore as for checking the control based on the Invasive Alien Species Act, checking of the control of the designated 11 alien species has been conducted by the government in 10 prefectures. Thus measures for controlling alien species are expanding.

Movements for the conservation of Satochi-Satoyama areas are also expanding through establishment of Satochi-Satoyama area conservation ordinances and forming a framework such as agreements to conserve Satoyama with the people's cooperation.

Systems for the conservation of forests and water sources, such as forest environment tax, have been introduced in about half of total prefectures. Measures for the conservation of forests and water sources are promoted by using the financial resources including forest environment tax. Conservation of rich biodiversity in the upstream area is promoted by many people living in the river-basin area.

Currently, Chiba prefecture started efforts for establishing the Chiba biodiversity strategy through town meetings, etc. In 2006, 20 town meetings were held throughout the prefecture, and in 2007 prefectural citizen's meetings were held with spontaneous themes. Chiba prefecture is expected to establish a community-based strategy with the participation of many people of Chiba. There have not been many movements in local governments for establishing community-based strategies, but they are implementing various ordinances related to nature conservation and laws related to agricultural lands, forests, and other ecosystems, as well as projects. These activities will play an important role in promoting regional efforts to conserve biodiversity in the future.

4 Efforts by private enterprises

As an example of efforts by economic organizations focused on the conservation of the nature and biodiversity, Nippon Keidanren (Japan Economic Federation) established the Nature Conservation Fund Steering Committee in 1992 (changed to "Nippon Keidanren Committee on Nature Conservation" in 2000), through which Nippon Keidanren has supported nature conservation projects mainly for the Asia-Pacific region. In 2002 they announced a declaration on nature conservation. Toward the realization of an economic society in harmony with the nature, they declare their mission and advocated the significance of nature conservation efforts, stating that the business world must work on nature conservation with confidence that a great contribution to the nature conservation can be made through proactive activities at each enterprise and cooperative efforts by the business world.

As examples of efforts at private enterprises, descriptions on efforts to conserve the nature and biodiversity appear in the environmental reports of 365 companies (nearly 80%) out of the 2005 environmental reports of 481 companies. Among the efforts, cleaning and beautification activities are prominent, but there are many other activities for greening, creation/conservation of biotopes, maintenance/conservation/restoration of Satoyama and national forests, awakening of environmental awareness, contribution to/support for other entities, etc. The 2007 Environmental Report Guidelines revised in June 2007 added “status of conservation of biodiversity and sustainable use of biological resources” as information to be described in the environmental report. Major impacts on ecosystems and wildlife in the raw material procurement process and assessment of the impacts are described in the guidelines as an example of appropriate information. The document also points out that the major causes of the impacts on biodiversity (such as use of raw materials manufactured by the method that affects biodiversity) must be removed while widely considering the supply chain ranging from the procurement of raw materials and manufacturing to distribution and sales. The document is required to include other various information and indexes. It is expected that nature conservation activities will further expand each time environmental report is made.

There are many private enterprises that have their own vast forest and/or urban land. Lands that have not been used directly for corporate activities and are well maintained for the conservation of biodiversity can be used for wildlife conservation and nature education activities. Urban lands that are not used at all or are not used frequently can be used as habitats of familiar living things in the urban area by promoting greening using native plants. These efforts are expected as part of corporate philanthropy programs.

Corporate efforts for the conservation of biodiversity are also expected in the biodiversity convention. The 8th meeting of Conference of the Parties of the Convention on Biological Diversity (COP8) held at Curitiba, Brazil in March 2006 adopted the decision to encourage private sector’s participation in the convention, extensively showing the importance of corporate roles in the conservation of biodiversity. The decision encourages the following roles required for private enterprises: (1) Adapt the corporate management policy and activities to the three objectives of the convention: the conservation of biodiversity, the sustainable use of its components, and the fair and equitable sharing of benefits arising out of the utilization of genetic resources); (2) report independent efforts that will contribute to attaining the 2010 objectives to the conference of parties (COP); and (3) participate in the conference of parties (COP), the Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA), and the experts’ meeting.

5 Efforts by nongovernmental organizations (NGO) and other bodies

NGOs and other citizens’ groups also perform a wide range of activities for biodiversity conservation. An NGO is developing biodiversity conservation activities in important areas concerning biodiversity, an NGO is performing citizen participation monitoring, and another NGO is providing children with nature education. They are also engaged in efforts to import/sell farm products that are produced with a foreign sustainable method, operate systems to authenticate sustainable forest management and forestry products, promote organic agriculture that does not use chemical fertilizers and agricultural chemicals in principle, and conduct eco-tours with a guide to feel rich biodiversity. Many of these are community-based activities that reflect citizens’ needs, which cannot be done fully by the government. Such community-based activities are important in promoting the conservation of biodiversity in accordance with regional characteristics. The conservation of biodiversity can be developed to extensive activities by promoting these activities and exchanging information with close

linkage.

Furthermore, community-based activities are also going on. An NGO working for communities is making efforts for forestation and conservation of fields in valley sides in collaboration with companies, and an international NGO is developing a project to conserve foreign forests and neritic areas jointly with local NGOs with the cooperation of overseas companies. Although biodiversity conservation activities, including philanthropy, are drawing increasing attention from companies, there are few experts in companies. Therefore, some companies are in good partnership with NGOs for better activities. This is also beneficial for NGOs because they can develop their activities with financial aid from companies. It is essential for both NGOs and companies to feel benefit for continuous activities. Expansion of biodiversity conservation activities is expected by having more opportunities for information exchange between companies interested in biodiversity conservation and NGOs working at home and overseas.

Chapter 3 Targets of the Conservation and Sustainable Use of Biodiversity

This chapter describes targets to be achieved against the backdrop of Chapter 1 “Importance of Biodiversity and its Rationales” and in response to Chapter 2 “Status and Problems of Biodiversity.” First of all, three targets to build a “Society in harmony with nature” in Japan are set up. Then, in relation therewith, the global Convention on Biological Diversity 2010 targets and the execution of the comprehensive assessment that shows the biodiversity status in Japan are described. In that context, what the future country, regions, and the societies should be as the image of targets to be achieved on a very long-term basis (100-year level) is shown as the grand design of the country from the biodiversity perspective, together with concrete images.

Section 1 Targets and Assessment

1 Three targets

The following three targets are set up to build a “Society in harmony with nature” where we inherit rich biodiversity for the years to come so that we can continuously enjoy the benefit arising from the rich biodiversity.

- (1) Conserve region-specific animals/plants and ecosystems in accordance with regional characteristics, and maintain and restore the country-level biodiversity by building an ecological network.
In particular, maintain and restore the populations and habitat environments of species currently threatened with extinction, as well as take proper measures to prevent threatened species living in Japan from increasing.
- (2) Sustainably use the national land and natural resources beyond generations by a method that does not reduce biodiversity.
- (3) Incorporate the conservation and sustainable use of biodiversity into social economic activities on a global to civic life basis.

These three targets are related mutually. (1) show the general target of biodiversity conservation, especially focusing on the conservation of species, (2) show the target for using the components of biodiversity, and (3) show the target of Japan’s future economic society to be aimed at to surely achieve targets (1) and (2).

To achieve target (1), it is important to strengthen the conservation of the remaining nature and restore the already damaged nature. To achieve target (2), it is important to maintain the sustainable use of the components of biodiversity while conserving biodiversity in connection with human life and production activities, as well as to protect specific rare species and wild nature. To achieve target (3), it is important to design the Japan’s socioeconomic structure also based on international perspective and considering changes in nation’s lifestyle.

Although these targets are set up on a long-tem basis, steady developments are required toward the achievement of these targets over five years, the planned period of the national strategy, by implementing priority policies described in Chapter 4, Section 2 “Basic Strategy” and Part 2 “Action Plan.” according thereto.

2 2010 Biodiversity target and comprehensive assessment on biodiversity in Japan

Globally, the 2010 biodiversity target “to achieve by 2010 a significant reduction of the current rate of biodiversity loss” was adopted at the COP6 Conference of Parties in April 2002 immediately after the new national biodiversity strategy was established. Japan is also expected to contribute to achieving the global 2010

biodiversity target through steady developments toward the achievement of the three targets.

To this end, the biodiversity status in Japan should be comprehensively assessed first in terms of people's awareness of biodiversity and their participation in biodiversity conservation activities, including the socioeconomic aspect. The Potsdam Initiative presented in the G8 Environment Ministers' Meeting held in Germany in March 2007 states that the economic importance of the global loss of biodiversity will be assessed under the leadership of Germany. Japan will conduct the comprehensive biodiversity assessment employing the approaches in accordance with the natural conditions and socioeconomic situation while learning the globally conducted Millennium Ecosystem Assessment (MA: 2005) and the Global Biodiversity Outlook 2 (GBO2: 2006) and in coordination with the global analysis made by the Potsdam Initiative. Nine indicators (including trial indicators) such as "degree of human disturbance of vegetation in the nature conservation basic survey" are presented as indicators for the promotion of efforts in the biodiversity conservation field in the Third Basic Environment Plan established in 2006. While referring to the indicators exemplified in the decision made at the Conference of Parties, we will develop more understandable indicators before starting the assessment to grasp how the biodiversity in Japan has changed and how various measures are effective. While conducting the comprehensive assessment, we will specifically map the biodiversity crisis status for use as a diagnostic record to indicate the prescription for the crisis, and select hot spots (important areas for the conservation of biodiversity) to preferentially promote efforts in such areas. Thus we will strive to significantly decrease the rate of biodiversity loss.

Considering the connection of biodiversity between Japan and the world, Japan is responsible for positive contribution to the conservation/restoration of healthy global ecosystems and for the consideration to prevent the global biodiversity from deteriorating, through efforts for achieving the 2010 biodiversity target and the subsequent three targets. We will encourage the G8 participant nations to conduct an assessment equivalent to the Japan's comprehensive biodiversity assessment and technically assist Asian regions with the assessment method. When we conduct the comprehensive assessment, we will also study the future global target after 2010 and lead international discussions toward the setup of the global target with a view to the holding of the COP10 Conference of Parties in Japan in 2010.

To continue the comprehensive assessment, scientific data on biodiversity must be improved and maintained. A certain volume of data has been accumulated in Japan through the nature conservation basic survey and other surveys for many years. However, it is necessary to strengthen the collaboration with other organizations, such as sharing of data with ministries involved and museums of natural history, make quicker reports, grasp the population and population density of medium to large mammals, and collect the data on Satochi-Satoyama, coastal, and oceanic areas in accordance with the Third Science and Technology Basic Plan (March 2006) whose policy target is sustainable conservation and use of ecosystems.

Section 2 Grand Design of the National Land from the Perspective of Biodiversity

1 National land from the perspective of biodiversity

The biodiversity in Japan has been formed by the platform of the nature (landform, geological features, climate, etc.) and years of human life accumulated on the platform. The Japan's national land is broadly classified into land area and sea area. However, it can be classified into the following seven areas from the perspective of biodiversity, or from the relationship between biota and human activities.

- (1) Natural mountain area.....Area with relatively high naturalness
- (2) Satochi-Satoyama area/countryside
.....Area positioned between (1) and (3) with medium nature quality and interference by humans (including area where artificial forests take precedence)
- (3) Urban area.....Area where human activities take precedence
- (4) River/wetland area.....Water system as the core of the ecological network connecting areas
- (5) Coastal area.....Land area and sea area on either side of the coastline
- (6) Oceanic area.....Vast sea area surrounding the coastal area
- (7) Island area.....Islands located in the coastal area and oceanic area

2 Basic stance

The Meiji Shrine forest where a rich forest ecosystem can be seen has developed to the current rich forest for nearly 100 years since it was newly created by humans with a 100-year vision. For the realization of a “Society in harmony with nature” where biodiversity conservation and sustainable use of the components of biodiversity are consistent, we should consider the realization of the “Society in harmony with nature” on a 100-year basis taking the period required for the restoration of natural ecosystems into account. To this end, it is important to present the grand design of the national land from the perspective of biodiversity as a forward-looking (100-year level) common vision so that various entities engaged in the biodiversity conservation and sustainable use can make efforts from a long-term perspective.

First of all, the basic stance when considering the grand design of the national land from the perspective of biodiversity with a 100-year vision is shown below as the “Centennial Plan.”

- (1) Restore ecosystems on the national land, which have been damaged or destroyed over the past population increased 100 years, for the next population decreasing 100 years by greatly changing the human involvement in the nature, that is, from unilateral exploitation of natural resources and destruction of the nature to active contribution to the nature from the human side.
- (2) Make the most of regional resources in the age when the national land can be used more easily due to a decrease in the total population for the purpose of developing a unique and attractive region based on region-specific nature and culture.
- (3) Perform ecological land management focused on the harmony with the nature, as well as prioritize and streamline the investment necessary for the national land management, while national land use reorganization is underway in the face of the occurrence of an area unable to maintain the current national land management level due to a decrease and aging of primary sector workers, conversion to an intensive urban structure, and increased investment in the maintenance/update of the social capital.
- (4) Aim to steadily improve the quality of the nature throughout the country. Since it takes long period until

various efforts become effective, improve the quality of the nature in an adaptive manner. To address problems of damage to agriculture and forestry caused by wildlife, it is essential to restore better balance of humans and the nature step by step while obtaining social agreement.

- (5) The adaptive attitude in flexibly reviewing the content and method of efforts in response to changes in the nature and socioeconomic status for 100 years requires to be backed by accumulation of scientific data. Changes in people's awareness and action pattern also become an important factor. In 100 years, the forest environment tax that is being promoted in local areas may be popular throughout Japan and biodiversity may be incorporated in the socioeconomic structure. In this context, consider the possible realization of the action pattern and system framework for the conservation of biodiversity which are not prevailing at present.

The following estimate is assumed when considering a society 100 years ahead. According to the medium variant (reference data provided by the National Institute of Population and Social Security Research), the future population is assumed to be less than 50 million (less than 40% of the current population) and the rate of people aged 65 and over is 40% of the total population (nearly twice of the current rate). Temperature is assumed to have increased by 1.8°C, the best predicted value, expecting that measures against the global warming are advanced in the society where environmental conservation and economic development are consistent globally as shown in the IPCC Fourth Assessment Report.

As the first step of the Centennial Plan toward the realization of this grand design, the main direction of the national policies to be carried out for the coming five years or so is described in Chapter 4, Section 2 "Basic Strategy" and the specific policies in line with the basic strategy are shown in Part 2 "Action Plan."

In principle, the grand design will not be revised significantly for 100 years, but the relation with the direction of efforts stated in the basic strategy will be reviewed according to the situation at that time when the national strategy is reviewed in about five years. Furthermore, at the time of review after 10 years or so, the necessity of review in accordance with changes in the nature and the socioeconomic status will also be considered.

3 Grand design in accordance with national land characteristics

The following is a detailed description of the whole image of the grand design of the national land from the perspective of biodiversity.

- (1) An ecological network that interconnects and properly lays out habitats around large protected areas according to the ecological characteristics of each life is firmly formed throughout the country. The river/wetland area that connects natural mountain area, Satochi-Satoyama area/countryside, urban area, and coastal area as a continuous space, the coastal area and roadside green space in the urban area are positioned as the vertical axis and horizontal axis of the ecological network in the country.
- (2) Some species living in islands and alpine zones that are vulnerable ecosystems under the effect of global warming will be at higher risk of extinction. However, the number of species whose rank in the red list lowers will be larger than the number of species whose rank in the red list goes up through effective protection of life while monitoring systems are established throughout the country. The extinction risk of species of total country will lower. No new risk due to alien species will increase because the dependence on overseas natural resources will decrease and the check system at the border for unintended introduction of alien species will be improved, as well as various efforts to control alien species will be

advanced in each region, backed by population decrease and effective use of domestic resources.

- (3) Procurement of law materials and other activities will be performed by private enterprises and people engaged in agriculture and fishery with sustainable methods in consideration for impacts on biodiversity. Thus domestic natural resources will be used effectively in a manner consistent with efforts for the conservation of biodiversity such as protection of region-specific rare species.
- (4) Formation of a transborder ecological network will be developed centering the Asia-Pacific region, such as conservation/restoration of wetlands as habitats of migratory birds and networking in protected areas for coral reefs. A decrease in the dependence on overseas natural resources including import of pet animals and spread of sustainable use of marine resources thanks to international cooperation will reduce the Japanese impact on global biodiversity.
- (5) The conservation of biodiversity and sustainable use of the components of biodiversity will be incorporated in various social mechanism, and international cooperation for supporting resource producing countries, economic measures such as aid by fund, and corporate philanthropy will be well established. Education on life and nature will be well developed. People will enjoy the richness of biodiversity while voluntarily participating in biodiversity conservation/restoration activities, making a contribution to the support for activities, and selectively purchasing biodiversity-friendly agricultural and marine products. Thus people will establish a new lifestyle through such actions in a society that is consistent with the nature.

In addition to the whole image, 100-year-looking target images of the grand design in each of the seven areas in accordance with national land characteristics are shown below.

(1) Natural mountain area

[Current status]

Natural mountain area is an area with relatively high naturalness, which contains mountains backbone and receives little impact from humans. This area functions as the backbone of biodiversity in the country, containing wild nature, core habitats of large mammals (bears, serows, etc.) and birds of prey with large home range (golden eagles, spizaetus nipalensis etc.), and river sources. Natural vegetation consisting of natural forests and natural grasslands, which accounts for nearly 20% of the Japan's total land area is distributed in the natural mountain area. This area is distributed widely in ridges in the central Honshu and Hokkaido. In areas where natural vegetation is remaining only in limited areas such as high mountain areas like Chugoku District, areas with relatively high naturalness such as secondary forests left to natural transitions are contained in the natural mountain area.

This area where representative and typical natural vegetation that exists according to climate conditions is remaining is vital as a core area for representative animals and plants of each area to survive in future years. Once vegetation is lost due to a terrain change in a steep area, it can hardly be restored. In particular, since the ecosystem in high-mountain or particular rocky soil area is put in a severe environment, it is susceptible even to small-scale human activities.

[Direction to be pursued]

- Conserve natural mountain areas that are large enough in each region.

- Minimize the impact on ecosystems caused by human activities (mountain climbing, etc.) with the nature-oriented management.

[Image of desirable area]

The natural mountain area is an area basically under the nature-oriented management as the core area of the country ecological network and also as an area allowing representative animals and plants to survive in their respective areas.

Organized natural mountain areas are secured through efforts to improve the quality of the nature by converting a secondary forest adjacent to a natural forest to a natural forest while leaving it to natural transitions to a certain extent. In Western Japan, large secondary forests that are left to natural transitions to a certain extent extend, allowing bears whose habitat was isolated to eat nuts in a remote forest. Thus natural mountain areas that are little affected by humans and are also used as a main habitat of large mammals are conserved collectively in each region.

In high-mountain areas that are isolated due to surrounding lowland, endemic species and relicts are changing their structure and distribution range under the influence of global warming, but natural mountain areas are continuously conserved and monitored so that they will not suffer anthropogenic effects other than global warming by excluding alien species or by other measures.

When mountain climbers who enjoy mountain areas enter a vulnerable or overused area, they receive an approval for the entry and enjoy mountain climbing by the rules, while considering so as not to give impact on the nature of the mountain area.

The vegetation in mountain areas damaged by treading due to overuse is restored with the cooperation of volunteers. In areas where natural regeneration of forests is difficult due to lush bamboo grass or artificially converted areas, rich forests can be seen through efforts to restore the nature with auxiliary care by humans.

(2) Satochi-Satoyama area/countryside

[Current status]

Satochi-Satoyama area/countryside is an area positioned between natural mountain area and urban area with medium nature quality and interference by humans. The Satochi-Satoyama area/countryside is a vast area that contains areas where artificial forests take precedence and countryside with paddy fields, as well as rural areas. The total area of the Satochi-Satoyama area/countryside accounts for about 80% of the total national land.

A Satochi-Satoyama area is an area where specific nature has been formed through various human approaches over a long period of history. It is a concept of region, which contains secondary forests surrounding communities, artificial forests, agricultural lands, reservoirs, and grasslands. At present, only secondary forests as the core of Satochi-Satoyama area accounts for about 20% of the total national land, and about 40% when surrounding agricultural lands, etc. are included. It is predicted that human approaches to this area will decrease as a whole with a decrease in population and aging in the future.

A natural environment that contains secondary forests, paddy fields, channels, reservoirs is a good habitat of various living things including threatened species, and is becoming more valuable as a place for city residents in suburban areas to appreciate the nature. At the same time, the Satochi-Satoyama area is also a place for living and production activities for humans. Thus the Satochi-Satoyama area has a lot of characters, such as

intricate values and rights.

While adapting to traditional management methods unique to each region, including water management method for paddy cultivation and secondary forest/grassland management method, diverse biota and rich culture based on the biota have been formed in this area. Along with natural mountain areas, Satochi-Satoyama areas and countryside have played an important role that supports the diverse biota in Japan.

With the modernization of lifestyle and agriculture from 1955 or so, many secondary forests have been left unused or uncontrolled, and secondary grasslands have significantly decreased. Furthermore, cultivation abandoned lands have increased from 1975 or so. With these changes, the habitat distribution and the number of habitats of medium to large mammals including deer, wild boar, and monkey are on the increase, and damage to human life environment, agriculture, and forestry is also on the increase. The quality of habitat environment for region-specific various living things such as grey-faced buzzard-eagles, killifishes, luehdorfias, and dogtooth violets is deteriorating. According to the research by the Ministry of the Environment, more than half of habitats of threatened species are distributed in Satochi-Satoyama areas.

[Direction to be pursued]

- Realize better harmony between humans and the nature focused on biodiversity through the activation of sustainable agriculture and forestry.
- Promote compartmentalization between humans and wildlife by maintaining buffer zones, etc.
- Positively use natural resources in the area effectively through eco-tours, biomass, etc.
- In addition to the activation of rural areas, promote the creation of a system to be supported by the whole community including city residents.

[Image of desirable area]

In areas filled with agricultural land, many people are engaged in agriculture with a production method focused on the conservation of biodiversity while utilizing the cycling function of the nature, and accordingly various forms of life are living vividly in paddy fields and other agricultural lands. When the agricultural production base is maintained, reservoirs and ridges between paddy fields are managed so that rich biodiversity is retained and the ecological connection between paddy field and river is secured. Thus animals and plants that have been maintained with the operation of agriculture are living here and there. Children collect insects and flowers, and students of a local school examine living things together with farmers making full use of the healthy ecosystem in the agricultural land. Rich connection between people is nurtured in the area. A part of cultivation abandoned agricultural land becomes a wetland or biotope, and environment conservation agriculture (including organic agriculture) that nurtures diverse life is disseminated. Such cultivation abandoned agricultural is maintained as agricultural land with the activation of domestic agriculture. In advanced areas in Japan that have positively made efforts for biodiversity conservation, the people's living area is full of various forms of life, where oriental storks and Japanese crested ibises peck food and fly elegantly in the sky.

In secondary forests, while the range that is managed according to previous usage style is limited, the area targeted for positive control becomes an adventure land for children through management as a bright accessible forest where native species such as Japanese emperors and beetles can be seen here and there. Thus such controlled secondary forest creates scenery full of variety including spring budding and beautiful autumn

leaves. Greatly extended bamboo grove is restored partly to a natural forest or secondary forest, and people dig bamboo shoots in controlled bamboo groves. Wood produced from controlled Satoyama is used in respective areas as biomass resources such as bolts and pellets that produce shiitake mushrooms and other mountain blessings.

In artificial forests, the problem of delayed thinning has been solved and the biodiversity conservation function is enhanced by converting to broadleaf forests and extending the thinning period according to locational characteristics. Thus, artificial forests are managed to meet regional needs. Even waste wood and thinned wood produced in mature artificial forests are effectively used in surrounding areas.

Various types of ecosystems are restored through diverse use of land and resources in Satochi-Satoyama areas where secondary forests, artificial forests, and agricultural land are well combined. Secondary grasslands once broadly distributed are continuously managed throughout the country for supplying the grass resources for biomass energy source or for other purposes, where a lot of wild herbs bloom and butterflies fly about. Thus increased rare animal and plant species can be seen here and there. Furthermore, scenery is beautifully maintained and the number of city residents who have been attracted and moved to the Satochi-Satoyama areas, as well as the number of foreign sightseers, is on the increase. Vigorous community construction is realized thanks to spreading and penetration of eco-tourism. Since the value of Satochi-Satoyama areas is recognized to the public through these efforts, Satochi-Satoyama areas are managed and maintained partly by public or private funds and volunteers. Furthermore, traditional knowledge and technologies making use of biodiversity cultivated in respective areas are inherited by children and specific climate linked with regional culture is valued in the symbiosis with rich biodiversity through the use of natural resources.

In addition to the improvement in habitat environment through active diverse forestation such as conversion to broad-leaf forests and others, installation of visible buffer zones, removal of left farm produce and tree fruit that will be food for wildlife in winter, preventive measures taken by the whole area to keep the wildlife away, and regulation of population by appropriate hunting successfully prevent medium to large mammals including bear, deer, wild boar, and monkey from appearing frequently in areas adjacent to agricultural land or village.

(3) Urban area

[Current status]

Urban area is an area where human activities take precedence, which has quite small natural space for various forms of life to live due to high-density land use and concentrated high environmental impact. The distribution range of many familiar living things such as skylarks and fireflies has receded to the suburban area with the expansion of urban area. As a result, only limited living things can be seen in urban areas, including those that live in isolation in remaining green spaces scattered in slope forests, shrine/temple forests, and premises forests and a part of life (including crows and grey starlings) that can adapt themselves to artificial environment. There are not many kinds of fish in moats, rivers, and channels that are historical elements of urban environment, pet red-eared sliders are released, and a lot of nonnative afforestation plant species are used, which may cause alien species to spread. The need to desire contact with the immediate nature is rapidly increasing around residential areas. On the other hand, the number of children who do not know how to contact the nature and the number of adults who do not know how to tell it to their children are increasing against a backdrop of small green space and scarce biodiversity in the living area.

[Direction to be pursued]

- Promote development of urban areas full of water and green in the rich nature.
- Secure contact with the nature in the common livelihood of people.
- Settle sustainable consumption from a global perspective.

[Image of desirable area]

Developed public transportation is moving along lining thick trees in compact urban areas with small population and high-energy efficiency and long-life buildings. Giant trees rise even in central areas and waterfront areas through large-scale development of green space like the Meiji Shrine forest using unused or little-used land, and birds of prey fly slowly on giant trees. Small spaces that allow urban residents and children to touch living things are created here and there using springs. These trees lining a street and green space contribute to global warming measures, alleviation of heat-island phenomenon, and creation of good landscape in urban areas.

Restoration of biodiversity is intended by conserving, restoring, and creating forests and waterside areas in urban areas centering green space in hilly areas and areas along a cliff, rivers, spring areas, and coasts, securing wind paths and healthy water cycling, and by networking healthy ecosystems. Suburban areas that have room for land usage have restored rich ecosystems through the restoration of forests, wetlands, etc. The biodiversity status is monitored mainly by citizens.

Green space with forests has expanded with rich variation of landform, such as biotopes at schools, kindergartens, and nursery schools where many forms of life live. Infants grow up while playing and venturing on the soil even in an urban area. The community network including children is strengthened by positive cooperation of residents in managing forests and green space.

Conservation activities are carried out actively in small paddy fields in the valley of suburban area, where people are actively engaged in agriculture in jointly managed agricultural land and children shout for joy in catching fishes and playing with water.

With respect to food and wood to be consumed by urban residents, more people select those produced in consideration of biodiversity conservation and sustainable use or those produced nearby. Such products are naturally provided with added value and are extensively introduced at a festival held at a large park to connect urban consumers with farm producers. Cities with rich green and water are vibrant as they become the base of sightseeing with the excellent landscape.

(4) River/wetland area

[Current status]

Water is vital to a large number of lives on the earth. Rivers and other water systems including lakes, wetlands, and springs are the vital platform of biodiversity. Water system becomes a vital axis of the ecological network of the national land when it interconnects forests, agricultural land, cities, coastal areas, etc. Earth and sand and nutrients generated in the river-basin area, as well as contaminated substances generated through the use of land, are carried down the stream through the interconnection, and at the same time salmon and eels shoal up the stream through the interconnection from the sea.

Water systems are vital as a habitat of aquatic life (fishes, etc.), water birds, and many other forms of life.

In particular, wetland has rich biodiversity, but it is also a susceptible ecosystem that is easily affected by humans.

Wetlands and forests in riverside floodplains have been developed and used as agricultural land or building land for a long time. With a decrease in flow rate due to repair of rivers, a change or fragmentation of water cycling route, reduced supply of sand gravel, diminished disturbance, and water contamination, river ecosystems have been greatly affected. About one-thirds of waterweed species growing in Japan are designated as threatened species, and many threatened species live in the waterside environment. On the other hand, the run of sweetfishes has been restored with the improvement in river environment such as water quality.

[Direction to be pursued]

- Conserve and restore habitats of various forms of life by conserving/restoring diverse river areas, maintaining sufficient water volume, restoring river variability, and by connecting upstream/downstream to river-basin areas.
- Establish river-basin, domestic, and international networks of life.
- Improve water quality so that people can contact varieties of aquatic life, as well as secure the healthy water cycle including groundwater and spring.
- Restore Japanese unique rivers where rich ecosystems and the regional history, culture, and life are in good harmony.

[Image of desirable area]

With the promoted conservation of natural river banks and wetlands and riverside groves as surrounding floodplain and the efforts to restore the nature, a river is formed in the river area through disturbance due to floods, leading to the creation of diverse river area. Diverse river ecosystem exists in that place with riverside willow grove and specific plants such as *Aster kantoensis* growing in the river channel. Rapids and abyss are formed in the stream and river beds suitable for living things to find food and breed are also formed. Thus rivers are a good habitat of aquatic life and fishes. Various technologies to conserve the variability of rivers are used.

In stagnations and surrounding wetlands in the river area, floating-leaved plants such as *Nuphar japaicum* and submerged plants such as *Potamogeton crispus* and *Potamogeton oxyphyllus* grow thickly. Such areas provide crucians and Japanese eight-barbel loaches with a place to live and lay eggs. Living things can move between river, surrounding wetlands, and agricultural land. Many forms of life (catfishes, golden crucian carps, etc.) that used to be common can be seen moving between river and paddy field. Furthermore, the continuity within the range from upstream of the river to the river mouth and coastal area has been improved, and sufficient water volume and good water quality are maintained thanks to the healthy water cycling in the river-basin area. Thus rich water area ecosystems are conserved, restoring the run of sweetfishes and gobies.

Thanks to the improvement in river water quality due to reduced contamination impacts in the river-basin area, pure water is flowing from the headwater point through to the river mouth. Migratory birds come from the Asia-Pacific region to lakes and wetlands with improved water quality, paddy fields filled with water even in winter, and tidal flats in the river mouth. Thus the network of stopovers for migratory birds is secured at home and abroad.

With the percolation of rainwater into the soil in urban areas and the improvement in water environment in

agricultural land, previously-familiar channels and springs are restored and healthy water cycle is secured with people's life. Beautiful watersides and the rich nature in the area create a scene of very Japanese river in harmony with the history, culture, and people's life. Native fishes that have grown with the healthy water cycle are used as regional daily food. Well-suntanned children are playing with shout in clean rivers in summer.

(5) Coastal area

[Current status]

With its rich biodiversity, coastal area that contains complicated varied coast and front neritic sea area including tidal flats, underwater forests, and coral reefs is closely related to people's life through the use for industries and recreation. Above all things, the area closely related to the life of people who have lived using blessings of the sea since early times is called "SATO-UMI" areas. It can be said historically that our life and culture have been developed, while greatly depending on coastal areas. On the other hand, neritic sea areas are greatly affected by land impacts from river-basin areas and inflow of nutritive substances and fresh water, playing an important role to allow the earth and sand carrying function of the river to form a sandy beach.

Tidal flats, underwater forests, and coral reefs are distributed in a coastal area where land area and sea area are in contact and interact with each other. Coastal areas have various important functions as a birth/growth place of diverse life, a place to produce abundant marine resources, a place to improve water quality, and a place to contact the nature. Animals and plants specific to landforms such as sandy beach, cliff, and tidal flat can be seen on the beach. Furthermore, the natural environment of beachside vegetation zone and beach is the important axis of the country ecological network. On the other hand, since population and a lot of industries have been concentrated in coastal areas, they have been greatly affected so far by land reclamation, water contamination, and fragmentation/decrease of connection to rivers. Thus, the reduced area of tidal flats, environmental deterioration, and the conversion of coastal lines have isolated humans from the sea. Horseshoe crabs (*Tachypleus tridentatus*) and fiddler crabs (*Uca arcuata*) living in tidal flats are designated as threatened species, which may be due to deterioration of their habitat environment. Furthermore, deteriorated coast environment has reduced the production amount of coast fishery and is affecting the inhabitation of diverse benthic life. In addition, there are impacts due to changes in ecosystems such as barren grounds (significant deterioration of underwater forests with thick large seaweed) and coral bleaching, as well as by drifting wastes and wastes ashore.

[Direction to be pursued]

- Restore the connection between people and sea and rich biota that are inherent in coastal area where land area is in contact with sea area.
- Restore coasts that allow people to approach and enjoy through the conservation and restoration of natural coasts and neritic sea areas.
- Activate sustainable fishery in coastal areas through efforts for upstream forestation, water quality improvement, etc.

[Image of desirable area]

In coastal areas, important tidal flats, underwater forests, and coral reefs that are left as habitats for life are suffering great effects of increased sea water temperature and increased sea level due to global warming.

Coastal ecosystems of tidal flats, underwater forests, and coral reefs are richly secured while being subject to natural disturbance such as typhoon through restoration efforts backed by scientific knowledge, which are performed based on data accumulation, conservation efforts for healthy ecosystems, and an analysis of environmental conditions including depth of water, tidal stream, and bottom sediments. Furthermore, in tidal flats throughout the country, various kinds of crab (Japanese littlenecks, fiddler crabs, etc.) and various marine life live, shorebird peck food, and many people enjoy digging clams. In enclosed coastal seas such as inner bay, problems of deteriorated coast environment, including accumulated sludge and generation of oxygen-deficient water masses, have been improved, and rich fishing grounds are conserved by forests maintained properly with the cooperation of fishermen and other people involved. Coastal areas that grow rich species continuously supply a lot of various seafoods and maintain healthy ecosystems. Seals can be seen swimming in the northern sea and dugongs in the southern sea. Furthermore, the inhabitation of horseshoe crabs is ensured in Western Japan by securing the continuity of an ecosystem starting from a sandy beach through tidal flat and underwater forest to the bottom of the sea.

Although coasts are affected by the increased sea level due to global warming, natural coasts are conserved and sandy beaches are maintained with the supply of earth and sand from the river to which the continuity is secured from the mountain. Sea turtles come ashore, little terns breed, and coast plants grow well on such sandy beaches. With the cooperation of Asian and other foreign countries, people are enjoying sea bathing at a clean coast free of litter and wastes.

(6) Oceanic area

[Current status]

The oceanic area extending offshore to the broad ocean is also a backbone structure that supports the biodiversity of Japan. The oceanic area is about 12 times larger than the Japan's total land area, and has exclusive economic zones. While there are various ecosystems to the abyssal sea, scientific data on biota, etc. is not sufficient although data on target marine species are organized by using the previous data.

The area of the oceanic area accounts for about 70% of the earth's surface. The oceanic area is huge stock for water cycling, and is closely related to the formation of global climate with its enormous heat energy. The oceanic area also functions as a huge sink of carbon dioxide through carbon cycling, taking charge of stabilizing the air. Japan is an island nation surrounded by the sea, and therefore the terrestrial climate, the distribution of land animals and plants, and ecosystems are greatly affected by the sea.

The seas near Japan enrich the marine biodiversity of Japan because of their varied oceanic structures represented by the cold water mass (the Oyashio current from the north) and the warm water mass (the Kuroshio current from the south) that are carried together with remote life, the Japan Sea that was isolated in the history, and the Japan trench that is 10,000 meters deep. On the other hand, wastes from countries in the world, harmful chemical substances, and oil spilled out of ships and boats are affecting the marine ecosystems in the oceanic area.

[Direction to be pursued]

- Promote the conservation of long-traveling animals while watching the trend of international coordination.
- Organize the general marine data including marine resources, and then promote sustainable fishery on the basis of the resource management based on ecosystems.

- Strengthen efforts to remove and prevent marine contamination with the international collaboration.

[Image of desirable area]

Habitat environments are improved for marine mammals, sea birds, sea turtles, and fishes that travel long distance in their life histories through conservation activities conducted in cooperation with Pacific nations and other countries involved. Thanks to the advanced technique to avoid bycatch, these living things can be seen in many places and regional revitalization is promoted while maintaining the coexistence of fishery and eco-tours such as whale watching. In the oceanic area where these forms of life live comfortably, in the light of the trend of international coordination, the standing crop of marine resources, etc. is grasped in a scientific and objective manner, and sustainable fishery in conformity with rules (for fish catches, etc.) is actively conducted together with the efforts for the conservation of biodiversity.

Efforts are going on with international cooperation to remove and prevent marine contamination due to drifting wastes, wastes ashore, harmful chemical substances, and spillage of oil, which affect marine ecosystems.

(7) Island area

[Current status]

In addition to the four main islands - Hokkaido, Honshu, Shikoku, and Kyushu, Japan has over 3,000 large and small islands. Among them, there are some islands, including Ogasawara Islands and Nansei Islands, which have distinctive biota over a long period of history isolated by the sea. A unique ecosystem is formed with a fine balance in a small area of these islands. Therefore, it can be said that island area is a vulnerable area that is easily affected by destruction of habitats and invasion of invasive alien species. Since there are a lot of region-specific species with a limited distribution range in island areas and they are vulnerable to anthropogenic effects, many of the species living in island areas are designated as threatened species.

[Direction to be pursued]

- Promote the conservation of distinctive ecosystems and proper biota through the protection and breeding of rare species and the exclusion of alien species.
- Promote the creation of fulfilled communities making the most of their originality.

[Image of desirable area]

Specific animal/plant species live stably in island areas, including tsushima leopard cats in Tsushima Island, Iriomote cats in Iriomote Island, amami rabbits in Amamiyohima Island, Okinawa rail in Okinawa, and *melastoma tetramerum* in Ogasawara Islands. Their distinctive ecosystems and proper biota are thoroughly examined and are well recognized as irreplaceable properties of the region, and some of which as world's properties. Furthermore, invasion of alien species from outside the island is checked at the border, and groups of tourists participate in the nighttime examination of specific species. Eco-tours are conducted actively while taking every care of the environment and utilizing characteristic nature and culture. Thus the creation of fulfilled communities that connect the unique nature and the culture of islands is in progress.

The habitats and egg-laying/breeding places for sea turtles, sea birds including albatross and common murre, and marine mammals including seals are conserved without excessive interference by humans as vital

areas for the conservation of biodiversity.

Chapter 4 Basic Policies for Conservation of Biodiversity and Its Sustainable Use

This chapter will present the basic policies for the measures we should take to realize the 3 targets and the grand design looking 100 years ahead, which we set forth in Chapter 3 on the basis of the “Status and Problems of Biodiversity” in Japan discussed in Chapter 2. To begin with, the basic perspectives we should maintain in implementing the measures will be explained. Then, with these perspectives in mind, the broad directions toward fulfilling the measures on which we should focus in the five years ahead will be presented as the basic strategies for achieving our goals.

Section 1 Basic Perspectives

In implementing the measures intended for the purpose of conservation and sustainable use of biodiversity, the following five basic perspectives should be maintained as the crucial and common bases for those measures: 1. scientific recognition and preventive/adaptive attitude; 2. community-oriented attitude and wide-area view; 3. coordination and collaboration; 4. use of socioeconomic systems; and 5. integrated and long-term viewpoint.

1 Scientific recognition and preventive/adaptive attitude

The conservation and sustainable use of biodiversity should be pursued on the basis of scientific data while using as important suggestions the wisdom of coexisting with nature accumulated in the local community. By doing so, many people in the community will better understand the importance of such efforts and the effect they actually produce. For example, it is necessary to make much of data and samples that were obtained as a result of long-term monitoring of the natural environment in the community, and the activities aiming for conservation and restoration and sustainable use of biodiversity should be promoted by utilizing such data and samples. Understanding and recognizing the status quo of the biodiversity in the community properly on the basis of science-based data constitutes the starting point and basis for the policy-making and the activities to be implemented.

Human beings are also one of the living species on the Earth and a component of the ecosystem. However, what differentiates us most from the other living organisms is that we have gained possession of technologies that can exert extremely great impact on the natural environment. In order to use this power for the purpose of realizing the harmonious coexistence between human beings and nature instead of using it indiscriminately, it is necessary to place great importance on the viewpoints below besides following the concept of the Ecosystem Approach agreed in the Meeting of the Conference of the Parties of the Convention on Biological Diversity:

1. Human beings should recognize that they can never grasp everything about the living organisms on the Earth and their ecosystems. We should always be modest enough to act cautiously. On top of that, we should not defer implementing biodiversity conservation measures for the reason of incompleteness of scientific evidences, but we should assume a preventive attitude of always striving to enrich scientific findings so that we can take measures in a timely manner.
2. As a principle of biodiversity conservation, we should recognize that the ecosystem of which human beings are a component has a complicated structure which is changing ceaselessly, and that the management

and use of the natural resources it provides should be implemented in an adaptive manner within the extent that the structure and function of the ecosystem can be well maintained. For that purpose, it is important to monitor the changes in the ecosystem accurately, and to review the method of managing and using it as required.

3. It is necessary that all the people concerned have in common a wide range of science-based information on nature and society, and that the policies for the management and use of the natural resources should be determined as a choice of the society.

2 Community-oriented attitude and wide-area view

Conservation of biodiversity cannot be achieved only by developing and implementing the National Strategies, but should be supported by the community activities aiming to preserve its natural environment. To that end, a community-oriented perspective is important. Appropriate, long-standing activities in the community will lead to construction of a community rich in biodiversity, and, through their process, strengthen the relationship among the residents ranging from children to the elderly. As a result, the beautiful biodiversity-based landscape unique to the community and the rich culture developed in such environment will be handed down from generation to generation, thus fostering the feeling of pride in and attachment to the community among the residents, arousing the interest of the people outside it, and vitalizing it economically as well as socially.

In developing various measures to conserve biodiversity, it is also essential to adopt the views of the people actually engaged in the work of conservation. The biodiversity conservation activities differ from community to community, having characteristics unique to each one. The people involved in the activities form the heart of the conservation project, and they have accumulated wisdom of properly managing the natural resources from a wealth of experiences they acquired in their own community. While it is important to cultivate community staff inheriting such local wisdom and encourage community-driven activities, there also needs to be a wide-area perspective of constructing a network of humans and information among many communities engaged in the conservation activities in order to further invigorate and expand such activities.

Biodiversity is not a matter of one community. For example, the biodiversity of entire reaches of a river from the upper to the lower reaches and that of even the sea are closely linked with one another through the flow of water, earth and sand, and nutrition salt. Therefore, as we can see in such cases as the forestation in the upper reaches of the river intended for preserving the fisheries of the sea into which the river flows, and the wide-area coordinated efforts of preserving common cormorants, which migrate over a wide area, it will be possible to promote the biodiversity conservation activities in such a manner that an activity in one community has beneficial ripple effects on the other communities.

Moreover, the socioeconomic activities and biodiversity of Japan are closely connected with those of the world, especially the Asian region. For this reason, by taking the advantage of our experiences of preserving the nature on a community basis and what we have done to foster biodiversity in our daily lives, it is possible for us to actively contribute to the international activities of conserving biodiversity particularly in the Asia-Pacific region. Considering that Japan heavily depends on the living resources of other countries for supplies of lumbars, and agricultural and aquatic products, it is important to recognize the global linkage of biodiversity and advance the conservation activities both at home and abroad from a wide-area perspective. We should collaborate with the countries producing such natural resources in

realizing the sustainable use of them by providing the knowhow of preventing illegal logging of the forests, for example, while making further efforts domestically to utilize the local resources as efficiently as possible.

3 Coordination and collaboration

Since the First National Biodiversity Strategy of Japan was developed, the ministries and agencies concerned have worked in close cooperation with one another to advance their efforts in a comprehensive manner. In such fields as nature restoration undertakings, maintenance and conservation of forests, conservation and use of Satochi-Satoyama areas (rural landscapes formed by sustainable use of natural resources), preservation and management of coastal and oceanic areas, education and learning on environment, ecotourism and other activities to contact with nature, appropriate conservation of genetic resources, and enrichment of data on natural environment, however, we need to further enhance coordination and collaboration among the ministries concerned by taking effective steps such as launching a model undertaking and establishing a liaison meeting among authorities concerned according to the concept of each measure being implemented.

In advancing the measures based on the National Strategies, it is also crucial to establish a system that promotes closer coordination among a wide range of entities including the government, local public bodies, private enterprises and organizations, experts, and community residents. In order to enhance conservation and sustainable use of biodiversity on a community basis, it is particularly important for the local public bodies and the community residents, who are to be involved in such activities as a daily routine, to take the initiative to plan and implement them in a manner that best suits the characteristics of the community. Recently, there are increasing numbers of cases where private enterprises and organizations cooperate with each other to carry out the activities, and such collaborated work should be further enhanced. In addition, the activities should be advanced on the basis of scientific findings and information, and in view of promoting the sharing of such findings and information among all those concerned, participation of experts, involvement of coordinators to link communications between the experts and ordinary residents, and timely disclosure of information are especially important. In this way, ensuring coordination and collaboration among all those concerned is a highly necessary perspective for implementing measures of biodiversity conservation and its sustainable use.

4 Use of socioeconomic systems

In order to promote the biodiversity conservation and its sustainable use as long-standing efforts instead of temporary ones, it is important that the people engaged in such activities should be benefited from them, and that they should not be burdened heavily at least economically. One of the measures to realize this is to adopt the systems that were used in the days when the natural resources used for fuels and fertilizers were recycled within the community. Of course, it is impossible to incorporate them into the present framework just as they were because they were used for long inevitably out of socioeconomic necessities in those days. However, what is important is to learn from the recycling system of old days and to devise a new one that can be applied to the present-day circumstance. Among the examples of such activities already underway are the commercial success of “Kounotori-no-sato Rice” (rice produced at the home of white storks), which is produced in Toyooka City in Hyogo Prefecture, using a biodiversity-friendly technique, and other rice brands named after the living organisms typical of the place of origin; and the certification systems

sponsored by the private sector with a view to promoting fishery and forest management and product distribution that give due consideration to the conservation and sustainable use of biodiversity, namely, MSC (for fishery management and distribution of aquatic products) and FSC/SGEC (for forestry management and distribution of forest products). As a completely new socioeconomic undertaking, ecotourism has been pursued extensively. It aims to preserve the natural environment, the resources of the community, while utilizing it commercially in the framework of sightseeing. These activities under socioeconomic systems are quite important in that they can involve a large number of people in the efforts for conservation and sustainable use of biodiversity, and that they can be continued for a long period of time.

It is also necessary to estimate the monetary value of the benefit of biodiversity and incorporate it into the socioeconomic systems. The forest environment tax adopted in many municipalities is a typical example of such systems. It aims to reallocate the benefit that the residents enjoy from the biodiversity and other multifunctionalities of forest to the activities of preserving and maintaining it. Incorporating biodiversity conservation efforts into such socioeconomic systems is an important perspective for advancing the conservation efforts in the long run.

5 Integrated and long-term viewpoint

The three crises of biodiversity do not exist independently. The first and second crises, which are seemingly contradictory, combinedly work to aggravate the critical situation in such a way that, as we can see in Satochi-Satoyama areas in the environs of a large city, urbanization enhances loss and fragmentation of species, which in turn causes lack of appropriate management of the ecosystem on the part of human beings. In such areas, the third crisis also emerges due to the increase of the alien species originated from animals for breeding purpose such as raccoons, thus accelerating the destruction of the ecosystem.

In order to aim for a sustainable society, it is necessary to integrate the Society in Harmony with Nature, Low-Carbon Society and Sound Material-Cycle Society into one comprehensive society. For example, we have to take extra care not to carelessly dispose of such resources as bamboos, and branches and leaves that come from the management activities of forest to conserve biodiversity. We also need to change our economic system and life style to achieve a sustainable society. For that purpose, these three societies should be analyzed from economic, social and other multiple aspects so that we can grasp them in an integrated manner.

In this way, to advance the activities for conservation and sustainable use of biodiversity, it is important to coordinate various aspects of such activities from an integrated perspective.

In our socioeconomic activities, we are apt to seek short-term productivity and efficiency. From a long-term point of view, however, it is said to be more economical to only preserve the ecosystem sustainably and let it recover by itself than to change it as we desire. According to the Millennium Ecosystem Assessment, developing wetlands into agricultural lands will enhance their economic values by making it possible to gather a harvest and creating the secondary natural environment different from wilderness, but will reduce their values in connection with conservation of reaches, water purification, and recreation. Developing mangrove forest for the purpose of cultivating shrimps will deprive it of its functions to absorb carbon dioxide and preserve the coastal areas, and will increase the risk for the residents along the coast to be exposed to flood and damage from the wind. Over-exploitation of aquatic resources may increase profits in the short run. But once they are exhausted, no profits are expected and the fishery

will collapse. Artificial disaster prevention measures for the river will enhance the safety, but will reduce the supply of nutritive salt and earth and sand depending on the technique employed, thus possibly decreasing the nature's blessings we enjoy from the tidal flats and sandy beach.

It is important for Japanese people, or more generally, human beings to make much of the benefit they can receive from the biodiversity sustainably in the long run, and act from the perspective of maintaining, preserving and restoring the sound ecosystem. Then, we can hand down the blessings of the rich biodiversity to the future generations, and it is the responsibility of our generation to do so.

Section 2 Basic Strategies

In order to promote the activities for conservation and sustainable use of biodiversity, it is essential that a large number of entities become interested in them, and that they participate in them actively to plan measures that reflect the characteristics of the nature and society of their community. To secure the sound ecosystem that is highly adaptive to the environmental change, it is also important to further expand the efforts to construct an ecological network not only on a nation-wide scale but also on a global scale.

With these in mind, the broad directions toward fulfilling the measures on which we should focus in the five years ahead are presented as the four basic strategies for achieving our long-term goals that look ahead 100 years from now, namely, 1. Mainstreaming biodiversity in our daily life; 2. Re-building sound relationship between man and nature in local communities; 3. Securing linkages among forests, countrysides, rivers and the sea; and 4. Taking action with global perspective.

1 Mainstreaming biodiversity in our daily life

The condition of biodiversity is worsening on a global scale, and the biodiversity crisis we have faced in our country has not been resolved yet. Though biodiversity has a direct impact on our living, its concept is recognized only poorly in our country. According to a survey, approximately 10% of the respondents know the meaning of the word “biodiversity”, and those who have heard of it accounted for approximately 30% including those who know the meaning (survey conducted by the Ministry of the Environment, 2004). In order for the national land rich with nature’s blessings to be inherited from generation to generation, it is necessary that general citizens are aware of biodiversity and pay attention to it in their daily lives. To that end, the “Our Life on Biodiversity Project” will be promoted with the participation of a large number of people and organizations so that all the generations including children will become fully aware of the importance of biodiversity conservation. Besides, education, learning and hands-on experience regarding biodiversity will be provided extensively, and the biodiversity-oriented lifestyle will be proposed as measures to infiltrate the concept of biodiversity into the society.

〈Promotion of PR and public-private partnership〉

By taking the opportunity of the 10th meeting of the Conference of the Parties of the Convention on Biological Diversity (COP10) to be held in Japan, activities to afford the people better understanding of the importance of biodiversity should be extensively carried out. Great efforts will be focused on the PR activities, and in addition to the regular activities to make the people know the deep relationship of biodiversity with our living and feel it familiar, the events to raise awareness of biodiversity will be held on the International Day for Biological Diversity (May 22). As a part of the PR activities, the biodiversity risks that may be incurred by people’s thoughtless conducts will be explained lucidly by giving concrete examples such as leaving fishing lines by the river and abandoning pets in the countryside.

In promoting these activities, it is necessary to enhance coordination among the government and local public bodies, and private enterprises and organizations including NGOs. For that purpose, the opportunities of building partnership between public and private sector participants will be provided.

〈Participation by local public bodies, private enterprises and citizens〉

Developing the national strategies alone will not realize the conservation of biodiversity. They need to be materialized as activities on a community basis. To that end, the local public bodies including urban and rural prefectures should develop biodiversity strategies, taking into consideration the characteristics of each local community in the first place. On the basis of them, they should make the importance of biodiversity conservation thoroughly known to the community residents, and promote various activities aiming to create a society coexisting with nature through coordinated efforts of biodiversity conservation among administrative agencies, private enterprises, NGOs, and community residents. Such local biodiversity strategies are also necessary for enhancing mutual cooperation among the local agencies concerned with biodiversity, and it is hoped that they will be prepared in all the prefectures in our country, as in the case of the Red Data Book and Red List. In preparing strategies, they do not need to focus solely on biodiversity conservation, but as in the case of Shiga Prefecture, which developed the “Basic Plan for Coexistence with Wild Species in our Hometown Shiga”, it is possible to develop a biodiversity conservation plan from the viewpoint of coexistence with wildlife or conservation of Satochi-Satoyama areas. In Chiba Prefecture, the work of developing biodiversity strategies have already been started, and a number of workshop events have been held with the participation of prefecture citizens. Aichi Prefecture and Nagoya City also have launched similar activities. The Government will provide guidelines for developing the strategies on a prefectural level by referring to such precedents, and introduce the cases of biodiversity conservation activities conducted by various entities, thereby encouraging effective strategy development and activity implementation on the local level.

Recently, there are increasing numbers of biodiversity conservation activities conducted by private enterprises. For example, a fishery company attaches MSC ecolabels on the aquatic products it distributes to show that they are from the sustainable fisheries. A livelihood cooperative association has been conducting research of organisms living in paddy fields to promote the use of organic farming, which enriches biodiversity. There is a company which is lending cooperation to the conservation of overseas tropical forest, from which it procures its raw materials. Another company is restoring paddy fields along the valley streams in cooperation with an NGO as its recreational program for employees to raise their awareness of environmental problems as well as to participate in the biodiversity conservation activities. Private enterprises have impact on biodiversity besides being benefited from it through many aspects of their business activities including procurement of raw materials, utilization of genetic information, and civil engineering works. Moreover, their business activities are closely connected with the social awareness of the consumers, and have influence on the consuming behavior of individual citizens. In this sense, private enterprises should incorporate the perspectives of conservation and sustainable use of biodiversity into their socioeconomic systems in connection with their entire business activities including CSR activities. Aiming to encourage private enterprises to participate in the biodiversity-related activities, the Government will prepare Biodiversity Activity Guidelines for Private Enterprises in cooperation with the economic bodies and companies besides collecting and providing information on ongoing biodiversity activities by private enterprises and introducing informative cases.

It is important that various entities including local public bodies, private enterprises, NGOs, and community residents advance the biodiversity conservation activities from a perspective unique to their own community. For the purpose of encouraging the participation of a wide range of entities, and supporting conservation activities based on diversified ideas such as those proposed by individual citizens, the

Government will improve the supporting system including economic assistance and the system of social assessment, and will promote the construction of “human” and “information” networks among the communities engaged in the conservation activities in order to provide such services as communication of informative cases of activities in a lucid manner. As a part of such efforts, a citizen-based survey will be conducted to monitor the biodiversity condition of the community by soliciting participation by the people engaged in the biodiversity conservation activities in the community, with the experts and NGOs acquainted with the nature there playing the central role. The results of the survey will be announced publicly to deepen the awareness of biodiversity among the residents.

〈Provision of education, learning and hands-on experiences, and change of lifestyle〉

It is necessary that many people share the recognition that biodiversity is the important issue involving all living species including human beings. To achieve this, education and learning designed for each group of residents should be provided. Among other groups, children are the most important targets. They should learn about biodiversity and biology, and topographical and geographical features of the community at home, school and community gatherings. Knowing about nature and living beings from experiences at early ages is quite important. To this end, environmental education including biology and geography will be promoted in the framework of school education, and training on environmental education and hands-on experiences will be provided to teachers and those engaged in the environmental preservation activities in the community. Besides, such occasions will be arranged with the cooperation of the community where children can learn about nature from experiences by communing with the nature unique to the community after school.

Social education for the adult residents is also important. By utilizing various public facilities in the community such as museums, education and learning on biodiversity will be provided. Also, the experts in the field of biodiversity will be supported so that they can actively participate in the international scene, and fostering of experts in environment in the universities will be assisted.

Children these days have decreasing opportunities to contact with nature, and it is important to afford them more chances to feel the nature with their “five senses” at their early ages. Social systems in which they can experience nature will be created. For example, forest, countrysides, and riverside and beach will be upgraded so that children can play there feeling at ease; park and other spots will be created in the urban areas to provide them with chances to contact with familiar nature in the neighborhood; and long-stay programs in agricultural, mountain and fishing villages will be offered.

Japan imports numerous kinds of natural resources including foods and lumbers from overseas, and our consumption behaviors heavily depend on the biodiversity in the exporting countries. If we recognize this and change our behaviors, this will have a great impact on the advancement of conservation and sustainable use of biodiversity on a global scale. More specifically, we can selectively purchase biodiversity-friendly foods and lumber products, and products offered by companies actively engaged in the biodiversity conservation activities, and we can also invest in such companies. From this viewpoint, change in lifestyle will be proposed in connection with the preparation of Biodiversity Activity Guidelines for Private Enterprises.

2 Rebuilding sound relationship between man and nature in local communities

In the history of agriculture in our country, people used to live in close relationship with nature. As urban areas expanded and many people moved to live there, such relationship with nature has become more and more tenuous these days. In the agricultural and mountain villages, use of the natural resources in the community has been reduced due to mechanization of agriculture and introduction of chemical fertilizers. Before the Meiji era, there were vast lands of meadow in the south of Kanto region including the environs of the urban areas, where oxen and horses for agriculture were bred and compost was produced. While such meadows served as the good source of resources for citizens, they were also the habitats for insects together with the wetlands contained inside. In recent years, however, there are only few open fields, to say nothing of meadows, due to increased urbanization in that region.

On the other hand, Satochi-Satoyama areas have been left uncontrolled to offer an ideal environment for birds and animals such as deer, wild boars and bears to grow, and frictions between human beings and wildlife have become a serious problem.

Under these circumstances, coexistence between human beings and nature will be enhanced through such measures as conservation of Satochi-Satoyama areas, reconstruction of relationship with wildlife, promotion of agriculture, forestry and fishery that foster life, and creation of places to foster diversified wildlife.

〈Conservation of Satochi-Satoyama areas and coexistence with wildlife〉

Satochi-Satoyama areas account for approximately 40% of our country. They constitute so-called secondary natural environment, which emerged after the natural forest and flood plain. Unique biota has been formed there as a result of the modest artificial modification caused by agricultural and other human activities.

The socioeconomic needs for Satochi-Satoyama areas have been reduced these days, and considering the decreasing population and aging of the residents, it is not practical to maintain them using labor and cost. Satoyama forests such as Japanese oak forest (*quercus crispula*) and sprout forests of chinquapin and oak growing near deep mountain area, which generally turn into natural forests without maintenance work, should be left untouched, letting them follow the natural course of change in principle, while checking the multi-faceted functions of forests. It is appropriate that the vegetation should be restored only as required. On the other hand, Satochi-Satoyama areas that should be maintained and handed down to the future generations will be selected from various perspectives including biodiversity, landscape, culture and use of resources, by taking into consideration such factors as the characteristics of biodiversity, intention of the community, and possibility of continuing the activities. Also, the directions of maintenance work and measures to secure maintenance staff will be examined.

In order to maintain the living environment of the wildlife unique to Satochi-Satoyama areas, a modest level of disturbance should be applied by utilizing them appropriately. For conservation of biodiversity, it is important that various components of environment such as secondary forest, farmland, grassland and reservoir emerge in the form of mosaic as a result. Now that the necessity of the natural resources to be used as fuel or fertilizer has been reduced in the community life, the relationship between human being and nature should be reconstructed with the help of various entities besides community residents. To achieve

this, a system of managing Satochi-Satoyama areas as the common resources (commons) jointly owned by various entities including urban citizens and private enterprises in addition to the owners of the farmland and forests will be examined by developing new methods of utilizing Satochi-Satoyama areas such as environmental education, ecotourism, and use of biomass as well as promotion of environmentally-friendly agriculture.

In order to rebuild the coexisting relationship between human beings and nature that once existed in Satochi-Satoyama areas, it is important to construct a community network among residents engaged in agriculture, forestry and fishery, and NGOs in maintaining Satochi-Satoyama areas and restoring forests with the help of local public bodies, private enterprises and urban residents. As a new scheme, Shinagawa Ward of Tokyo Metropolis is involved in the conservation activity of Satochi-Satoyama areas in Hayakawa-cho in Yamanashi Prefecture under an agreement. By actively promoting cultural exchanges between the urban areas and agriculture, mountain and fishing villages and organizing a network of information on proper management and people engaged in the conservation activities, an efficient framework for sustainable use of Satochi-Satoyama areas has been established with the participation of various types of entities. It should be noted, however, that in such a scheme, both urban residents lending support and community residents receiving support need to have feeling of gratitude to each other.

Satochi-Satoyama areas in the environs of cities are important natural environment left in the urban areas, and the conservation activities are actively promoted by NGOs and urban residents. The Government will enhance the conservation and management of such Satochi-Satoyama areas in the environs of cities by utilizing the existing systems for preserving urban parks and open green spaces.

According to the survey conducted in the period from 2000 to 2003, it was estimated that the habitat areas of deer, monkeys and wild boars expanded 1.7, 1.5 and 1.3 times, respectively, as large as those of 20 years before partly due to the change in the relationship between human beings and nature in the community, and the damages the wildlife caused to the agricultural products and vegetation have become increasingly serious. In fiscal 2006, Japanese bears made frequent appearances in the human habitations, and the number of accidents resulting in personal injury or death reached more than 140 with approximately 4,300 bears being caught and killed. In order to prevent this, it is important to create a community where bears, deer and other wildlife that may cause damage to human beings and agricultural products are difficult to enter the human habitations. In some communities, attempts are being made to improve the relationship between human beings and wildlife by installing and properly managing buffer zones between the forest inhabited by wildlife and the human habitations using the existing grazing land, or by removing agricultural products and fruits left in the human habitations lest wildlife should enter them in quest of food in winter. Their efforts have met with some measure of success. Therefore, besides managing wildlife by population control according to the Specified Wildlife Conservation and Management Plan, such efforts of habitat segregation between human beings and wildlife will be extensively promoted nation-wide. As the number of people engaged in agriculture and hunting are on the decrease in agricultural and mountain villages, the number of people involved in the activities of protection and management of wildlife is also decreasing. Fostering of such human resources will be promoted.

〈Agriculture, forestry and fishery that contribute to biodiversity〉

In order to meet the demand of consumers for stable supply of safe food, it is necessary to promote

sustainable agriculture, forestry and fishery based on biodiversity-friendly techniques, and vitalize agricultural, mountain and fishing villages that form the basis of them. For that purpose, in implementing measures related to agriculture, forestry and fishery, higher priority will be placed on conservation of biodiversity; sustainable agriculture, forestry and fishery that upgrade the quality of environment of living organisms will be promoted; and vitalization of agricultural, mountain and fishing villages will be pursued.

Satochi-Satoyama areas where people can contact with nature rich with various species of animals and plants, are closely associated with agricultural, forestry and fishery activities. It is important to afford the people better understanding of them. For that purpose, events to experience agriculture, forestry and fishery in the agricultural, mountain and fishing villages will be held, and the education on foods will be provided so that the people can deepen their understanding of the relationship between biodiversity and agriculture, forestry and fishery.

The efforts for conservation of biodiversity will become more effective if various entities participate in them and work in cooperation with those engaged in agriculture, forestry and fishery. Therefore, in view of supporting wide range of activities conducted by various entities including those engaged in agriculture, forestry and fishery, community residents, NGOs, private enterprises, and local public bodies, existing activities conducted by utilizing the original ideas and the know-how and techniques accumulated in the community will be reviewed to lend more support. Thus, the activities for biodiversity conservation will be promoted in a comprehensive manner with the understanding and participation of a wide range of people.

Conservation of biodiversity through promotion of agriculture, forestry and fishery of our country and proper preservation and management of the forests will be actively pursued, thereby reducing impact on the biodiversity of the other countries and contributing to preservation of environment on a global scale.

In the countryside and Satochi-Satoyama areas, it is feared that the use of inappropriate pesticides and fertilizers and the implementation of infrastructural development using a cost-effective method of construction may adversely affect the biodiversity. In addition, abandoned fields are increasing due to the shortage of workers engaged in agriculture, forestry and fishery. Therefore, agricultural production and upgrading/preservation of the countryside and Satochi-Satoyama, rural areas will be promoted with top priority being placed on conservation of biodiversity, so that the people of our country can enjoy safe and good-quality foods and natural environment with rich biodiversity. From the viewpoint that agriculture is an activity that brings diversified living organisms into the world besides producing foods, the Government will promote activities to offer the people opportunities to commune with nature and deepen the awareness of the relationship between agriculture and biodiversity, thus vitalizing the agricultural and mountain villages.

The forests, which cover two thirds of the land, are important components of biodiversity in our country as various types of forests ranging from natural to artificial forests serve as the habitats of a wide range of wildlife. For this reason, appropriate upgrading and preservation of forests will be promoted by implementing thinning and other measures as a result of vitalization of forestry and lumber industry, thereby making full use of the multi-faceted functions of forests including conservation of biodiversity.

As fishery is an environment-dependent industry that is greatly influenced by the conditions of the blessings of sea, rivers, lakes and marshes, it is important to keep the ecosystem, the basis of the productivity, always sound, and conserve the biodiversity in those regions. The coastal areas of our country

are particularly associated with human activities, and shellfish and seaweed gatherings have been conducted for a long time. The sea where high productivity and rich biodiversity have been conserved by modifying it while keeping harmony with natural ecosystem is known as SATO-UMI areas, the counterpart of Satochi-Satoyama areas. It is necessary to conserve it continuously in the future. The Government will promote establishment of vigorous fishery and vitalized fishing villages through the implementation of activities for conservation of biodiversity in the entire ocean areas including SATO-UMI areas and its sustainable use, so that the people can enjoy a stable supply of aquatic products, which have played an important role in the Japanese eating habits, over many years to come.

〈Creation of spaces fostering diversified wildlife through return to wildlife and measures against alien species〉

Top priority should be placed on the conservation of species unique to the community and ecosystem to avoid extinction of those species. But, promoting protection, breeding, and return to wildlife of Japanese crested ibises, white storks, Tsushima leopard cats and Okinawa rails is also important as a symbol of the activities to create spaces where diversified wildlife is fostered. To promote return to wildlife of birds including ibises, which depend on broadleaved forest and paddy fields for their habitats, and Tsushima leopard cats, it is necessary to disseminate biodiversity-friendly agriculture and to foster numerous living organisms they feed on. Organic agriculture using winter-flooded or early-flooded paddy fields can be seen in many parts of the country, and in the environs of Nagurinuma in Miyagi Prefecture, which is famous for white-fronted geese, diversified wildlife is living as a result of such efforts. As practiced in Sadogashima in Niigata Prefecture, where activities for return to wildlife of white storks is being promoted, spaces to foster not only the living organisms which rare species feed on but also diversified wildlife will be created in cooperation with the community residents.

Alien species jeopardizing the existence of the native species should be subject to control measures. For species ranging widely to strengthen their influences such as raccoons and largemouth basses, more effective control measures will be developed and disseminated to as many communities as possible. In Amami-Oshima Island, small Indian mongooses, which were introduced by humans, have had invasive effects on Amami rabbits and other rare species. Continuous implementation of the control measures has proved to be successful, and the efforts aiming for extermination of mongooses will be further sustained. To prevent extinction of the wildlife unique to the island regions, measures to prohibit introduction of alien species from outside the island is necessary. Therefore, measures to inhibit the movement of the alien species within the country will be examined. Also, preventive measures against the alien species introduced unintentionally together with raw materials or other non-invasive species will be examined.

3 Securing linkages among forests, countrysides, rivers and the sea

The forests and the sea are linked by the river. Transfer of earth and sand through it forms tidal flats and sand beaches, and the nutritive salts supplied from the forests foster the living organisms including fishes in the river and sea, thus creating rich SATO-UMI areas. In countryside areas, a network has been formed that involves rivers, wetlands, paddy fields, and man-made water system such as reservoirs and

channels, and the fishes use such network for their transfer. In view of securing such linkage of places that serve as the basis of inhabitation of living organisms, the Government will aim to construct an ecological network that links the communities having natural environment to be conserved over many years to come or excellent natural conditions in an organized manner, thereby actively promoting conservation and restoration of forest, countryside area, river, and sea as a continuous space of various scales from the perspective of ecosystem management of entire reaches.

〈Ecological network and protected areas, and restoration of nature〉

In order to ensure the stable retention of biota unique to a community or restore the damaged biota, it is important to construct an ecological network of protected areas having ample sizes in which habitats are appropriately linked and arranged according to the ecological characteristics of each living organism. By further examining the method of planning and materializing the construction of ecological network, and promoting information exchange and PR activities, preparation for developing such plan and implementing actual undertakings will be made for various scales of networks such as nation-wide, wide-area, prefectural and municipal levels. As it is particularly important to demonstrate the ecological network at a wide-area level in a concrete manner, method of visualizing the ecological network will be examined in close cooperation with the ministries and agencies concerned. In doing so, constructing a network in terms of water system involving rivers, lakes and marshes, wetlands, ground water, spring water and paddy fields, and the one in terms of water cycle in coastal areas is important in addition to the network of forests and open green spaces. Therefore, measures to effectively promote conservation of the ecosystem in the entire reaches of a river and construction of the network will be examined.

Less developed deep mountain areas are important as the framework of a nation-wide ecological network. Natural parks including National and Quasi-National Parks, which are mainly composed of mountainous backbones, cover more than 14% of the land, and serve as the foundation of the biodiversity conservation of our country. To protect the places for excellent natural landscape in the natural parks with the participation of various entities, necessary measures will be examined including revision of existing systems. In response to the changes in the natural environment and social conditions, and diversified evaluation of landscape, the quality of National and Quasi-National Parks will be checked from a comprehensive viewpoint, and their designation will be reviewed to reorganize them by taking into consideration the construction of ecological networks. During this process, “laurel forest”, “Satochi-Satoyama areas” and “sea area” will be evaluated on a priority basis as places for excellent natural landscape. Among others, the laurel forests of Amami Islands in Kagoshima Prefecture and Yanbaru district in Okinawa Prefecture will be subject to conservation and management measures with an eye toward designation as national parks and protected forests. In order to construct an ecological network having a nation-wide framework, coordination among various systems is required. With this in mind, such measures as designation as forest reserve and green corridor, and conversion into broad-leaved forest will be implemented to diversify the forests in pursuing the conservation and restoration of forests.

Not only in the land areas but also in the coastal and ocean areas, the fragmented ecological network should be restored. By actively promoting various activities including restoration of nature on the basis of scientific findings, securing of spaces for inhabitation and growth and ecological corridors to link them will be pursued. Though the activities to restore nature has just begun, data has been accumulated from the

cases underway in many parts of the country. As five years have passed since the Law for the Promotion of Nature Restoration was enforced, the current situation of law enforcement will be reviewed. On the basis of this, necessary measures to further promote the nature restoration will be examined. They include enhancement of techniques as required in the actual cases, method of promoting nature restoration from a wide-area perspective, and system of supporting private organizations working on nature restoration in privately-owned lands.

〈Conservation and maintenance of forests〉

Japan is a country with rich green forests, which cover two thirds of the land and constitute an important component of the ecological network.

The current Japanese forest resources are about to enter the utilizable stage with the artificial forests planted after the World War II accounting for a major proportion. In such artificial forests, implementing maintenance measures such as thinning at proper stage of growth, and creating diversified forests with different ages through cutting and renewal will ensure the sound growth as well as conservation of biodiversity. On the other hand, effective use of lumbers, which are friendly to both humans and environment, will lead to the formation of sound material-cycle society, prevention of global warming, and vitalization of mountain villages. Therefore, use of lumbers should be further enhanced. In case of secondary forests, maintenance and preservation should be conducted appropriately by utilizing them as resources according to the needs of the community. Natural forests should also be preserved and maintained appropriately in response to the social needs of natural environment preservation.

As forests constitute an important component of biodiversity, the measures to maintain and preserve them should be implemented from a comprehensive point of view so that they can perform their multi-faceted functions completely including conservation of biodiversity. To promote thinning and creation of diversified forests, the Government will roll out the “National Initiative of Creating Beautiful Forests” extensively as a collaborative undertaking of public and private sectors, and will carry out such activities as maintenance and preservation of forests, utilization of domestic lumbers, fostering of forestry workers, and community vitalization with the understanding and cooperation of a wide range of people.

〈Open green spaces in urban area, and other issues 〉

The open green spaces in urban area are quite important for the urban residents as places to commune with nature. They are linked to the forests and sea, and play a central role in the ecological network of urban area where a large number of people are living.

To retain rich biodiversity in the urban area, it is necessary to secure substantial scale of habitats of living organisms as the core of the open green spaces. The Government will aim to secure large-scale open green spaces that well deserve to be called a forest inside the urban area or at seaside area, by referring to the example of Meiji-no-Mori, where the forest created artificially now has rich biodiversity. It also aims to construct a network of water and green spaces inclusive of the micro-topography inside the urban area, thereby seeking to secure continuous habitats of living organisms.

In order to conserve biodiversity in the environs of urban areas, it is effective to cooperate with the urban residents highly conscious of natural environment, or the private enterprises doing business in the urban areas. Therefore, the Government will support conservation activities led by groups of urban

residents such as the National Trust, or activities to preserve green areas promoted by private enterprises in cooperation with NGOs by utilizing the land they own.

The waterside spaces in the urban area are important as the places where urban residents can commune with nature. In order to improve biodiversity and natural water cycle at the waterside, both of which have deteriorated substantially, measures developed in terms of volume and quality will be implemented in coordination with the measures to upgrade the open green spaces. Besides, in view of preventing eutrophication of lakes, marshes and closed water areas to conserve biodiversity in those areas, pollution loading amount flowing from urban areas will be reduced by way of advanced wastewater treatment of sewerage.

〈Preservation and restoration of rivers and wetlands〉

Water is the origin of life, and water system plays a central role in the ecological network linking the forests and countrysides with the sea.

In the rivers, efforts to improve the environment have been made in such a way that fishes can ascend or descend the river more easily. In Shiretoko, which is listed in the World Natural Heritage, the structures in the river have been improved so that the ascent of white and pink salmons will not be obstructed. In improving the environment for inhabitation and growth of living organisms in the rivers as continued efforts to create rivers with rich nature, ecological network will be constructed by taking into consideration the entire flow of the river leading up to the sea, such as variability in water volume and flow from upper to lower reaches, and flow of earth and sand.

As in the case of crucian carps (*Carassius auratus grandoculis*), which move between Lake Biwa and paddy fields, some living organisms move among more than one ecosystem on land and water areas, and other move between the sea and river, like eels and salmons. To secure the continuity of movement, Shiga Prefecture is conducting the “Paddy Fields as Fishes’ Cradle Project” and other activities to restore water environment that extends from Lake Biwa to the paddy fields without interruption. Referring to those examples, the Government will construct a network linking rivers, lakes and marshes, wetlands, spring water, reservoirs, channels and paddy fields that allows uninterrupted movement of living organisms among them. In addition, paddy fields flooded for an extended period and flood plain, which used to occupy large areas in the river, are important places for living organisms to stop by. Such ecosystem in water areas will be preserved and restored.

The wetlands are important habitat areas for various living organisms including water birds, but the ecosystem forming there are one of those that are decreasing to a great extent. Besides preserving such wetlands, restoration of wetlands and creation of biotope will be promoted by using cultivation abandoned land areas and fallow paddies. Furthermore, not only the water above the land surface but also the ground water is important. Preservation of ground water and spring water will be advanced.

〈Preservation and restoration of coastal/ocean area〉

Japan is surrounded by the sea on all sides, having many inland seas and inner bays. Its waters extend from the floating ice area in the north to the coral reef area in the south, and the cold and warm currents meet each other inside them. Coastal/ocean area is divided into coastal and ocean areas. The coastal area consists of neritic area containing beach, tidal flat, kelp coast and coral reef, and inner bays having rich

biodiversity. The ocean area contains various environments below the water surface down to the deep sea, and is inhabited by various living organisms such as sea mammals, sea birds and fishes. It also includes the world's sixth largest exclusive economic zone. The oceans are connected with each other beyond the national boundaries through the ocean currents, and their ecosystems have close relationship with those of the lands through the flow of earth and sand and supply of nutritive salt. Assuming that the water system in the land area is the vertical axis of the ecological network, the coastal area corresponds to its horizontal axis. In preserving and restoring the vast coastal/oceanic area, it is necessary to determine the divisions of areas in the ecosystem according to the current conditions, climates and geographical conditions, and develop measures that suit the division.

Basic Act on Ocean Policy, which passed the Diet in April 2007, specifies that the Government should take necessary measures to conserve ocean environment including securing of biodiversity of oceanic life. To develop and implement conservation measures, scientific findings on oceanic life and ocean environment should be enriched. It is also important to strengthen the collaborative relationship among the ministries and agencies concerned with ocean, and examine the measures to conserve ocean environment.

Fishery has long been the major industry of Japan, and there are substantial numbers of findings on fishery resources. Though the National Survey on the Natural Environment was conducted to upgrade the data on the coastal area, which is important for conservation of biodiversity in tidal flat, kelp coast and coral reef, however, the data on the oceanic life other than fishery-targeted species is still insufficient. Therefore, the data on life and ecosystem in the coastal area will be further enriched by extensively conducting another National Survey on the Natural Environment and exchanging information among the ministries and agencies concerned. For the upgrading of the comprehensive data on biodiversity in the ocean in general, effective and efficient method of collecting data will be examined including the form of collaboration among the ministries. As the first step, Natural Environment Map for Sea Area will be prepared.

In the coastal area, where the land and sea areas meet, ecosystems important for conservation of biodiversity are formed on the tidal flat, kelp coast, coral reef and sand beach. However, they are easily affected by human activities, and preservation and restoration of those areas should consider influence from both land and sea. Therefore, biodiversity conservation of entire reaches of the river, and preservation, restoration and creation of the tidal flat, kelp coast, coral reef and beach will all be promoted by taking into account the influence exerted from the land area. The current situation of designation of tidal flat, kelp coast and coral reef as National and Quasi-National Parks and National Wildlife Protection Area shows that 40 to 50% of kelp coasts and coral reefs have gained designation, but are designated as the "Ordinary Zone of National and Quasi-National Parks", where the regulation is relatively generous. Only 10% of the tidal flats have gained designation, and the designation as "Marine Park Zone of National and Quasi-National Parks" are limited to total of approximately 3,700ha, most of which are the coral reefs. Therefore, increase of designation as the protected areas will be considered for neritic areas. In addition, by referring to the case of the Sea Area Control Plan for Shiretoko World Natural Heritage Area, where conservation of biodiversity in sea area is pursued while fishery resources are maintained principally by fishermen's self-imposed control based on the concept of adaptive management, and the case of sand eel fishery in Aichi Prefecture, where adaptive no-fishing area has been set to realize the sustainable fishery, the Government will examine the activities aiming to reconcile biodiversity conservation and multiple use of it including fishery by way of self-imposed resource management based on the agreement within the community, and the

method of promoting biodiversity conservation in the sea protected area.

In the coastal area of our country, regional communities have controlled the use and maintenance of the natural resources for many years as in the case of fishery resource management by fishermen. Even today, in the sandfish fishery in the north of the Sea of Japan, resource management is conducted voluntarily by restricting the size of meshes of the fishnet, and it is necessary that the community takes the initiative to preserve the coastal area so that sustainable use of resources is made possible. In doing so, preservation of natural coast, water pollution prevention measures in the closed water area, and forest creation in the upper reaches of the river should be promoted to restore SATO-UMI areas, rural sea rich with blessings of nature that people can enjoy for many years to come.

In the oceanic area, sound ecosystem of ocean should be maintained. To this end, scientific findings on biodiversity in the ocean in general will be collected, and the method of biodiversity conservation in the ocean will be studied. Besides, wide-area and international activities will be enhanced with the migration of sea birds and sea turtles in mind, and preservation of important habitats such as breeding area and development and dissemination of bycatch prevention techniques will be promoted.

It is also important to prevent the marine pollution from influencing the ecosystem, and prevent the animals from swallowing the driftage. For that purpose, the condition of marine pollution in the sea area surrounding Japan will be monitored continuously, and measures against heavy metals, harmful chemicals and red tide will be implemented to prevent the marine pollution from occurring. For driftage, such measures as monitoring of current condition, elimination of source of occurrence through international action if necessary, and assistance to heavily damaged area will be implemented, thus contributing to biodiversity conservation in the coastal/ocean area.

4 Taking action with global perspective

The biodiversity of our country is linked with those of other countries through the sea and sky. Most of the natural resources we use are imported from other countries, and we are having impact on the biodiversity of the world. We should have such global perspective, and recognize that it is our responsibility to take the initiative of conserving biodiversity of the world, and Asia-Pacific region in particular, with which we have had close relationship, in cooperation with the countries of the world.

Taking the opportunity of G8 Environment Ministers' Meeting to be held in 2008 in advance of the G8 Hokkaido Toyako Summit and the 10th meeting of the Conference of the Parties of the Convention on Biological Diversity (COP10), Japan will communicate its experiences and wisdom to other countries, thereby contributing toward conservation of global biodiversity and promotion of its sustainable use. We should also make coordinated efforts with the international society to clarify the influence of global warming on biodiversity and achieve the 2010 Biodiversity Target. It is necessary that further efforts should be exerted after 2010 to substantially reduce the rate of loss of biodiversity by setting another specific target common to the world. Furthermore, in pursuing conservation of biodiversity, we will act from a global perspective, making much of the international cooperation especially with the countries in the Asia-Pacific Region, with which we have had close relationship.

〈Global provision of the model of coexistence with nature such as Satochi-Satoyama areas〉

Japan has its own view on nature developed in the monsoon climate, which blesses the country with

much rain and pronounced four seasons, and various wisdom of coexisting with nature accumulated in the long agricultural life. They taught us how to foster nature while using it rather than leaving it untouched to protect it.

In Satoyama, for example, use of compost and fuel collected there was strictly restricted based on the common. They were considered common resources of the residents, and the place, period and even the method of collection were strictly controlled by the self-governing organization of the region in view of using them for an extended period of years in the future. In the sea areas, such cases can be seen even today where fishery resources are under strict control of the community organization. Resource management due to the limited amount of land and resultant sustainable use of them has led to conservation of biodiversity in those communities. Such cases can be seen in many parts of the world, and it seems that conservation and management of biodiversity can be achieved more effectively by the self-imposed system of the community than by the modern laws and regulations imposed by the central government. The Government will reorganize the old-time model of coexistence with nature in the modern society as the new system of cooperative use and management of natural resources with the participation of various entities including urban residents, private enterprises, NGOs as well as the community residents, by incorporating the perspective of recycling of natural resources, and vitalized use of ecotourism and biomass. In addition to the activities to reorganize the society in coexistence with nature, wisdom and tradition of coexistence with nature existing in many parts of the world, form of sustainable use of natural resources, and social system to realize it will be studied. They will be combined together, and proposed to the world as “SATOYAMA Initiative” to present the method of reorganizing sustainable society according to the nature and social condition of each community in various parts of the world.

It is also important to communicate to the world Japan’s unique style of coexistence with nature in a lucid manner. With an eye toward G8 Hokkaido Toyako Summit in 2008, “Nature Campaign of Beautiful Japan” will be launched. Among others, Japanese system of National Park, which promotes handing down of beautiful nature to the future generations while enhancing coexistence between nature and the community, and the beautiful forests showing harmony between conservation and use will be introduced to the countries of the world. The Government will lend support to the Asian countries so that they can coexist with nature while promoting conservation according to their social condition of the community.

〈Implementation of comprehensive assessment and monitoring of influence of global warming on biodiversity〉

Active involvement by each country of the world is required to achieve 2010 Biodiversity Target of reducing the rate of loss of biodiversity substantially. In order for Japan to contribute to the achievement of the target, it is necessary to know accurately how its biodiversity stands, to what extent the conservation measures have progressed, and what effects have been produced. The National Strategies are checked every year, and the progress of the measures is reported. With an eye toward 2010, a comprehensive assessment will be conducted based on the scientific findings while taking into account the socioeconomic aspects, so that overall outlook of biodiversity of our country can be grasped. For this purpose, the indices to measure the condition of the biodiversity in our country and effects of the measures taken in a comprehensive manner will be developed in cooperation with the ministries concerned. Then, by using these indices, the risk condition of biodiversity is visualized in the form of a map. Important area in terms of biodiversity

conservation (“hot spot”) can be identified in the map to implement conservation and restoration measures on a priority basis. Such attempt to carry out a comprehensive assessment of biodiversity on a country level is rarely found in the world, Japan will call for the use of it among the G8 countries, to begin with, in the hope that the method will be used extensively throughout the world in the future. In addition, technical support will be extended to the Asian-Pacific Region including cooperative efforts to collect basic data of natural environment by using earth observation satellite, with a view to achieving a remarkable reduction of rate of loss of the world biodiversity. As a preparatory work for the 10th meeting of the Conference of the Parties of the Convention on Biological Diversity (COP10) in 2010, the need to upgrade the legal system for biodiversity conservation will be examined, and the organized coordination among the systems will be enhanced.

In order to conduct the comprehensive assessment continuously, enrichment of data on natural environment and improvement in method of reporting the results quickly are necessary. To this end, the condition of natural environment of the country will be continuously monitored by implementing Monitoring-Site 1000. Among others, data on inhabitation condition of medium- to large-sized mammals, which is not sufficiently in hand currently, data of living species and ecosystem in the ocean/coastal area, and data on expansion of bamboo forests in Satochi-Satoyama areas will be collected on a priority basis. In order to grasp the changes in biodiversity over a long period of time, satellite data will be utilized extensively with the cooperation among ministries, and data that can serve as indicator of biodiversity will be disclosed regularly, once a year, for example, as a quick report of the monitoring results. In addition to this, comprehensive ecosystem monitoring system that covers the influence of global warming will be established, and by using it in combination with a prediction technique, preventive conservation measures will be implemented.

By taking advantage of the findings obtained as a result of the comprehensive assessment and comprehensive monitoring system, Japan will contribute to the global evaluation of the achievement of 2010 Biodiversity Target, taking the opportunity of COP10 held in Japan. Besides, through the expert meeting, we will take the initiative in setting the next world target and discussing the measures to achieve it at COP10.

〈Mitigation of global warming from the perspective of biodiversity and adaptation to its impact〉

As the global warming has become an established fact, it is necessary to implement measures to mitigate it from the perspective of biodiversity, and examine the ways to adapt to its impact.

On the basis of the fact that conserving sound ecosystem of forests, grasslands and wetlands, which fix a large amount of carbon, will inhibit the release of green house gases, contributing to mitigation of global warming, measures to conserve biodiversity will be promoted.

The function of forests as the source of absorbing green house gases is effective in mitigating global warming besides their function to conserve biodiversity. Upgrading and preservation of forests will be promoted so that they can fulfill their functions to the fullest extent. Furthermore, vegetation-derived biomass produced as a result of ecosystem management to conserve rich biodiversity, such as thinning of artificial forest, control of secondary forest, mowing at the waterside and grazing in the secondary grasslands will be used extensively as the alternative energy of fossil fuel. This will also lead to the vitalization of the local industry.

It is important that adaptation to the impact of global warming should be studied before it becomes an

issue in many parts of the country. Adaptation measures will be examined from the viewpoint of conservation of biodiversity including upgrading of monitoring to incorporate impact of global warming, survey of ecological network highly adaptive to environmental change including climate change, and key points of conserving and restoring sound ecosystem.

〈Promotion of international cooperation including bilateral and multilateral networks〉

In order to conserve the habitat environment of animals migrating beyond the national boundaries, it is necessary to foster international cooperation rather than attempting to achieve it single-handedly. It is also necessary to conserve the areas already having rich biodiversity by promoting conservation measures from the global perspective as international efforts.

As a part of efforts in this context, Japan will take the initiative in the fields of coral reef preservation and conservation of migratory birds in the Asia-Pacific Region by holding the International Reef Protected Area Network Conference, and establishing Asia Oceania Region Important Reef Network, while utilizing such frameworks as International Coral Reef Initiative (ICRI), Partnership for the Conservation of Migratory Waterbirds and the Sustainable Use of their Habitats in the East Asian - Australasian Flyway (Partnership for the East Asian - Australasian Flyway), the Conventions and Agreements for Protection of Migratory Birds, and Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar Convention). In such fields as management of protected areas including National Parks and collection of data on natural environment, we will also establish bilateral and multilateral network, enhance international collaboration, lend support in fostering human resources, and provide relevant information.

We will continuously support Critical Ecosystem Partnership Fund (CEPF), which lends support to the organizations conducting activities to conserve “Biodiversity Hot Spot” (an area especially rich with living species and in a critical condition) in developing nations, and cooperate with GBIF (Global Biodiversity Information Facility) and GEOSS (Global Earth Observation System of Systems) in upgrading information infrastructure regarding biodiversity on a global scale.

From a global perspective, the condition of biodiversity is deteriorating due to reduction of forests caused by expanded agricultural lands and illegal logging, desertification, and reduction in kelp coasts and tidal flats. Recognizing that Japan imports a major proportion of resources as foods and lumbers from overseas, we should contribute to conservation of biodiversity on a global scale. For that purpose, we will actively participate in the discussion at Food and Agriculture Organization (FAO), United Nations Forum on Forests (UNFF), International Tropical Timber Organizations (ITTO), United Nations Convention to Combat Desertification (UNCCD) and Asia Forest Partnership (AFP), and promote international cooperation in connection with sustainable forest management including measures against desertification and illegal logging.

Part 2 Action Plan on Conservation and Sustainable Use of Biodiversity

Preface

Part 2 describes, systematically and exhaustively, specific measures and policies aimed at ensuring the conservation and sustainable use of biodiversity, in the form of the government's action plan for the next five years. Since the measures and policies addressed here cover a wide range of areas, they are categorized and compiled for each area.

Chapter 1 "Measures and Policies for National Land Area" consists of two bodies. The first body specifies nationwide and other wide-area measures under the title of *Measures and Policies Based on Wide-Area Coordination*, which is divided into four sections: "Ecological networks," "Conservation of Priority Areas," "Nature Restoration" and "Agriculture, Forestry and Fisheries." The second body describes measures in line with characteristics of individual regions under the title of *Measures and Policies for Local Areas*, which is divided into five sections: "Forests," "Countryside and Satochi-Satoyama Areas," "Urban Areas," "Rivers and Wetland Areas" and "Coastal Areas and Oceanic Areas." Chapter 2 "Cross-Sectoral and Fundamental Measures and Policies" has seven sections: "Conservation and Management of Wildlife," "Sustainable Use of Genetic Resources," "Communication and Implementation," "International Approach," "Information Management and Technology Development," "Efforts against Global Warming" and "Environmental Impact Assessment." In total, Part 2 has 16 sections.

The ministries and agencies concerned wrote about the respective sections for which they should be responsible, by way of a readable standard format indicating *Basic Concepts* at the beginning of each section and describing *Current Situation and Challenges* and *Specific Measures and Policies* for each topic.

Specific measures and policies are itemized with clear indications of the contents of the measures and policies to be implemented and the ministries and agencies in charge of implementation. Numerical targets are also set if possible so as to make descriptions more concrete.

Part 2 shows about 650 specific measures and policies in total. In the process of implementing these measures and policies, the ministries and agencies concerned will enhance cross-sectoral coordination between them, and also enhance coordination with various other parties to be involved in the measures and policies, such as local public governments, private enterprises and NGOs, while encouraging their voluntary efforts. Furthermore, with the objective of contributing to conservation and sustainable use of biodiversity on a global scale, attention will be paid in order to ensure that Japan can show leadership in the international community in this field.

The measures and policies specified in this Part will be upgraded and enhanced if necessary, while taking into consideration changes in the circumstances surrounding biodiversity that may occur at home and abroad within the next five years, as well as the progress in the implementation of individual measures and policies including the achievement of numerical targets, as identified through annual reviews.

The table below indicates the relationships between the sections of Part 2 and the four "basic strategies" (the main directions for the measures and policies to be focused on), shown in Part 1, Chapter 4, Section 2. Among the sections of Part 2, those marked with a circle are particularly closely related to the respective basic strategies based on the descriptions of the topics contained therein.

Chapter 1 Measures and Policies for National Land Area

[Part 2]	(Measures and Policies Based on Wide-Area Coordination)				(Measures and Policies for Local Areas)				
	Section 1	Section 2	Section 3	Section 4	Section 5	Section 6	Section 7	Section 8	Section 9
[Part 1] Basic strategies	Ecological Networks	Conservation of Priority Areas	Nature Restoration	Agriculture, Forestry and Fisheries	Forests	Countryside and Satochi-Satoyama Areas	Urban Areas	Rivers and Wetland Areas	Coastal Areas and Oceanic Areas
(1) Mainstreaming biodiversity in our daily life				○					
(2) Rebuilding sound relationship between man and nature in local communities				○	○	○	○	○	○
(3) Securing linkages among forests, countrysides, rivers and the sea	○	○	○	○	○	○	○	○	○
(4) Taking action with global perspective	○			○					

Chapter 2 Cross-Sectoral and Fundamental Measures and Policies

[Part 2]	Section 1	Section 2	Section 3	Section 4	Section 5	Section 6	Section 7
	[Part 1] Basic strategies	Conservation and Management of Wildlife	Sustainable Use of Genetic Resources	Communication and Implementation	International Cooperation	Information Management and Technology Development	Efforts against Global Warming
(1) Mainstreaming biodiversity in our daily life			○		○		
(2) Rebuilding sound relationship between man and nature in local communities	○	○	○				○
(3) Securing linkages among forests, countrysides, rivers and the sea							○
(4) Taking action with global perspective	○	○	○	○	○	○	

Chapter 1 Measures and Policies for National Land Area

(Measures and Policies Based on Wide-Area Coordination)

Section 1 Ecological Networks

(Basic Concepts)

In order to promote the stable survival of regional biota and the restoration of species with reduced populations, and achieve a country where biodiversity is secured for the future, we will have to organically link zones with natural environments subject to conservation or with exceptional natural conditions into ecological networks where habitats are connected together and distributed appropriately. This effort is expected to produce various effects, including not only the protection of wildlife habitats but also the provision of attractive landscapes and opportunities for interaction between humans and nature, mitigation of climate change, improvement of urban and water environments and preservation of national land. In the context of wildlife species' adaptation to climate and other environmental changes, the paths for their movement and dispersal will have to be secured to increase the probability of their survival.

In forming an ecological network, we will have to give consideration to regional ecosystems, including those with virgin nature areas as their cores. Habitats in natural mountain areas, Satochi-Satoyama (secondary nature) and rural areas, urban areas, coastal areas and oceanic areas should be organically linked vertically and horizontally through rivers, roadside greenery and beaches.

White-fronted geese and other migratory birds move across national borders. Bears move across prefectural borders. Frogs shuttle between forests and wetlands. Wildlife habitats and ranges of movement are thus very diverse. Therefore, a network should be considered for each wildlife species at international, national, wide-area, prefectural, municipal and other levels. In this respect, consideration should be given to the hierarchical relations between these levels, administrative units and a geographical combination of river basins including coasts, mountains and hills. In addition, preventing the spread of alien species should be taken into account along with how best to secure an appropriate distance between wildlife and humans to avoid wildlife damage to the agriculture, forestry and fishery industries.

1 Promotion of formation of ecological networks

(Outline of Measures and Policies)

Habitat clusters will be appropriately located and preserved as core areas of ecological networks and their buffer zones with the outside world, to ease their mutual impact. At the same time, ecological corridors will be secured to connect these wildlife habitats in order to enable the dispersal and movement of wildlife, promote interaction between wildlife populations and conserve species and hereditary diversity. Ecological networks will be formed in this way. In a nationwide ecological system, for example, Satochi-Satoyama and rural areas located between natural mountain regions and urban regions can serve as a buffer to ease the impact that human activities in urban regions have on core areas of virgin nature. Well-managed Satochi-Satoyama and rural areas can also be thought of as an appropriate buffer zone between wildlife habitats and human residential areas, to help prevent wildlife damage to residential areas.

The 21st-Century Environment Nation Strategy, the Basic Environment Plan, the National Land Plan and

the like have pointed to the significance of conservation and restoration of nature through the formation of ecological networks.

Ecological networks should be formed at various levels, ranging from a nationwide natural environment conservation framework based on global or cross-border ecosystems to a wide area covering multiple prefectures and municipalities as familiar living areas. These networks should also be multilayered. Therefore, nationwide, wide-area, prefectural and municipal network schemes and plans should refer to each other, be put into a hierarchical framework and considered using scientific knowledge. The relevant central government ministries and agencies should cooperate with each other, local governments, non-government organizations, business enterprises and researchers in forming these networks at various levels.

1.1 Formation of ecological networks

(Current Situation and Challenges)

We must develop methods for formation of ecological networks, work out schemes and plans at various levels and implement effective projects. Some advanced regions have begun to work out plans and implement relevant projects. However, a path to the formation of wide-area and nationwide networks has yet to be demonstrated.

In forming ecological networks, we must consider creating buffer zones to ease the reciprocal influence between nature and humans, including the influence of human activities on the core of virgin nature (human influences on nature) and wildlife damage to farm products (natural influences on humans). We should also consider enhancing the continuity of ecosystems to prevent alien species from spreading.

A decline in wetlands for migratory birds, division of habitats through development, and cross-river structures impeding the run of fish and other aquatic life may lead to the contraction and depletion of natural habitats and reduction of populations' genetic diversity, becoming a problem for the conservation of biodiversity. More efforts are required to improve these problems.

(Specific Measures and Policies)

- The government will promote the formation of ecological networks at national, regional, prefectural, municipal and other levels by studying and considering methods for planning and achieving ecological networks, by assessing and examining the effects of existing networking measures and projects, by providing local governments, wide-area councils, non-government organizations and the like with information for planning such networks, and by enlightening them about such planning. (MLIT, MOE, MAFF)
- Since it is important to demonstrate specific pictures of ecological networks at wide-area and other levels, the relevant government ministries and agencies will closely cooperate in mapping such networks. (MOE, MLIT, MAFF)
- In order to secure and conserve zones as cores of sufficiently wide and well-balanced ecological networks, the government will expand protected zones and improve their management under the measures cited in Chapter 1, Section 2, "Conservation of Priority Areas." As for forests, the government will designate "green corridors" to link protected forests into networks. (MOE, MEXT, MAFF, MLIT)
- The government will position ecological network formation and its significance in the Green Basic Plan, river development plans and other plans, in order to enlighten the relevant project operators about the

importance of such networks. Relevant measures will be implemented systematically. (MLIT, MAFF, MOE).

- By implementing the measures given in Chapter 1, Section 3, “Nature Restoration” and Sections 4-9, the government will proceed with comprehensive efforts to conserve, restore or create wildlife habitats in forests, farmlands, roads, parks and green spaces, coasts, ports and harbors, fishing ports and sea waters, and secure the continuity of these habitats via migratory routes arranged through the improvement of artificial structures. (MOE, MLIT, MAFF)
- The government will proceed with international cooperation in enhancing ecological networks, such as: international networks of important habitats for migratory birds under the Partnership for the Conservation of Migratory Waterbirds and the Sustainable Use of their Habitats in the East Asian - Australasian Flyway; important coral reef networks under the International Coral Reef Initiative (ICRI); and networks of protected marine areas subject to international discussions regarding the conservation of migration paths for marine mammals, sea turtles and others that migrate long distances across state borders. (MOE) [Cited in Chapter 2, Section 4, 2.10, 3.1 and 3.2]

Section 2 Conservation of Priority Areas

(Basic Concepts)

In order to conserve biodiversity, protected areas and other systems must be created for representative or typical ecosystems and priority areas, as habitats for diverse wildlife species that demonstrate regional biological characteristics. These systems must secure a sufficient size or scope, appropriate distribution, proper regulations, appropriate management standards and mutual cooperation in accordance with the characteristics of the priority areas for conservation. Systems for designating priority areas for conservation include those that directly aim at conserving exceptional natural areas, including biodiversity. They also include those that aim at protecting cultural properties, conserving national land or creating living environments and contribute indirectly to conserving biodiversity. From the viewpoint of biodiversity, these systems are insufficient in terms of designation realities, regulations and management standards. Efforts will be made to allow them to work more effectively.

To this end, the government will designate and review protected areas based on scientific data so that priority ecosystems and habitats at various levels, from national to regional, can work more effectively as core areas of national ecological networks. As for the national and quasi-national parks that cover a wide portion of the country including mountainous backbones, in particular, the government will consider designation standards in view of changes in the natural environment and society, and review and redistribute these parks at the nationwide level. Furthermore, the government will expand protection and management measures for specific types of ecosystems in areas designated for protection. For protected marine areas, for which government measures have lagged behind those for protected land areas, the government will promote appropriate protection and use in coordination with the relevant organizations.

Some areas designated for protection under domestic law are registered (or cited) as internationally protected areas based on the Ramsar Convention and the Convention Concerning the Protection of the World Cultural and Natural Heritage. For the world natural heritage sites in Japan, regional liaison councils comprising relevant administrative agencies and local people have been created, along with scientific committees consisting of experts on various areas, to form consensus and implement conservation and management based on scientific knowledge. These actions represent Japan's pioneering efforts for protected areas. Particularly, by referring to the case of the Sea Area Control Plan for the Shiretoko World Natural Heritage Area, where the conservation of marine biodiversity is pursued while fishery resources are maintained principally by fishermen's self-imposed controls based on the concept of adaptive management, the government will consider regional consensus-based voluntary resource management efforts and biodiversity conservation measures in protected marine areas, to reconcile the protection of biodiversity with the multiple uses of biodiversity, including fisheries.

1 Conservation under the Nature Conservation Law

(Outline of Measures and Policies)

Conservation areas under the Nature Conservation Law include wilderness conservation areas and nature conservation areas designated by the central government, and prefectural nature conservation areas designated by prefectural governments.

Wilderness conservation areas are those where nature conservation is particularly required, among areas that remain wild and are sufficiently wide. Under the principle of leaving the areas to natural succession, tough

activity regulations and other measures are implemented for conservation.

Nature conservation areas are those where nature conservation is particularly required, among areas that are sufficiently wide and: maintain forests dominated by exceptional natural forests; are exceptional riparian zones such as lakes, rivers, coasts and sea waters; have peculiar geographical or geological features; or are wildlife habitats. In the areas designated for nature conservation, behavior regulations and conservation projects are implemented systematically.

Prefectural nature conservation areas are those where nature conservation is particularly required, among the areas that are close to nature conservation areas. Prefectural governments are responsible for the conservation of these areas.

These nature conservation areas are designed for the maintenance of the natural environment, and are combined with natural parks and other natural environment conservation areas to form the core of national ecological networks and play a key role in conserving biodiversity.

1.1 Wilderness conservation areas and nature conservation areas

(Current Situation and Challenges)

As of November 2007, the government had designated five wilderness conservation areas (totaling 5,631 ha) and 10 nature conservation areas (totaling 21,593 ha). These areas account for less than 0.1% of Japan's total land and cannot be described as large. They do not necessarily cover all exceptional natural environments.

No new conservation areas have been designated since the Shirakami-Sanchi mountain range's designation for conservation in 1992. In the future, the government will have to designate new conservation areas from the viewpoint of national ecosystem diversity conservation, based on the latest knowledge.

Global warming is expected to affect ecosystems. In this sense, we are required to grasp the present situation and past changes of ecosystems at these nature conservation areas and conduct on-site inspections for appropriate management.

(Specific Measures and Policies)

- In order to promote the formation of national ecological networks, the government will review the locations and sizes of conservation areas from the viewpoint of nationwide biodiversity conservation, based on scientific knowledge including data from the nature conservation basic survey and other surveys, and on the prefectural nature conservation area designation. As necessary, the government will proceed with efforts to designate new wilderness or nature conservation areas or expand existing conservation areas. (MOE)
- At the existing conservation areas, the government will utilize the Project for Monitoring Ecosystems in Japan (Monitoring Sites 1000) and others to monitor ecosystem changes, including those attributable to global warming, and accumulate necessary data. The government will also check the conditions of conservation and use continuously, set up signs and enhance patrolling to appropriately manage conservation. (MOE) [Cited in Chapter 2, Section 1, 1.2; Chapter 2, Section 5, 2.2 and Chapter 2, Section 6, 1.1]

1.2 Prefectural nature conservation areas

(Current Situation and Challenges)

As of March 2007, 536 prefectural nature conservation areas (totaling 76,451 ha) had been designated. In

the five years between FY 2002 and 2006, nine new prefectural nature conservation areas, including natural forests and wetlands, were designated.

These areas play a key role in securing regional biodiversity through the conservation of ecosystems peculiar to particular regions and habitats for rare wildlife species. These regional situations have yet to be grasped on a national basis. Their total size is limited to 0.2% of Japan's total land and cannot be described as large.

(Specific Measures and Policies)

- Since the conservation of natural environments with high naturalness at a regional level is very important for securing diverse ecosystems throughout the nation, the central government will cooperate with prefectural governments in grasping the situation of nature conservation at designated areas. (MOE)
- The government will provide advice regarding prefectural designation and the management of nature conservation areas as necessary. (MOE)

2 Natural parks

(Outline of Measures and Policies)

Natural parks under the Natural Parks Law are divided into three categories: national parks (29 parks, totaling 2,086,790 ha), quasi-national parks (56 parks, totaling 1,361,535 ha) and prefectural natural parks (309 parks, totaling 1,949,711 ha). (Area sizes are as of November 2007.)

National parks are Japan's representative exceptional natural landscapes and quasi-national parks are landscapes of natural beauty. Both are designated by the Minister of the Environment. Prefectural natural parks represent exceptional prefectural natural landscapes and are designated by prefectural governors under relevant prefectural ordinances. The Natural Parks Law was amended in 2002 to specify the central and local governments as responsible for securing biodiversity in natural parks.

Since national parks and other natural parks are required to proactively serve as the backbone for biodiversity conservation, the government will review and redistribute national and quasi-national parks on a nationwide basis and steadily reform the park plans based on changes in the natural and social environment.

While many relevant parties have long cooperated in the management of natural parks as zoning system in Japan, more proactive management has recently been required with respect to such problems as the maintenance of secondary nature and wildlife's influence on ecosystems. Therefore, the government will rebuild cooperation between a variety of entities in their management, and step up wildlife protection and management based on scientific data.

In addition, natural parks have been utilized for purposes such as human interaction with nature and learning about the environment. In order to deepen people's understanding about nature and promote their appropriate use of it, the government will develop opportunities for human interaction with nature and improve the quality of natural park use.

2.1 Designation of natural parks

(Current Situation and Challenges)

National parks and other natural parks are required to proactively serve as the backbone for biodiversity conservation. As for mountainous areas, centering around the abundant natural forests and grasslands of the

mountainous backbone, natural parks of relatively large sizes are designated to serve as the cores of ecological networks. In order to form nationwide ecological networks where habitats are appropriately linked and distributed, however, the natural park system must be combined with other measures and policies to play an even greater role in conserving biodiversity.

As for sea areas, marine park zones are designed for the maintenance of marine natural landscapes. However, these zones of national and quasi-national parks total only 3,744 ha (as of November 2007), accounting for just 0.0087% of Japan's territorial waters.

For natural parks, plans regarding regulations and facilities for protection and utilization are provided as park plans, on which activity regulations and the development of said facilities are based. Park plans and the like should be reviewed roughly every five years, based on data from surveys and monitoring of natural landscapes, wildlife and ecosystems, as well as on social changes.

(Specific Measures and Policies)

- Based on the natural environment and social conditions and changes such as the diversification of landscape assessment, the government will consider standards for the selection of national and quasi-national parks and review all national and quasi-national park designations within five years. Based on the review, the government will realign and redistribute national and quasi-national parks. In the course of such reform, the government will give positive ratings to “evergreen broadleaf forests,” “Satochi-Satoyama areas” and “sea areas” as exceptional natural landscapes. (MOE).
- As for natural forests and natural grasslands (with a vegetation naturalness index of 9 or 10) with very high naturalness, the government will utilize other protected area systems with the direct objective of conserving the natural environment to gradually designate higher-priority areas as parks for protection, in a bid to subject sufficiently wide areas to protection over the long term. (MOE)
- As for sea areas, the government will promote the protection of coastal national and quasi-national parks through measures such as designating marine park zones. The government will also revise the conditions for selection of marine park zones, reconsider and redistribute such zones and review the wildlife species designated for catching restrictions. (MOE)
- The government will expand surveys and monitoring of natural landscapes, wildlife and ecosystems and utilize survey and monitoring data for reviewing park areas and plans roughly every five years, to promote fine-tuned park management. (MOE)
- Prefectural governments' designation and appropriate management of prefectural natural parks as exceptional natural landscapes that represent the relevant regions are important for conserving biodiversity and providing opportunities for human interaction with nature in areas familiar to citizens. The government will continue to give necessary advice to prefectural governments on the designation and management of nature parks. (MOE)

2.2 Protection and management of natural parks

(Current Situation and Challenges)

Natural parks are required to play a positive role in protecting not only natural landscapes but also wildlife species and their habitats, from the viewpoint of biodiversity conservation.

Japan's natural parks have been managed as regional natural parks through cooperation among a wide

range of relevant parties. In order to promote positive management including nature restoration and the conservation of Satochi-Satoyama areas, however, natural park management systems must be reconstructed.

Information on the natural environment and other scientific data are still insufficient as a foundation for the promotion of natural park management. Systems have yet to be sufficiently developed for setting and assessing management standards based on scientific data, reviewing park areas and plans and improving natural park management methods.

(Specific Measures and Policies)

- For the protection and management of national parks, since 2005 the government has appointed auxiliary rangers, in addition to park rangers for nature protection, to enhance park management operations including patrolling and monitoring, and proceed with appropriate protection and management. (MOE)
- The government will promote the efforts of natural park guides and park volunteers to secure appropriate use and conservation of natural parks. (MOE)
- Under the Special Programs to Engage the Public in Nature Conservation Activities in National Parks (Green Worker Programs), the government will implement natural environment protection activities including patrolling for the prevention of illegal digging of alpine plants, vegetation restoration and removal of alien species, and improve management standards. (MOE)
- Under the mountain environment sanitation and safety programs, the government will improve night soil and effluent treatment facilities at mountain huts and the like in natural parks. The government will also implement demonstration tests of advanced technologies for night soil treatment in mountain areas and provide appropriate information. (MOE).
- In order to build attractive national parks through cooperation among a wide range of relevant parties, the government will consider systems and methods for facilitating cooperation between park management participants including the central and local governments, local residents, experts, business enterprises and NGOs, and reconstruct management systems for each national park. In this respect, the government will implement model programs at national parks including Oze and the Joshinetsu Kogen. In order to further expand park management, the government will also consider necessary institutional reforms, including amendments to the Natural Parks Law. (MOE)
- In order to promote voluntary natural environment conservation and management activities by local residents and private-sector organizations well-versed in regional nature, the government will designate organizations with a certain management capacity as park management organizations and support their fine-tuned management, meeting local realities. For parts of the park where the landscape or ecosystem has deteriorated due to insufficient management by landowners, the government will encourage park management organizations to conclude landscape protection agreements with landowners to increase their operations for promoting landscape conservation and management in natural parks. (MOE)
- In areas where deer damage to vegetation is seen at the cores of national parks, the government will work out protection and management plans based on scientific data and adaptively implement measures such as installing vegetation protection fences and capturing deer for adjustment of the deer population. (MOE) [Cited in Chapter 2, Section 1, 2.3]
- The government will implement capture and other programs to remove alien species that adversely affect ecosystems in national parks. As for alien species that are likely to have adverse effects, the government

will work out species treatment guidelines to forestall their penetration or adverse effects, and consider risk assessment methods and imposing restrictions on the release of alien species at special areas in addition to the special protected areas where such restrictions have already been imposed. As for greening plant species for slope-greening and other programs in national parks, the government will work out guidelines for the treatment of alien species to give consideration to regional biodiversity in promoting greening programs. (MOE)

- At parts of national parks where the natural environment has deteriorated or where ecosystems have been divided, the government will promote nature restoration programs. (MOE)

2.3 Promoting use of natural parks

(Current Situation and Challenges)

Natural parks are not only destinations for sightseeing trips but also places for human interaction with nature and for learning about the environment. As rare places for citizens to interact with Japan's preserved nature and learn about natural mechanisms, national parks should enhance and expand their roles and functions.

At natural mountains, islands, plateaus and other areas that have virgin ecosystems, problems such as vegetation deterioration or overuse have emerged. Efforts are required to improve the use of natural parks.

(Specific Measures and Policies)

- The government will implement nature observation programs and promote public awareness campaigns on natural environment conservation at natural parks that have exceptional natural environments. The government will utilize brochures and Internet websites to publicize Japan's wonderful natural environment at home and abroad and will develop and provide information to deepen citizens' understanding about the natural environment and their interaction with nature. (MOE) [Cited in Chapter 2, Section 3, 3.1]
- The government will promote learning and education about the environment, ecotourism and other programs for the consideration and implementation of qualitative improvements to the use of natural parks. (MOE) [Cited in Chapter 2, Section 3, 3.1]
- The government will consider and implement designation of access control districts and guidance of use under the Natural Parks Law and other measures, to disperse and level out use of natural parks. (MOE) [Cited in Chapter 2, Section 3, 3.1]
- In order to prevent the destruction of vegetation and disturbance of wildlife habitats through concentration of visitors and other forms of overuse at natural parks, the government will implement appropriate facility development, including the construction of boardwalks at wetlands and installation of off-limits fences at alpine plant communities. (MOE) [Cited in Chapter 2, Section 3, 3.2]
- By supporting restrictions on private cars at heavily trafficked parts of national and quasi-national parks, to ease the impact of traffic congestion and curb carbon dioxide emissions by such cars, the government will promote natural park use giving consideration to the natural environment. (MOE)
- The government will develop places for human interaction with nature, to deepen people's understanding about nature and promote its appropriate use. (MOE)

2.4 Natural park development

(Current Situation and Challenges)

A total of about 600 million people visit national and quasi-national parks in Japan annually. Natural park programs have been implemented for these people to learn about and experience nature. As public works expenditures have generally been reformed, however, natural park program expenditures (among public works expenditures) have declined from a peak of some 17.6 billion yen in FY 2000, and stood at some 11.8 billion yen in FY 2007. Under the so-called three-part local finance reform and other measures, the central government's subsidies to prefectural governments for development of national parks were terminated in FY 2005. It has become difficult for local governments to engage in national park programs. In this way, the central government is now required to promote development in key zones of national parks. In the meantime, it is trying to expand subsidies for quasi-national parks.

Regarding natural park development, the government must give consideration not only to natural environment conservation but also to regional development utilizing natural park resources, and implement measures and policies to meet the public's need for interaction with nature and promote safe and comfortable use of natural parks.

(Specific Measures and Policies)

- For national parks, the government will develop mountain climbing trails (through such measures as installation of signs, scour repair and vegetation restoration), information facilities at major park entrances and long nature trails that organically link natural parks with exceptional natural environments and cultural properties together. The government will also promote human interaction with nature and expand facilities for providing information on nature. (MOE) [Cited in Chapter 2, Section 3, 3.2]
- At national park points where ecosystems have disappeared or changed, the government will rejuvenate or restore forests, wetlands, tidal flats, seaweed beds or the like. (MOE) [Cited in Chapter 2, Section 3, 3.2]
- For quasi-national parks, the government will provide natural environment development subsidies to support local governments' programs to take advantage of regional characteristics to develop places for human interaction with nature and to conserve and restore natural environments. (MOE) [Cited in Chapter 2, Section 3, 3.2]

3 Wildlife protection areas

(Outline of Measures and Policies)

In order to protect wildlife and their habitats, the government has designated some areas as wildlife protection areas, based on the Wildlife Protection and Appropriate Hunting Law. The government regulates wildlife hunting in these protected areas and designates the particularly important portions of them as special protection areas with activity regulations, to conserve a variety of wildlife species and their habitats.

3.1 Wildlife protection areas [Cited in Chapter 2, Section 1, 2.1]

(Current Situation and Challenges)

Japan has 66 national wildlife protection areas, totaling 547,840 ha (as of November 2007), following an increase in the number of designated sites such as wetlands of international importance as migratory bird

habitats. In addition, there are 3,831 prefectural wildlife protection areas, totaling 3,102,427 ha (as of March 2007).

In wildlife protection areas, it is important to accurately grasp the wildlife population conditions through monitoring and other surveys for appropriate management. Over recent years, the wildlife habitat environments in wildlife protection areas have deteriorated due to sediment inflow from their surroundings or rapid increases in some animal populations, leading to a growing need for improvement of such environments in some protection areas. Therefore, the Wildlife Protection and Appropriate Hunting Law was amended in 2006 to launch conservation programs that improve the habitat environment, including lake water quality improvement and the installation of facilities to prevent the penetration of animals affecting wildlife habitats in wildlife protection areas. In FY 2007, conservation programs started at national wildlife protection areas such as Katano Kamoike and Manko.

(Specific Measures and Policies)

- The government will promote designation of wildlife protection areas and special protection areas, which is a core system for wildlife protection, to secure wildlife habitats and contribute to maintaining, restoring and improving regional biodiversity. In this respect, the government will try to grasp important wildlife habitats based on scientific knowledge about wildlife population conditions and habitat environments, and give priority to such important habitats in designating wildlife protection areas. In order to secure habitats for a wide diversity of wildlife species, the government will try to give the designation to areas that cover a variety of ecosystems and wildlife communities. For example, the government will try to designate important coastal and marine bird colonies as wildlife protection areas to promote the conservation of coastal and marine natural environments. The government will promote designation of wildlife protection areas that are important from a national or international viewpoint, in coordination with the relevant organizations. (MOE)
- Since it is important to secure international networks of migratory bird habitats and other ecological networks by designating bird migration grounds and the like as wildlife protection areas, the government will promote designation of wildlife protection areas, and build up a close connection with other relevant protection measures such as natural park management. (MOE)
- The government will appropriately manage wildlife protection areas by implementing management operations such as regular patrolling and wildlife inhabitation surveys, and promoting appropriate guidance of human use of the areas, public awareness campaigns on wildlife ecology and conservation and development of suitable environments for wildlife inhabitation, in order to ensure harmonious coexistence between humans and wildlife. For national wildlife protection areas, in particular, the government will work out master plans indicating protection and management guidelines to enhance their management. When wildlife habitat environments deteriorate in wildlife protection areas, the government will construct wildlife breeding and feeding facilities, lake water quality improvement facilities and the like, and fences to prevent penetration by wildlife-affecting animals as necessary to conserve, develop and improve wildlife habitats. (MOE)

4 Natural habitat conservation areas

(Outline of Measures and Policies)

Natural habitat conservation areas are designated for the conservation of Designated national endangered species under the Law for the Conservation of Endangered Species of Wild Fauna and Flora. Within each natural habitat conservation area, particularly important areas are designated as management areas, where permission is required for various activities, and others as surveillance areas, where reports are required on various activities. Habitat environments are conserved through such activity regulations.

4.1 Natural habitat conservation areas

(Current Situation and Challenges)

Since the formulation of the Second National Biodiversity Strategy of Japan, the government has designated the Yonehara Natural Habitat Conservation Area for *Platypleura albivannata* (November 2003) and the Zennoji-Nagaoka Natural Habitat Conservation Area for *Hynobius abei* (July 2006). As of November 2007, the designation had covered seven species at nine areas, totaling 885 ha.

At each natural habitat conservation area, conservation guidelines have been set according to the ecological characteristics of designated species. Surveys must be expanded on the population conditions of designated species. Population conditions will have to be improved if such conditions clearly deteriorate with the penetration of invasive alien species.

(Specific Measures and Policies)

- Since habitats must be secured for the stable survival of endangered fauna and flora species, the government will promote designation of natural habitat conservation areas in such a manner as to give priority to areas where habitats are maintained in good condition, while coordinating closely with other protection measures such as wildlife protection areas and natural park systems as necessary. (MOE)
- The government will appropriately manage natural habitat conservation areas and try to maintain and improve habitat environments in accordance with the protection guidelines set for each area. (MOE)

5 Places of scenic beauty, natural monuments, cultural landscapes

(Outline of Measures and Policies)

Places of scenic beauty and natural monuments are designated under the Law for Protection of Cultural Properties to protect, as cultural properties, places of scenic beauty that represent Japan's diverse natural beauty value and natural monuments commemorating natural spots of high scientific value. The designation and relevant protection have contributed much to conserving Japan's natural beauty and biodiversity. As well as the central government, local governments have designated many places of scenic beauty and natural monuments under their respective ordinances, contributing to the conservation of regional scenic landscapes and biodiversity.

The Law for the Protection of Cultural Properties, as amended on April 1, 2005, positions cultural landscapes as new cultural properties, defining them as "landscapes that have been formed through local residents' styles of living or working and regional climate, and are indispensable for understanding Japanese people's styles of living or working." The law also provides that particularly important cultural landscapes among the ones protected by prefectural or municipal governments may be selected as "important cultural

landscapes.” Correct evaluation and appropriate protection of cultural landscapes such as rice terraces and Satoyama village mountains that have been nurtured in harmony with nature in the regions has led to sustainable regional development, contributing to the conservation of regional biodiversity.

5.1 Places of scenic beauty and natural monuments

5.1.1 Designation, Conservation and Management

(Current Situation and Challenges)

The designation of places of scenic beauty and natural monuments is based on the “standards for the designation of special and non-special historic sites, places of scenic beauty and natural monuments.” Places of scenic beauty include cultural places that have been developed artificially, and natural places that originate from natural developments and have landscapes supported by history and culture. Natural places of scenic beauty are intended to include local climate, traditional land use, worship or recreation, in addition to long-known beautiful landscapes. Natural monuments include those that combine animals and plants peculiar to Japan’s nature with secondary nature created through cultural activities that have a long history. Japan’s cultural property system is globally unique, in that human-nature relations are interpreted in a multifaceted way as cultural artifacts similar to other cultural properties. As of November 1, 2007, 147 natural places of scenic beauty and 978 natural monuments had been designated.

In order to secure appropriate protection of natural places of scenic beauty and natural monuments, the central government has regulated actions for changing the status quo and provided subsidies for local governments’ conservation and management programs, including fact-finding surveys, consideration of conservation measures, development of conservation and management plans, protection and proliferation of animals and plants, management and restoration of plant communities, and purchases of designated sites.

While more than 80 years have passed since the launch of the natural monument designation system, critics have pointed to various problems including biased designation, failures to interpret animals and plants as communities in designation, and the absence of systematic protection. In order to solve these problems and work out guidelines for expanding protection, the government has conducted survey research in cooperation with many experts since FY 1998. At the end of FY 2003, a report was made for improving the relevant protection system while giving consideration to the conservation of biodiversity.

(Specific Measures and Policies)

- From the perspective of protecting cultural artifacts regarding human-nature relationships in Japan, the government will promote designation of natural places of scenic beauty and natural monuments among the unique landscapes and natural areas that could become the core of regional landscape diversity or biodiversity. (MEXT)

5.1.2 Conservation and management plans and restoration/rejuvenation

(Current Situation and Challenges)

In order to secure effective integrated conservation and management of places of scenic beauty and natural monuments, and their surroundings, a wide range of stakeholders should take part in working out a conservation and management plan to specify the direction of conservation and management, concrete measures and the sharing of burdens for each place or monument. For natural places of scenic beauty and

natural monuments that feature secondary nature, for example, measures may be taken to avoid community shifts. In response to declines in animal and plant populations designated as natural monuments seen in limited areas, and the inflow of alien animals and plants, local governments and the like may breed Kissing Loach (*Leptobotina curta*), Deep-bodied bitterling (*Acheilognathus longipinnis*), Metropolitan bitterling (*Tanakia tanago*) and other natural monument freshwater fish at sites other than their original habitats, promote the project to return white stork to the wild as a special natural monument, and remove alien species. These measures may achieve appropriate recovery or restoration of endangered species if they are implemented gradually and systematically under conservation and management plans.

Multifaceted efforts are required for these measures. The relevant organizations must cooperate in such efforts and local residents must participate in them. In this sense, we believe that support should be provided for the comprehensive promotion of measures such as the development of appropriate manuals and human resources, and construction of learning and breeding facilities.

(Specific Measures and Policies)

- For regions where places of scenic beauty or natural monuments have been designated, the government will cooperate with local governments in their conservation and provide subsidies for their programs to conduct fact-finding surveys, develop conservation and management plans and implement maintenance, management and restoration to conserve appropriate landscape diversity and biodiversity. (MEXT)

5.1.3 Utilization

(Current Situation and Challenges)

Between FY 1994 and 2000, the Agency for Cultural Affairs implemented model projects for the construction of learning facilities and the like for local schools and communities, to utilize familiar natural monuments for learning about the environment and community-building efforts, and provided subsidies for eight facilities.

Learning and education about the environment in school and community education should be promoted to develop a framework for conserving the natural environment and biodiversity in regional communities. To this end, the central government will continue to support the provision of learning opportunities utilizing natural monuments, in coordination with local governments.

(Specific Measures and Policies)

- The central government will cooperate with local governments, researchers and local residents for appropriate utilization of natural monuments and provide subsidies for local governments' programs for learning and education about the environment, and development and public opening of natural monuments as regional resources. (MEXT)

5.2 Cultural landscapes

(Current Situation and Challenges)

Over recent years, social and economic changes have led to the abandonment of Satoyama mountains and an increase in idle land, affecting the good interaction nurtured between humans and nature in regional communities. Depopulation has been occurring in intermediate and mountainous areas. Regional styles of

living and working have changed dramatically, making it difficult for regional communities to be maintained.

The cultural landscape protection system is designed to correctly assess and appropriately conserve and utilize cultural landscapes that have been nurtured through regional people's styles of living and working and local climate. As of November 1, 2007, the government had designated four important cultural landscapes: the Omihachiman lakeside area (Omihachiman City, Shiga Prefecture), the Ichinoseki Hondera rural landscape (Ichinoseki City, Iwate Prefecture), the Saru River cultural landscape nurtured through Ainu traditions and modern development (Hiratori Town, Saru County, Hokkaido Prefecture), and the Yusumizugaura terrace field (Uwajima City, Ehime Prefecture).

In order to conserve and utilize cultural landscapes, the central government has provided subsidies for local governments' programs for surveys, preparation of conservation plans, development, public awareness campaigns, etc.

(Specific Measures and Policies)

- In order to protect cultural landscapes nurtured through human interaction with nature, the government will promote designation of appropriately protected and valuable cultural landscapes as important cultural landscapes. (MEXT)
- In order to promote conservation and utilization of cultural landscapes, the government will provide subsidies for surveys, preparation of cultural landscape conservation plans, and specific restoration projects in areas with important cultural landscapes. (MEXT)
- In order to promote public awareness campaigns on cultural landscapes, the government will provide subsidies for programs for study sessions, open lectures and workshops where local residents participate. (MEXT)

6 Protected forests and protection forests

(Outline of Measures and Policies)

As for national forests including virgin natural forests and wildlife habitats, the government has promoted the networking of protected forests into "green corridors" for biodiversity conservation. The government has also stepped up appropriate conservation and management by grasping accurate data about precious wildlife species and protected forests and taking measures such as restoring vegetation and installing protection fences as necessary.

National or private forests that are required to have water recharging and other public functions are systematically designated as protection forests. In order to secure protection forests' functions according to their respective purposes, the government appropriately manages and conserves these forests through regulations on logging and changes in their use.

6.1 Protected forests and protection forests

(Current Situation and Challenges)

"Protected forests" are national forests where virgin natural forests or habitats for precious wildlife species are protected through management using natural succession. The government has designated such protected forests (833 forests, totaling 778 thousand ha, as of April 1, 2007) and networked protected forests into "green corridors" (24 corridors, totaling 509 thousand ha, as of April 1, 2007) for the conservation of

biodiversity, while requesting cooperation from private forests neighboring protected forests.

The government is required to promote designation of “protected forests” and “green corridors” and step up appropriate conservation and management of them by grasping accurate data about precious wildlife species and protected forests, and by taking measures such as restoring vegetation and installing protection fences as necessary.

National or private forests that are required to have water recharging and other public functions have been systematically designated as protection forests (11.76 million ha, as of the end of FY 2006) under the Forest Law. In order to secure protection forests’ functions according to their respective purposes, the government has appropriately managed and conserved these forests through regulations on logging and changes in their use. In the future, the government should promote systematic designation of protection forests (planned at 12.45 million ha for the end of FY 2018) under the national forest plan and implement appropriate management and conservation of them.

(Specific Measures and Policies)

- The government will continue to appropriately conserve and manage precious natural environments by implementing management using natural succession, restoring vegetation and installing protection fences as necessary in existing protected forests, and by promoting designation of new protected forests. (MAFF)
- In green corridors, the government will thin artificial forests to develop feeding environments for precious wildlife species and habitats for their feed animals, and will conduct monitoring surveys to grasp forest conditions and wildlife living conditions. The government will also promote designation of new green corridors to further secure the conservation of species and biodiversity. (MAFF)
- The government will systematically promote designation of protection forests that are required to demonstrate water recharging, soil spillage prevention and other public functions, based on a plan to expand the total area of such forests to 12.45 million ha by the end of FY 2018. At the end of FY 2006, the total area of designated protection forests stood at 11.76 million ha. (MAFF)

7 Green conservation areas, etc.

(Outline of Measures and Policies)

In urban regions, the government has conserved green spaces that form important natural environments for conserving biodiversity by designating green conservation areas and special green conservation areas under the Urban Green Space Conservation Law, and suburban green conservation areas and special suburban green conservation areas under the Law for the Conservation of Green Belts around the National Capital Region and the Law for the Development of Conservation Areas in the Kinki Region.

In city planning areas or quasi city planning areas, the government designates green conservation areas to appropriately conserve green spaces for preventing disorderly urbanization, pollution or disasters and for securing a healthy living environment for local residents through harmonious land use.

In city planning areas, the government designates special green conservation areas where certain behaviors require permission, to conserve the good natural environments of green spaces that contribute to preventing disorderly urbanization or disasters, are of traditional or cultural significance, feature exceptional landscapes, or are wildlife habitats for conservation.

The suburban green conservation area system is designed to subject certain activities to reporting and

conserve green spaces with good natural environments in the suburbs of big cities in the greater Tokyo and Kinki regions, to prevent disorderly urbanization, preserve urban living environments and contribute to the conservation of biodiversity. Within suburban green conservation areas, prefectural governments or the like designate in their city plans special suburban green conservation areas that feature particularly good natural environments or the like and show far greater effects of greenery conservation efforts.

7.1 Green conservation areas, etc.

(Current Situation and Challenges)

At the end of March 2007, the designation covered 355 special green conservation areas, totaling 2,034 ha, 25 suburban green conservation areas, totaling 97,073 ha, and 26 special suburban green conservation areas, totaling 3,456 ha.

Some designated suburban green conservation areas where activities are regulated have failed to fully work as the infrastructure of diverse and sound ecosystems, as the relevant landowners have fallen short of implementing sufficient management. Urban green spaces are not only the precious properties of urban residents but also wildlife habitats. Their management should be shared between landowners, local governments and local residents and taken over by future generations. The Urban Green Space Conservation Law and the like have established a management agreement system under which local governments or greenery management organizations conclude agreements with the owners of green spaces in special green conservation areas to manage these green spaces in place of their owners. This system should be utilized further.

(Specific Measures and Policies)

- The government will provide appropriate subsidies for compensation for losses on activity regulations, land purchases and development of landslide prevention and other facilities for conservation of green spaces. It will also promote designation of special green conservation areas and suburban green conservation areas as cores of urban wildlife habitats in order to secure biodiversity. (MLIT)
- In the greater Tokyo and Kinki regions, the government will consider designating areas for conservation in the Grand Design of Urban Environment Infrastructure (see Note 1) as suburban green conservation areas. (MLIT)
- The government will try to utilize management agreements and other systems to secure good management of green spaces by diverse parties. (MLIT)

Note 1: The grand design gives the future goals that relevant central government ministries and agencies, and local governments should share for conservation, restoration and creation of natural environments. It also indicates guidelines for measures and policies, and cooperation and burden-sharing among various stakeholders in achieving these goals.

The urban environment infrastructure means natural and artificial urban infrastructure that contributes to the improvement of urban environments for a better-quality urban life through such measures as maintaining and restoring sustainable ecosystems, providing opportunities for human interaction with nature and alleviating the heat island phenomenon.

8 Ramsar sites

(Outline of Measures and Policies)

In order to promote implementation of the Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention), which aims to promote the conservation of internationally important wetlands and their flora and fauna and ensure the wise use of such wetlands, the government has proceeded with the designation of wetlands of international importance as Ramsar sites, their conservation and wise use, and relevant public awareness campaigns.

8.1 Ramsar sites

(Current Situation and Challenges)

After the adoption of the 2nd National Biodiversity Strategy of Japan in 2002, two Japanese Ramsar sites were registered later in the year (when the 8th Meeting of the Conference of the Contracting Parties to the Ramsar Convention, or COP8, took place). In 2005 (when COP9 took place), 20 more Japanese wetlands were registered as Ramsar sites, including marshes, rice paddies, lakes, karst landscapes, tidal flats, coral reefs, mangrove forests, seaweed beds and neritic waters. As of November 2007, Japan has 33 Ramsar sites, totaling 130,293 ha, including Fujimae-higata, Kabukuri-numa and the surrounding rice paddies, and Notsuke-hanto and Notsuke-wan.

The government should further promote the conservation and wise use of these Ramsar sites and make efforts to register new Ramsar sites in Japan.

(Specific Measures and Policies)

- Among the wetlands considered for registration on the occasion of COP9 in 2005 but not yet registered, and those that have been found through new surveys to meet the criteria for identifying wetlands of international importance, the government will try to register 10 more Ramsar sites in Japan by COP11 (planned for 2011). (MOE) [Cited in Chapter 2, Section 4, 2.2]
- Following the decisions by the COP, the government will promote comprehensive conservation and wise use of wetlands by implementing monitoring surveys and information development for Ramsar sites, restoration of wetlands, environmental education, relevant public awareness campaigns and other measures, in cooperation with relevant local governments, NGOs, experts and local residents. (MOE, MLIT) [Cited in Chapter 2, Section 4, 2.2]

9 World heritage sites

(Outline of Measures and Policies)

The world heritage list based on the Convention Concerning the Protection of the World Cultural and Natural Heritage (World Heritage Convention), for protecting the world's important heritage for all of mankind, includes three Japanese natural heritage sites: Yakushima Island, the Shirakami Mountains and Shiretoko (as of November 2007).

The Sacred Sites and Pilgrimage Routes in the Kii Mountain Range and the Iwami Ginzan Silver Mine and its Cultural Landscape, specified in the cultural heritage list, have been admitted as having not only cultural value but also cultural landscapes, defined as "the combined works of nature and of man" in the Operational Guidelines for the Implementation of the World Heritage Convention.

The relevant organizations are internationally required to cooperate in conserving the acknowledged value of these world heritage sites in the future.

9.1 Natural world heritage

(Current Situation and Challenges)

The world heritage list under the Convention Concerning the Protection of the World Cultural and Natural Heritage (World Heritage Convention) for protecting the world's important heritage for all of mankind includes three Japanese natural heritage sites: Yakushima Island (10,747 ha), the Shirakami Mountains (16,971 ha) and Shiretoko (71,103 ha). Japan is internationally required to conserve the acknowledged value of these world heritage sites in the future. At each world heritage site, the relevant administration and other organizations have formed a World Heritage Area Liaison Committee, worked out a World Heritage Area Management Plan and promoted appropriate conservation. For Shiretoko, the government has created the World Heritage Area Scientific Council, comprising experts to conserve and manage the heritage site based on scientific knowledge.

Since Shiretoko was registered as a world heritage site in July 2005, Japan has been required to implement measures such as preparing a sea area management plan.

As for the Ogasawara Islands and the Ryukyu Islands (covering the Tokara and southern islands), which were considered along with Shiretoko as candidates at Japan's panel on world heritage candidates in 2003, Japan is required to solve problems such as treatment of alien species and expansion of protection guarantees.

(Specific Measures and Policies)

- For Yakushima Island, the Shirakami Mountains and Shiretoko, the central government will implement monitoring surveys and patrolling based on the world heritage area management plans it made in cooperation and coordination with local governments and other relevant parties. The government will also promote appropriate conservation and management of these world heritage sites under the Natural Parks Law, the Law for the Promotion of Nature Restoration, the Forest Ecosystem Protection Area System and the Law for Protection of Cultural Properties. (MOE, MAFF, MEXT) [Listed in Chapter 2, Section 4, 2.4]
- Based on discussions at the World Heritage Committee, the government will build a monitoring setup to grasp the impact of global warming on world heritage sites. (MOE, MAFF) [Cited in Chapter 2, Section 6, 1.1]
- At Shiretoko, the government will promote conservation and management based on scientific knowledge in line with recommendations by the existing Shiretoko World Natural Heritage Site Scientific Council. (MOE, MAFF)
- At Yakushima Island and the Shirakami Mountains as well, the government will try to enhance conservation and management, based on the management setup and scientific knowledge. (MOE, MAFF)
- Based on the Sika Deer Management Plan in the Shiretoko Peninsula developed in November 2006, the multi-use comprehensive sea area management plan prepared in 2007, assessment of the impact of artificial river structures on salmon and other fish, and discussions on how best to improve these structures, the government will work out a new Shiretoko World Natural Heritage Site Management Plan to appropriately conserve the area's natural environment through the realization of integrated marine and ground management operations. (MOE, MAFF, MEXT, MLIT)
- Based on the Basic Plan on the Proper Use of the Apical Region of the Peninsula Zone of Shiretoko National

Park adopted in December 2004 and the Basic Plan on the Proper Use of the Central Region of the Peninsula Zone of Shiretoko National Park produced in September 2005, the government will spread suitable rules for the use of virgin nature in Shiretoko, impose necessary restrictions and provide information and programs for the utilization of various natural and cultural resources to disperse use and appropriately guide users. (MOE, MAFF)

- The government will develop the Shiretoko World Heritage Center (tentative name) as a base for Shiretoko surveys and research and for the provision of information to Shiretoko users. (MOE)
- The government will implement the Shiretoko Natural Forest Development Campaign to enrich Shiretoko's forests and develop a base facility for voluntary activities as the base for forest development and forest environment education. (MAFF)
- As for the Ogasawara Islands, which Japan plans to recommend as a world heritage candidate in the future, the government will cooperate with the relevant organizations in expanding protection guarantees, promoting measures against alien species and conserving rare wildlife species over three years from 2007, to make visible achievements before making the recommendation. (MOE, MAFF, MEXT) [Cited in Chapter 1, Section 9, 1.5 and Chapter 2, Section 4, 2.4]
- As for the Ryukyu Islands (covering the Tokara and southern islands), Japan is required to expand protection guarantees for important areas, including habitats for endangered species. Therefore, the government will analyze and assess the value of the islands as a natural world heritage site and cooperate with local organizations in setting up and expanding protected zones. (MOE, MAFF, MEXT) [Cited in Chapter 1, Section 9, 1.5 and Chapter 2, Section 4, 2.4]
- The government will promote ecotourism at existing natural world heritage sites and candidates. (MOE)

10 Biosphere reserves

(Outline of Measures and Policies)

The Man and Biosphere (MAB) Program is one of the international joint programs of the United Nations Educational, Scientific and Cultural Organization (UNESCO), and aims at developing scientific bases for solving environmental problems. One of the most important pillars of the MAB Program is the Biosphere Reserve Management.

Biosphere reserves are representative ground and coastal reserves admitted as providing value for conservation as well as scientific knowledge, skills and human values to support sustainable development under the MAB Program. This program seeks to combine biosphere reserves into international networks to promote international sharing of information on the conservation of natural or managed ecosystems.

Biosphere reserves include strictly protected areas as their cores and their surrounding human activities, and cover such activities as scientific research, monitoring, education and training. The reserves are thus designed to provide models for strict protection and harmonious coexistence of man and nature, based on the activities of local communities and scientific knowledge.

10.1 Biosphere reserves

(Current Situation and Challenges)

UNESCO has designated four biosphere reserves in Japan. They are Yakushima Island, Mount Odaigahara & Mount Omine, Mount Hakusan and Shiga Highland.

Over recent years, biosphere reserves have been increasingly used in the world for “Education for Sustainable Development” and monitoring climate and other long-term global environment changes, as well as for scientific research.

(Specific Measures and Policies)

- As for the four designated biosphere reserve areas, the second edition of the “MAB Biosphere Reserve Catalog” was made in 2007, describing the present natural environment and biota situation, the impact of human activities and the like. The government will continue to promote their appropriate conservation and management, conduct monitoring surveys, publish monitoring survey results and use them for conservation and sustainable development of biodiversity. (MEXT, MOE)
- Based on global trends, the government will consider developing new measures and policies to take advantage of the biosphere reserves system, including selecting new biosphere reserve candidates. (MEXT, MOE) [Cited in Chapter 2, Section 4, 3.3]

Section 3 Nature Restoration

(Basic Concepts)

As well as enhanced conservation of precious existing nature, the proactive restoration of nature lost in the past has become important for rejuvenating weakening ecosystems. In July 2001, the prime minister-led “Conference on the Creation of ‘Wa-no-kuni’ - An Eco-society through Partnership - in the 21st Century” issued a report recommending the promotion of nature restoration public works. In December 2001, recommendations by the Council for Regulatory Reform called for the promotion of nature restoration projects in which various entities participate. In response to recommendations by a committee for conservation of the Kushiro Shitsugen river environment in March 2001, experts, NPOs and administrative organizations launched the Kushiro Shitsugen restoration project, Japan’s first nature restoration project in which various parties participated.

In response to such development, the Second National Biodiversity Strategy of Japan, adopted in March 2002, positioned nature restoration as one of three directions for future measures and policies. Under the recognition that Japan should shift from unilateral exploitation of natural resources or destruction of nature to qualitative improvement of overall domestic ecosystems, depending on regional environmental potentials, the relevant central government ministries and agencies and various parties have started joint nature restoration projects.

In order to comprehensively promote nature restoration measures and policies, the Law for the Promotion of Nature Restoration was enacted and took effect in January 2003. The law features three points: the objective of restoring lost or depleted ecosystems, the adoption of a bottom-up approach in which regional panels work out schemes and plans, and the principle of adaptive management for nature restoration projects.

In response to the effectuation of the Law for the Promotion of Nature Restoration, the Cabinet made a decision on the Basic Policy for Nature Restoration in April 2003. Regional nature restoration committees (hereinafter referred to as regional committees) were inaugurated at various points including the Arakawa Taroemon District and Kushiro Shitsugen. Including the regional committee launched in June 2004 for Nakaumi, a total of 19 regional committees existed as of November 2007. Various ecosystems including forests, grasslands, Satochi-Satoyama areas, rivers, lakes, wetlands and coral reefs have become subject to nature restoration projects. As of November 2007, 16 regional committees had prepared comprehensive nature restoration schemes (hereinafter referred to as comprehensive schemes), indicating overall nature restoration directions including restoration objectives and target areas. Under these comprehensive schemes, the committees make nature restoration implementation plans (hereinafter referred to as implementation plans) that give details of specific nature restoration projects. As of November 2007, eight regional committees had produced 14 implementation plans. As five years have passed since nature restoration was proposed under the Second National Biodiversity Strategy of Japan, Japan has shifted from nature environment surveys and preparation of comprehensive schemes to production of specific implementation plans and full-fledged implementation of nature restoration projects for diverse ecosystems.

Based on the Law for the Promotion of Nature Restoration, the government has established the Nature Restoration Promotion Council, comprising relevant administrative organizations, and the Nature Restoration Expert Committee, which gives advice for the council’s liaison, coordination and recommendations on implementation plans. The Nature Restoration Expert Committee has given the following views regarding the nature restoration framework:

- (1) Consideration should be given to natural resilience and cycles to prevent restored natural environments from depending on human operations in the future.
- (2) Now that nature restoration has just started, specific restoration cases should be accumulated.
- (3) Consideration should be given not only to upstream areas for nature restoration but also to ecosystems in downstream areas, including sea waters, as well as catchment areas, including river coasts.
- (4) Efforts should be made to promote effective nature restoration, based on a broad perspective covering the entire country.

Based on the basic principles of the Law for the Promotion of Nature Restoration, including cooperation among various regional entities, respect of regional independence and secured transparency, implementation based on scientific knowledge and utilization of nature restoration for learning about the natural environment, the government should steadily proceed with nature restoration efforts from a long-term perspective, in line with the project process, covering surveys, development of schemes and plans, implementation of monitoring, and assessment and reform of projects. At the same time, the government should improve technologies through accumulating nature restoration cases, develop nature restoration from a wider-area viewpoint and support nature restoration operations by private sector organizations at private sites. Now that five years have passed since the effectuation of the Law for the Promotion of Nature Restoration, the government will examine its implementation and take the measures required to effectively promote nature restoration projects.

1 Steady implementation of measures for nature restoration

(Outline of Measures and Policies)

The government will steadily implement nature restoration projects through coordination between relevant central government ministries and agencies, and the participation and cooperation of various entities. At the same time, the government will accumulate technological knowledge through nature restoration cases throughout the nation, to effectively promote nature restoration. In order to promote the public's understanding about ongoing nature restoration projects and prompt various entities to participate in such projects, the government will implement public awareness campaigns for local residents and the like about the need for nature restoration.

1.1 Steady implementation of measures for nature restoration and accumulation of technological knowledge

(Current Situation and Challenges)

The relevant administrative organizations have been implementing nature restoration at 144 sites (as of October 2006), including those for the above-mentioned regional committees. The Ministry of the Environment has been carrying out nature restoration projects under its direct control at seven national parks, including the restoration of wetlands in Kushiro Shitsugen and Sarobetsu, restoration of forests in Odaigahara, restoration of grasslands in Aso, and restoration of coral communities in Tatsukushi and Sekisei Lagoon. The ministry has also provided subsidies for quasi-national parks and national wildlife protection areas to support local governments' nature restoration projects at 12 sites. Various entities – including relevant central government ministries and agencies, local governments, NGOs, experts and local residents – have been coordinating and cooperating with these nature restoration projects. Since FY 2007, the ministry has implemented wildlife

habitat improvement projects under its direct control at national wildlife protection areas. In 2007, it launched such projects for four sites including Miyajima Marsh.

Nature restoration projects have thus been implemented for various types of ecosystem. Nature restoration projects should be implemented adaptively, based on the characteristics of target ecosystems, natural resilience, sensitive ecosystem balances and scientific knowledge. At present, however, the accumulation of technological knowledge is insufficient. Therefore, we must develop various nature restoration techniques, including methods to take advantage of natural resilience for nature restoration, to secure the autonomous survival of restored natural environments, and to implement nature restoration based on scientific knowledge, such as fine-tuned and careful measures kept in harmony with nature. They also include adaptive management methods to monitor the implementation of nature restoration and scientifically evaluate monitoring results. It is important to conduct nature restoration technology research and development in coordination with the implementation of nature restoration projects.

We should also pay attention to the following points in implementing nature restoration projects:

First, it is important to set the goal of a natural environment that can sustain a good condition. We should set long- and short-term goals while taking account of a natural environment's sustainability, based on natural resilience and cycles. In this respect, we should position natural changes and disturbances as a genuine dynamic mechanism of ecosystems for their maintenance.

Second, we should give priority to the conservation of existing nature and remove the fundamental factors behind the deterioration of natural ecosystems. Therefore, we should proceed with short-term stopgap measures including preventing the extinction of specific species in limited areas, while considering and implementing fundamental measures based on an understanding of deterioration factors and their compound effects.

Third, nature restoration projects are expected to produce various effects including conservation and restoration of natural environments, protection of biodiversity, contributions to conservation of the global environment, and invigoration of regional communities or economies. We should monitor and analyze these effects after nature restoration projects are implemented and appropriately assess relevant projects.

(Specific Measures and Policies)

- The government will steadily promote nature restoration projects, including such ongoing projects as the restoration of forests in Mt. Moriyoshi Heights, restoration of grasslands in Aso, restoration of Satoyama forests at Mt. Konoyama, restoration of lowland forests at Mt. Kunugi, restoration of wetlands in Kushiro Shitsugen and Sarobetsu, restoration of tidal flats at the mouth of the Fushino River, and restoration of coral reefs in Sekisei Lagoon. (MOE, MAFF, MLIT)
- Through the steady promotion of nature restoration projects, the government will collect project implementation methods and adaptive management methods, based on technological knowledge gained through the implementation of projects at various points. The government will then systematize these methods to accumulate technological knowledge on nature restoration. (MOE, MAFF, MLIT)
- In a bid to develop methods for appropriate assessment of the effects expected to result from nature restoration projects, the government will consider how to assess nature restoration projects and will establish relevant methods. (MOE)

1.2 Promotion of public awareness campaigns on nature restoration

(Current Situation and Challenges)

In areas where nature restoration efforts are necessary, public awareness campaigns about current natural environment conditions and the significance of nature conservation and restoration must be implemented efficiently and effectively to lead local residents, NGOs and other entities to understand and participate in nature restoration projects.

(Specific Measures and Policies)

- In areas where nature restoration efforts are necessary, the government will implement relevant public awareness campaigns through public participation natural environment surveys, preparation of nature observation handbooks, workshops on nature restoration, information services and environmental education. Through these campaigns, the government will seek to create 10 more regional nature restoration committees in five years. (MOE)

2 Promotion of new measures for nature restoration

(Outline of Measures and Policies)

Toward the promotion of new nature restoration efforts, the government will take account of a grand design for national land, seen from the viewpoint of biodiversity, and implement nature restoration projects aimed at specifying the ecological network initiative from nationwide and wide-area perspectives. In efforts to stimulate the participation and cooperation of various entities in nature restoration projects, the government will also consider how best to support nature restoration by private sector organizations at private sites. As five years pass since the effectuation of the Law for the Promotion of Nature Restoration, the government will examine its implementation and review the Basic Policy for Nature Restoration.

2.1 Promotion of nature restoration based on nationwide and wide-area perspectives

(Current Situation and Challenges)

At present, regional nature restoration committees are inaugurated based on regional voluntary initiatives. The way has yet to be paved for nature restoration based on a nationwide or wide-area viewpoint. Therefore, it is important to pick up areas with greater nature restoration needs and develop a mechanism for systematically implementing nature restoration projects through coordinating measures by relevant ministries and agencies under a long-term vision.

(Specific Measures and Policies)

- The relevant central government ministries and agencies will cooperate in considering the direction and specific measures for nature restoration based on a nationwide or wide-area viewpoint, Japan's comprehensive biodiversity assessment and progress in the ecological network initiative, and will proceed with efforts to systematically implement nature restoration projects. (MOE, MAFF, MLIT)
- The government will put in order and analyze accumulated information and utilize the comprehensive analysis for considering specifying areas with a greater need for nature restoration. (MOE, MAFF, MLIT)

2.2 Supporting nature restoration projects by private sector organizations and at private sector sites

(Current Situation and Challenges)

Since nature restoration is implemented for wide areas from a long-term perspective, the participation and cooperation of various entities including regional private sector organizations and residents are indispensable. However, the administrative sector has played a leading role in implementing nature restoration projects. Six private sector organizations serve as secretariats for regional nature restoration committees and an increasing number of private sector organizations positively participate in such committees. In order to further promote the participation and cooperation of regional private sector organizations and residents, regional communities may have to create mechanisms to support voluntary and positive nature restoration by private sector organizations at private sector and other sites. Private sector companies' agreement and cooperation with nature restoration may be required, along with public and private financial support. Support may also be necessary for coordination with landowners.

(Specific Measures and Policies)

- The government will consider and implement more effective methods to support nature restoration by private sector and other organizations at private sites. (MOE)

2.3 Examining implementation of the Law for the Promotion of Nature Restoration and reviewing the Basic Policy for Nature Restoration

(Current Situation and Challenges)

The Law for the Promotion of Nature Restoration requires the government to examine implementation of regional nature restoration projects and new problems, and take necessary measures based on the examination when five years have passed after the law's effectuation. It also requires the government to review the Basic Policy for Nature Restoration based on the progress in nature restoration projects roughly every five years.

(Specific measures)

- As five years pass since the effectuation of the Law for the Promotion of Nature Restoration, the government will utilize the Nature Restoration Promotion Council, which consists of the relevant central government ministries and agencies, to examine implementation of the law and take necessary measures for the effective promotion of nature restoration projects based on the examination. At the same time, the government will review the Basic Policy for Nature Restoration. (MOE, MAFF, MLIT)

Section 4 Agriculture, Forestry and Fisheries

(Basic Concepts)

The agriculture, forestry and fisheries sector implements essential operations for providing foods and living materials for human survival, and has played a key role in forming the natural environments familiar to humans and allowing a variety of wildlife species to survive in Japan.

The agriculture, forestry and fisheries sector can play a large role in conserving biodiversity in Japan. At the same time, the conservation of biodiversity is essential for the maintenance and development of the agriculture, forestry and fisheries sector and farming, forestry and fishing villages that provide safe, high-quality agricultural, forestry and fisheries products.

Indicating the close relationship between biodiversity and the agriculture, forestry and fisheries sector, our living essentials, including the rice, vegetables, fish and meat we eat every day as well as timber for the houses in which we live, are provided through the sector from rice paddies, forests and seas.

The agriculture, forestry and fisheries sector, unlike other industries such as manufacturing, has benefited from nature by working with nature, utilizing it and promoting natural cycles in a manner to adapt to it, instead of conflicting with it. The sector is based on the sound maintenance of biodiversity and natural material cycles.

Japan has a 380,000 square kilometer land mass extending north to south. Forests account for some 67% of the country, and farmlands for about 13%. In addition, Japan has a 4.47 million square-kilometer exclusive economic zone that is the sixth largest in the world and 12 times as large as the land mass. Agriculture, forestry and fisheries operations are conducted on the land and in the EEZ waters. Japanese fishermen also catch fish in other countries' EEZ waters under bilateral agreements, as well as in high seas.

Virgin natural forests are limited to remote mountainous backbones, peninsulas and isolated islands in Japan. Rice paddies, vegetable fields and other farmland, cedar and other artificial forests, Satoyama forests used for fuel wood and meadow production, and grasslands occupy a large part of the country.

On this farmland, artificial and Satoyama forests, grasslands, seaweed beds and tidal flats, human operations in the agriculture, forestry and fisheries sector and other industries have been repeated stably over a long time in a manner deep-rooted in seasonal climates, taking advantage of knowledge and techniques that have been accumulated regionally.

The sector has thus formed and maintained unique regional landscapes and natural environments, providing precious habitats for a variety of wildlife species. Unique regional ecosystems have been formed and maintained, contributing to biodiversity.

At the same time, nature-rich farming, forestry and fishing villages nurtured under a variety of unique regional cultures have been formed as places for the productive operations of the agriculture, forestry and fisheries industries and as places for humans to live through harmonious coexistence with various wildlife species. In these villages, we see wildlife species such as red dragonflies in the autumn dusk and killifish groups in streams, in addition to those useful for productive operations. Villages have directly interacted with these wildlife species.

The utilization of diverse genetic resources for the development of new crop varieties has contributed to the development of the agriculture, forestry and fisheries industries and can provide new potentials.

However, water quality has been deteriorated with the inappropriate use of agricultural chemicals and fertilizers, farmland and channel development pursuing economic efficiency, and household wastewater. Seaweed beds and tidal flats have declined with reclamation. Overfishing and the introduction of alien species

have destroyed ecosystems. Human operations that have failed to give consideration to the conservation of biodiversity have degraded wildlife habitats and seriously affected biodiversity.

In promoting the agriculture, forestry and fisheries sector over recent years, the government has given priority to Sustainable Agriculture and to production infrastructure that gives consideration to the environment. In the meantime, the agriculture, forestry and fisheries industries' productive operations have declined with the depopulation of farming, forestry and fishing villages and the decrease in the number of people performing these operations, as economic activities have changed with lifestyle shifts and other rapid social structure changes, and with economic activity reforms amid computerization and globalization. As use of Satoyama forests has decreased and abandoned farmland increased, wildlife species that had been seen easily in biodiversity-rich Satochi-Satoyama areas have decreased, with wildlife damage growing more serious.

We should interpret these conditions as a warning sign for the development of the agriculture, forestry and fisheries sector, which supports the lives of the people, and promote conservation of biodiversity more powerfully in this sector under the following four basic policies:

[4 basic policies]

(1) Promotion of agriculture, forestry and fisheries measures that give greater priority to the conservation of biodiversity

In order to meet the people's or consumers' demand for stable supply of safe food, the government should promote sustainable agriculture, forestry and fisheries industries that maintain good production environments, including the viewpoint of biodiversity conservation. At the same time, the government should invigorate the farming, forestry and fishing villages that support the sustainability of these industries.

Therefore, the government will give greater priority to biodiversity conservation in promoting agriculture, forestry and fisheries measures, promote sustainable agriculture, forestry and fisheries industries that can enhance the quality of wildlife habitats, and invigorate farming, forestry and fishing villages.

(2) Promotion of citizens' understanding about agriculture, forestry and fisheries, and biodiversity

As urbanization and industrialization have reduced human relationships with nature, all citizens from children to adults are keen to interact with various animals and plants, and bountiful nature. As Satochi-Satoyama areas – where people can interact with various animals and plants – and bountiful nature are closely linked to agriculture, forestry and fisheries operations, it is important to gain all citizens' understanding about the agriculture, forestry and fisheries sector's role in conserving biodiversity.

Therefore, the government will promote efforts to deepen citizens' understanding about the agriculture, forestry and fisheries sector and biodiversity through their experiences and interaction with nature in farming, forestry and fishing villages, as well as food education.

(3) Promotion of various entities' efforts, taking advantage of regions' original ideas

Activities have been implemented to reform regional agricultural production from the viewpoint of biodiversity conservation, including regional organic agriculture to restore white storks and other rare wildlife species, as well as conservation of ponds as biotopes in farmland development.

Farmers, community associations and NPOs have taken part in regional community activities to conserve farmland and agricultural water, to provide rice paddy fish ladders and feeding grounds for migratory birds for

conservation of ecosystems and to develop Satochi-Satoyama areas for reducing wildlife damage. Business enterprises are creating forests as part of their social contribution activities. Fishermen and NPOs are implementing forestation projects, and maintenance and management of seaweed beds and tidal flats to conserve fishing grounds. At various areas in Japan, a wide range of biodiversity conservation efforts are leading to invigoration of the agriculture, forestry and fisheries sector, and farming, forestry and fishing villages.

The wide range of biodiversity conservation efforts will become more effective if agriculture, forestry and fisheries workers engaged in their productive operations participate in these efforts, in cooperation with various other entities, as undertakers of biodiversity conservation.

Therefore, in a bid to support a wide range of activities conducted by various entities including agriculture, forestry and fisheries workers, local residents, NPOs, private enterprises and local governments, the central government will review and support biodiversity conservation activities utilizing regions' original ideas or know-how and techniques accumulated in local communities. The government will thus comprehensively promote biodiversity conservation with the understanding and participation of a wide range of people.

(4) Contribution to global environmental conservation through agriculture, forestry and fisheries

Regarding global biodiversity, the Sixth meeting of the Conference of the Parties to the Convention on Biological Diversity in 2002 committed themselves to achieve a significant reduction of the current rate of biodiversity loss by 2010. At present, however, the Secretariat of the Convention reports that biodiversity is still deteriorating.

Globally, biodiversity has deteriorated with factors such as deforestation caused by the expansion of farmlands and illegal logging, etc. and reduction of seaweed beds and tidal flats. There is also concern about the impact of global warming on ecosystems.

Recognizing that agricultural, forestry and fisheries product imports represent utilization of foreign countries' biodiversity, the government will positively tackle biodiversity conservation through promoting the agriculture, forestry and fisheries industries, and forest conservation and management in Japan in order to reduce Japan's impact on overseas biodiversity and contribute to global biodiversity conservation. At the same time, the government will undertake international cooperation that contributes to biodiversity conservation in the agriculture, forestry and fisheries sector, such as combating desertification and global warming.

1 Biodiversity in agriculture, forestry and fisheries

(Outline of Measures and Policies)

In developing agriculture, forestry and fisheries policies, the government has traditionally promoted the development of production infrastructure while giving consideration to Sustainable agriculture and environmental conservation, and has stepped up biodiversity conservation under the Second National Biodiversity Strategy. In response to a review of the Basic Food, Agriculture and Farming Village Plan (March 2005), the Basic Forest and Forestry Plan (September 2006) and the Basic Fisheries Plan (March 2007), and enactment of the Organic Agriculture Promotion Act (December 2006), the Ministry of Agriculture, Forestry and Fisheries adopted its biodiversity strategy (July 2007).

The strategy specifies problems and measures regarding biodiversity in the agriculture, forestry and

fisheries industries. Based on the strategy, the ministry plans to comprehensively promote biodiversity conservation by implementing new measures and policies, gaining the understanding and participation of a wide range of people and reviewing and supporting regional biodiversity conservation efforts.

In order to promote biodiversity conservation in the agriculture, forestry and fisheries sector, in line with the above four basic policies, the ministry will go ahead with the conservation of countryside and Satochi-Satoyama areas, forests, and Satoumi and other sea areas. Since such areas are closely linked to each other, biodiversity conservation must cover forest, river and sea ecosystems. In this sense, the ministry will support agricultural production emphasizing biodiversity in countryside and Satochi-Satoyama areas as well as broad-leaved tree planting by fishermen, will designate and conserve fish-breeding forest reserves and will develop forests for fishing ground conservation to positively conserve forest, river and marine biodiversity. The ministry will also tackle conservation and sustainable use of genetic resources, global environmental conservation in the agriculture, forestry and fisheries sector and development of biodiversity indicators in the sector.

1.1 Biodiversity in agriculture, forestry and fisheries

(Current Situation and Challenges)

The agriculture, forestry and fisheries sector uses cycles involving various wildlife species in nature and nurtures animals and plants, based on biodiversity.

In farming, forestry and fishing villages, people conduct sustainable agriculture, forestry and fisheries operations and interact with nature to produce bountiful biodiversity. Biodiversity must be conserved to maintain and develop such farming, forestry and fishing villages and leave a secure Japan for the children of the future.

The conservation and management of forests with exceptional natural environments that have contributed to biodiversity are important.

(Specific Measures and Policies)

○ Region-by-region biodiversity conservation

In order to accurately address the circumstances surrounding biodiversity in the agriculture, forestry and fisheries sector and farming, forestry and fishing villages, the government will comprehensively promote the following biodiversity conservation measures. (MAFF)

(1) Conservation of countryside and Satoyama-Satochi areas (detailed in Chapter 1, Section 6)

(2) Conservation of forests (detailed in Chapter 1, Section 5)

(3) Conservation of Satoumi and other sea waters (detailed in “Fisheries in Satoumi and other sea waters” in Chapter 1, Section 9)

○ Promotion of biodiversity conservation covering forests, rivers and seas

“Forests are the lover of seas.” Forests have water recharging and soil spillage-preventing functions and contribute to biodiversity by providing seas with nutrients, through rivers going through the countryside and Satochi-Satoyama areas, to grow the seaweed and phytoplankton that live in Satoumi waters. Appropriate use of agricultural chemicals and fertilizers for agricultural production in countryside and Satochi-Satoyama areas can reduce the impact of human activities on biodiversity in Satoumi waters. Since forests, countryside, Satochi-Satoyama areas and Satoumi waters are closely linked, the government will promote biodiversity

conservation covering all ecosystems in forests, rivers and seas. (MAFF)

- Conservation and sustainable utilization of genetic resources (detailed in Chapter 2, Sections 1-2)

The government will promote the conservation and sustainable use of useful genetic resources and secure Japan's biodiversity through regulations on genetically modified farm products. (MAFF)

- Contributions to global environmental conservation in agriculture, forestry and fisheries (detailed in Chapter 2, Section 4)

The government will take advantage of Japan's experience and knowledge at home and abroad to promote international cooperation for sustainable agriculture, forestry and fisheries industries and positively contribute to global environmental conservation, including the prevention of desertification, sustainable use of water resources and measures against global warming. (MAFF)

- Development of biodiversity indicators in agriculture, forestry and fisheries (detailed in Chapter 2, Section 5)

Biodiversity conservation, on which the agriculture, forestry and fisheries sector is based, is indispensable for the stable supply of safe, high-quality agricultural, forestry and fisheries products to the people.

However, in the implementation of the policies and measures for agriculture, forestry, and fisheries including sustainable agriculture, although biodiversity is taken into consideration, the indicators based on a scientific basis that can qualitatively grasp the effect have not been developed. Since the development of such indicators is needed to effectively promote those policies and measures, the government will examine the indicators based on scientific ground and will clarify the role that agriculture, forestry, and fisheries play for biodiversity, in addition to promoting deepening national and international understanding. (MAFF)

(Measures and Policies for Local Areas)

Section 5 Forests

(Basic Concepts)

A variety of genes and species of animals, plants and soil organisms inhabit the forests that account for two-thirds of Japan's land. Together with location and weather conditions, forests constitute diverse complex ecosystems and have become a key factor for conservation of biodiversity. Forests absorb and store carbon dioxide to help prevent global warming. They also stabilize weather conditions, prevent soil runoffs, recharge water reserves, supply timbers as renewable resources and store massive genetic resources. Forests are an environmental and survival infrastructure that is indispensable for human beings. In Japan, forests fulfill citizens' various needs including environmental education and health promotion. They are thus required to serve as places of healing and cultural infrastructure.

Forestry is based on the productivity of forest ecosystems and plays a role in allowing forests to demonstrate their multiple functions including conservation of biodiversity, through appropriate operations including planting, weeding, brushing and thinning. Forestry produces timbers that have less environmental load. Effective utilization of timbers over a long term and multiple phases contributes to realization of a sustainable society.

Forests are formed over a very long time. As various environments including grass plants, bushes and tall trees are formed during the forest growth process, forest biodiversity changes along with wildlife habitats. Appropriate forest development can foster sound forests that are resistant to disease and insect pests, and wind and snow damage. Development of forests of various ages through appropriate logging and planting, with consideration given to conservation of animals, plants and ecosystems, can lead to conservation of biodiversity.

We must carry the precious forests over to future generations and allow forests to sustain multiple functions into the future. In this sense, development of diverse and sound forests is important. Also important are promotion of forest conservation and management, implementation of forestry operations giving consideration to biodiversity, invigoration of mountain villages through training of forestry workers and exchanges between urban and rural communities, forest development movements of business corporations and NPOs, and expansion of forest environment education and citizens' interaction with forests to deepen citizens' understanding about roles of forests and forestry and about significance of timber utilization. With understanding and cooperation by a wide range of citizens, the government and private sectors must be united to comprehensively promote the National Campaign for the Promotion of "Utsukushii Mori Zukuri" (the creation of well-managed forests and nature-rich land for future generations). As artificial forests developed after the war and other forest resources have growingly become available for human utilization, we must promote appropriate development and conservation of forests through such operations as thinning in a bid to revitalize forests and the forestry and timber industry through expansion of forest utilization.

National forests that account for 20% of Japan's national land and 30% of Japan's forests are located at remote mountainous backbones and water sources, and include a variety of forests from virgin natural forests to artificial ones, playing an important role in conserving biodiversity and allowing citizens to enjoy affluent lives. National forest administration and management must be designed for allowing national forests to demonstrate public functions as "forests for citizens." Virgin natural forests and forests with habitats for precious wildlife species, which could be registered as world natural heritages, should be designated as "protected forests" or

“green corridors” for protection and management of precious natural environments. Artificial forests should be appropriately developed and conserved through promotion of thinning and mixing of coniferous and broad-leaved trees. At the same time, the public sector should coordinate and cooperate with citizen groups to take advantage of regional characteristics for forest formation and provide opportunities for citizens’ interaction with forests.

In addition, Japan as a big importer of timbers, should contribute to conservation of forest biodiversity on a global scale through assistance to overseas forest conservation and sustainable forest management.

1 Forests

(Outline of Measures and Policies)

Forests have multiple functions including conservation of biodiversity and widely benefit citizens as “green social infrastructure.” As the first commitment period (2008-2012) under the Kyoto Protocol for reduction of greenhouse gas emissions is approaching, forest development has been increasingly expected to secure absorption of carbon dioxide. Forests are also expected to be useful for forest environment education and forest therapy. Citizens’ needs for forests have become diversified.

[Promoting creation of diverse forests]

The Basic Plan for Forests and Forestry, which was compiled in September 2006 under the Forest and Forestry Basic Act, calls for classifying forests into three categories in accordance with their respective priority functions and promoting category-by-category forest development and conservation measures. The three categories are the “water and soil conservation forest” for the water-recharging or mountain region disaster-preventing function, the “human-nature symbiosis forest” for the living environment protection or health-promotion and cultural functions and the “cyclic resource utilization forest” for timber production. Under the policy of developing a fast-increasing number of old-age artificial forests into diverse sound forests through thinning, mixing of coniferous and broad-leaved trees, planting of broad-leaved trees and long-term felling over the next 100 years to sustain forests’ multiple functions including conservation of biodiversity and meet diversifying needs of citizens, the government is now promoting various measures through forestry planning and other systems.

At their meeting on February 23, 2007, related Cabinet ministers decided to promote the National Campaign for the Promotion of “Utsukushii Mori Zukuri” (the creation of well-managed forests and nature-rich land for future generations) as a joint movement between the public and private sectors based on understanding and cooperation by a wide range of citizens. The campaign calls for thinning over a total forest area of 3.3 million ha over six years from 2007. It also pledges to (1) build a sound material-cycle society rich with greenery through promotion of appropriate forest development including utilization of timbers, (2) develop vigorous human resources and communities supporting forests and (3) promote participation in forest development efforts by a wide range of parties including urban residents and business corporations.

In proceeding with these forest development measures, the government will promote operations giving considerations to conservation of animals and plants living in forests and ecosystems.

[Promoting appropriate conservation and management of forests]

Forests that are particularly required to demonstrate public functions are designated as protection forests to

promote regulation of tree felling and their diversion, establishment of conservation facilities in wastelands and improvement of forests losing functionality. Against forest damage through disease and insect pests, the government will promote accurate and efficient measures in cooperation and coordination with forest owners, local residents and relevant organizations while considering damage details and regional conditions. Against forest damage being brought about by deer and other wildlife species, the government is promoting wide-area and effective measures based on damage and wildlife habitat conditions in coordination with wildlife protection and management measures. The government will also appropriately step up measures giving consideration to humans' harmonious coexistence with wildlife species.

[Invigorating mountain villages]

Japan's mountain villages are depopulated and have aging residents. Living standards in such villages are still inferior to those in urban regions. Therefore, mountain villages must be invigorated to implement appropriate development and preservation of forests and conservation of biodiversity.

Therefore, the government will secure new forestry workers and promote exchanges between urban and rural communities and people's settlements in mountain villages to invigorate these villages.

[Forest development with citizens' participation and promotion of diverse forest uses]

The government will promote forest development with citizens' participation and diverse forest uses including forest environment education by paving the way for business corporations, NPOs and other entities to participate in forest development, by developing personnel and public awareness campaigns for promotion of forest environment education and by providing fields and technical guidance for experience-based activities.

[Development of forestry and timber industry]

Appropriate forest development is required for forests to play multiple functions including conservation of biodiversity. In this respect, it is important to ensure that timbers supplied through appropriate production operations are used finally by consumers and that earnings from timber sales are used to cover costs shouldered by forest owners and reinvested in development and conservation of forests.

To this end, the government will proceed with structural reforms to reduce costs for production, distribution and processing of materials and to develop systems for stable supply of products with good quality and performances. In this way, the government will expand uses of domestically produced timbers for development of the forest and timber industry.

[Promotion of national forest administration and management]

National forests are located at various points including remote mountainous backbones, water sources and Satoyama areas. These forests are diverse, including Japan's three most beautiful forests of Aomori Hiba (Hinokiasunaro), Akita Sugi (Akita cedar tree) and Kiso Hinoki (cypress); Yanase cedar forests; Hokkaido mixed forests including Yeddo spruce and fir trees; Japan Alps mountains; artificial forests where tree planting and maintenance have been implemented over more than 100 years; red pine woods at Mt. Higashiyama in Kyoto; fuel wood and other community-based forests; forests with ecosystems inherent to the Ogasawara Islands; laurel forests in the Aya region of Kyushu Island; Yakushima Island and the Shirakami-Sanchi Mountain Range registered as world natural heritages; and virgin natural forests on the Shiretoko Peninsula.

These national forests play a role in recharging water and preventing mountain disasters and make great contributions to conservation of Japan's biodiversity.

Over the recent years, citizens' expectations on forests have become diversified. Forests are now expected to help prevent global warming and conserve biodiversity. Under the policy of allowing national forests to play public functions as "forests for citizens" or common assets of citizens, the government has administered and managed national forests based on diverse opinions from citizens, in order to ensure that citizens enjoy affluent lives.

In administration and management, the government classifies national forests by priority function into categories for different treatment and bases promotion of forest development and conservation on the classification. In order to respond to diverse problems and needs in coordination with privately owned forests along each river, the government also works for agreements among relevant parties and enhances upstream-downstream cooperation.

Precious forests for protection of forest ecosystems, conservation of genetic resources and preservation of plant communities will be designated as "protected forests" for special maintenance and conservation through monitoring and other operations. At the same time, "green corridors" will be set up to network protected forests to conserve species and genetic diversity.

The government will also cooperate with local communities in implementing the "Akaya Project," the "Aya Laurel Forest Project" and other forest development projects taking advantage of regional characteristics. It will also promote diverse uses of forests through such measures as forest development with citizens' participation and provision of fields for forest environment education.

At the same time, the government will support local activities through the "Forest Environmental Conservation Center" and the like to ensure that a wide range of citizens will participate in promoting uses of forests.

[Promotion of sustainable forest management in the world]

As promotion of "sustainable forest management" has been recognized as an important challenge for growing interests in global environmental problems over the recent years, countries in the world are using "criteria and indicators" of "sustainable forest management" as agreed through international processes for monitoring and assessing their respective forest conditions.

Given the trend, Japan is required to grasp sufficient data on non-commercial trees and biodiversity in its forest resources surveys. The government will thus promote unified methods for forest resources monitoring to collect and analyze timber production, biodiversity, carbon cycle, water resources conservation and other data regarding internationally agreed "criteria and indicators."

In order to promote sustainable forest management in the world, the government will contribute to global biodiversity conservation by participating in international fora such as the United Nations Forum on Forests (UNFF) and by promoting bilateral and multilateral cooperation.

1.1 Concepts of Developing Forests into Desirable Ones Meeting Priority Functions (Current Situation and Challenges)

All forests variously contribute to maintenance and improvement of citizens' lives by playing multiple functions. Therefore, forests should be developed and conserved to effectively achieve their respective

requirements.

Japan is a small country with high precipitation, and has a massive population engaged in advanced economic and cultural activities. However, many forests have multiple functions to effectively play. Therefore, the government must promote more appropriate development and conservation of forests while considering their priority functions in response to their natural conditions and regional needs.

Japan's forests have quantitatively expanded as a result of positive postwar artificial forest development. In order to develop these artificial forests into desirable ones, the government will have to appropriately select forestry operations based on present forest conditions, locations and citizens' needs and promote systematic forest development and conservation.

(Specific Measures and Policies)

- The government will specify three categories of desirable forests -- the "water and soil conservation forests," the "human-nature symbiosis forests" and the "cyclic resource utilization forests" -- in the Basic Plan for Forests and Forestry and promote forest development and conservation in pursuit of their respective desirable forms through forestry planning and other systems. (MAFF).

The three categories of desirable forests follow:

In desirable "water and soil conservation forests," some space should have been secured between trees to allow appropriate sunlight to reach and grow understorey vegetation. Fallen leaves and other organic substances should have been abundantly supplied into soil. Understorey vegetation and tree roots should have grown deep and wide to hold soil. Sufficient cracks should have been formed in soil to absorb and keep water. The forest should excellently hold soil and charge water. As necessary, forest conservation facilities should have been built to prevent soil runoff or collapse.

Desirable "human-nature symbiosis forests" should include a forest that has a virgin nature environment suitable for inhabitation of precious wildlife species, a forest where town streets, historic sites and scenic spots are united with a virgin nature environment to form pleasant landscapes and historic sceneries, a forest that prevents noise and winds and provides pleasure and security for human lives, a forest that is appropriately managed as a familiar place for human-nature interaction and provides citizens with recreation and learning opportunities, and a forest where facilities for health-promoting, cultural and education activities are developed as necessary.

Desirable "cyclic resource utilization forests" should have soil suitable for growth of trees, include excellent trees useful as timbers, grow relatively faster and be highly capable of fixing carbon dioxide. These forests should be sufficiently wide and have appropriately developed infrastructure including trails.

- The government will specify concepts of how to develop the three categories of forests into desirable ones and promote forestry development and conservation through forestry planning and other systems based on such concepts. (MAFF)

Following are the concepts of how to develop the three categories of desirable forests:

In developing desirable "water and soil conservation forests," forests should be left to age with felling-caused bare land being narrow and dispersed. At the same time, appropriate forest development and conservation should be based on the following concepts for specific forests:

In multi-storied forest development operations, existing trees at single-storied coniferous forests subject to careful operations with consideration given to prevention of soil runoff or collapse should be left

to age as upper-story trees. At the same time, thinning should be repeated for gradual renewal. Natural forces may be used to introduce broad-leaved trees according to location conditions as well as social needs including conservation of landscapes. In this way, broad-leaved trees may be mixed with coniferous trees to develop multi-storied forests.

Natural forests subject to continuous management for water and soil conservation should be developed into multi-storied forests through partial planting and renewal assistance, quantitative tree adjustment and tending.

In developing single-storied coniferous forests that are located at mild slopes, growing relatively faster and sufficiently large in size, appropriate tending and thinning should be implemented with considerations given to plane expansion and mosaic distribution. Felling intervals should be extended for development and management of single-storied forests.

Treeless land or deserted forests where planting is required for water-recharging and other functions should be developed into single-storied forests. After sufficient growth, these single-storied forests should be transformed into multi-storied forests as necessary over an extended period of time.

In natural forest management, renewal assistance and other operations may be implemented as necessary for appropriate conservation and management of forests that depend on natural forces and play water-recharging and other functions.

Development of “human-nature symbiosis forests” should give basic priority to conservation and creation of natural environments. At the same time, appropriate forest development and conservation should be based on the following concepts for specific forests:

In natural forest management, forests with excellent natural environments and landscapes, including important wildlife habitats for conservation of virgin nature and natural environments, should basically be left to natural succession. As necessary, vegetation should be restored for appropriate conservation and management.

In multi-storied forest development, broad-leaved and coniferous trees should be mixed for suburban, Satoyama and remote forests that are subject to continuous development and management as forests that make daily lives pleasant and relaxed and serve as the places for human-nature interaction and humans’ harmonious coexistence with wildlife.

In single-storied forest development and management, appropriate tending and thinning should be basically implemented with considerations given to landscapes for single-storied coniferous forests that are located at Satoyama and other mild slopes and growing relatively faster.

Development of desirable “cyclic resource utilization forests” should give basic priority to efficient and stable supply of timbers. At the same time, appropriate forest development and conservation should be based on the following concepts for specific forests. When development methods are selected, considerations should be given to timber production costs.

In multi-storied forest development and management, belt or zone thinning should be implemented to efficiently develop single-storied coniferous forests that are growing slowly.

Natural forests subjected to continuous development and management, including broad-leaved tree forests located between single-storied coniferous forests, should be developed into multi-storied forests with excellent large trees through renewal assistance and quantitative adjustments.

In single-storied forest development and management, appropriate tending and thinning should be

basically implemented for single-storied coniferous forests that grow fast.

Natural forests that are surrounded by developed multi-storied and single-storied forests at mountain ridges or valleys and depend on natural forces for maintenance of sound conditions should be appropriately conserved and managed through renewal assistance as necessary.

1.2 Promoting development of diverse forests

(Current Situation and Challenges)

Under the previous Basic Plan for Forests and Forestry, some progress was seen in emergency thinning efforts. But there are many forests that cannot be expected to continuously and efficiently achieve their multiple inherent functions including conservation of biodiversity. Unless appropriate operations are implemented, such forests may increase. Efforts are still limited for development of multi-storied forests for maintenance and improvement of water-recharging, soil runoff prevention and other public functions to help prevent forests from becoming bare land. This may be because diverse methods including low-cost ones to develop mixed or broad-leaved tree forests and concepts of how to select forests for such development and relevant technologies have failed to diffuse. Introduction or diffusion of efficient operation systems to promote thinning and development of multi-storied forests has been insufficient. Relevant trail network development has also been insufficient. Distribution of trail networks has failed to meet efficient operation systems.

As aged artificial forests are expected to increase in Japan, promotion of development of diverse forests to meet citizens' needs is reaching a turning point. Japan is now required to efficiently and effectively promote thinning for sound forest growth and development of diverse forests meeting location conditions and social needs in order to allow all forests to continuously achieve their multiple inherent functions.

While thinning and other efforts are required for developing diverse forests, citizens including urban residents will have to be involved in forest development through such measures as utilization of wooden products.

(Specific Measures and Policies)

[Developing diverse forests through such measures as expansion of broad-leaved tree forests and extension of felling intervals]

- In order to promote development of diverse forests through such measures as expansion of broad-leaved tree and mixed forests and extension of felling intervals, the government will propose development methods for forest owners' selection, systematically diffuse efficient operation know-how, form consensus on acceleration of efforts to develop diverse forests, and select forest development sites. While promoting and diffuse these efforts on a nationwide basis, the government will back up efficient operations including belt or zone felling. In a bid to ease the burden of forest owners, the government will also try to diffuse and settle technologies for efficient and low-cost afforestation and tending. (MAFF)

[Efficient and effective implementation of operations]

- The government will develop, diffuse and settle low-cost, efficient operation systems combining forest trail networks with high-performance forestry machines. (MAFF)
- The government will promote appropriate combinations of forest trails and strip roads meeting natural conditions and specific operation systems planned for introduction. Particularly, the government will try to

harmonize forest trails with surroundings in all phases including planning, design and construction. (MAFF)

[Securing regional activities for appropriate implementation of forest development]

- In order to ensure that systematic and integrated forest operations are implemented timely and appropriately, the government will support such regional activities as “collection of forest information” required for intensification of forest operations by forestry business entities and “specification of operation implementation zones” required for implementation of forest operations by forest owners. (MAFF)

[Promotion of forest development through public sector involvement]

- In order to ensure people’s safety and security, municipal and prefectural governments will promote intensification of operations by forestry cooperatives and other business entities and effective implementation of thinning for forests where owners and the like have difficulties in implementing appropriate development operations. For forests that are strongly requested to achieve public functions while failing to be developed timely or appropriately even with local government support, the government will implement necessary development operations through forest conservation and other projects. Then, the government will promote expansion of mixed forests based on location conditions. (MAFF)
- The government will promptly promote forest renewal measures for vacant lots where no planting has been implemented following felling, while trying to prevent such lots from emerging. (MAFF)

[Research, and technology development and diffusion]

- In order to secure research and technology development and forest tree breeding for future development of forests and the forestry and timber industry and to systematically and effectively diffuse their achievements, the government and related independent administrative agencies will promote research and technology development efficiently and effectively while enhancing industry-academia-government cooperation involving prefectural testing and research institutions, universities, academic societies and business corporations, based on the “research and technology strategy for forests, forestry and timber industry areas” and the “forest tree breeding strategy” that specify goals for appropriate and efficient forest development and conservation and for enhancement of the timber industry’s competitiveness. (MAFF)
- In order to transfer research and technology development achievements and to promote regional communities’ integrated forest development and conservation, and forestry production, the government will efficiently and effectively promote diffusion of such achievements among regional forestry leaders and forestry entities engaged in intensification of operations, through forestry diffusion guidance projects. (MAFF)

[Conservation and utilization of genetic resources]

- In order to secure excellent seeds as necessary, the government will implement production and distribution measures including development of seed resources and improvement of seedling technologies. (MAFF)
- In order to appropriately develop and conserve forests in Japan for the future under the “forest tree breeding strategy” as prepared in 2007, the government will steadily promote development of seeds with necessary genetic characteristics, seeds for national land conservation of water-recharging functions and other new seeds meeting citizens’ needs and diffuse these new seeds. (MAFF)

- In order to conserve rare and precious forest tree genetic resources including endangered species and to secure and effectively utilize forest tree genetic resources useful as breeding materials for development of new forest tree species, the government will collect, store and evaluate forest tree genetic resources and manage and distribute relevant information. (MAFF)

[Financing social costs]

- Various resources are used for financing social costs for development of water sources and other forests, including general-purpose financial resources, environmental tax and surcharge revenues at central and local governments, upstream-downstream cooperation funds, profit-sharing forest contracts, fees collected for forest space uses and volunteer funds. In a bid to allow forests to sustainably achieve their multiple inherent functions, the government will consider selecting financial resources accurately to meet regional conditions in view of social and economic situation changes while getting citizens' understanding. (MAFF)

[Contributing to prevention of global warming]

- In order to achieve forests' target absorption of 13 million tons in carbon under the Kyoto Protocol Target Achievement Plan, the government will promote comprehensive efforts including development of sound forests, appropriate management and conservation of protection forests and other forests, utilization of timbers and wood biomass and forest development with citizens' participation in cooperation with local governments, forestry and timber industry stakeholders and citizens. (MAFF) [Cited in Chapter 2, Section 6, 1.1]
- The government will positively participate in the international assessment of roles that forests and timber utilization play in preventing global warming. (MAFF) [Cited in Chapter 2, Section 6, 1.1]

1.3 Promotion of National Campaign for the Promotion of “Utsukushii Mori Zukuri”

(Current Situation and Challenges)

Forests have various public functions including conservation of biodiversity. Promotion of “Utsukushii Mori Zukuri” (the creation of well-managed forests and nature-rich land for future generations) forms the basis for building of a beautiful country.

As mountain villages have lost vigor due to deterioration of forest profitability over recent years, however, forests are feared to lose public functions in the absence of thinning. In order to allow forests to achieve their public functions, artificial forests accounting for 40% of Japan's forests should be thinned appropriately and developed into diverse forests including broad-leaved tree forests.

Japan's forest resources including those at artificial forests developed after the war are becoming available for utilization. As timber demand has been increasing globally, forests and forestry should be revitalized through development and conservation including appropriate thinning and expanded utilization of domestic timbers.

Therefore, relevant government ministries and agencies (Cabinet Secretariat Office for the Promotion of Regional Revitalization, MIC, MEXT, MHLW, MAFF, METI, MLIT and MOE) should cooperate to comprehensively promote appropriate development and conservation of forests, utilization of domestically produced timbers, development of forestry workers and rural communities and other efforts while gaining understanding and cooperation from a wide range of citizens.

(Specific Measures and Policies)

- The government will promote intensification of forestry operations through proposals to forest owners, diffusion and settlement of lost-cost operation systems, efficient distribution of forest products and larger-scale lumbering and processing operations to structurally reform timber production and distribution systems for stable provision of high-quality and high-performance products. (Relevant government ministries and agencies)
- The government will promote utilization of timbers for housing, energy areas and public works, development of new products and technologies meeting consumer needs, creation and expansion of new markets giving priority to consumers and diffusion of good wood uses. (Relevant government ministries and agencies)
- The government will attempt to secure and develop people undertaking forest development and conservation by promoting training of people interested in forest development and conservation, including those who are moving to rural communities in their so-called U, J or I turn. The government will also secure and develop forest development and conservation workers in coordination with efforts to encourage a rising number of retired workers to return to their hometowns. Furthermore, the government will take forest management adjustment measures including specification of borders in line with promotion of forest development and conservation. (Relevant government ministries and agencies)
- The government will attempt to invigorate mountain villages by conserving mountain village resources including excellent natural environments, cultures and traditions, by utilizing these resources for creation of new industries and attractive communities and by developing mountain village infrastructure and these villages' systems for acceptance of new residents. (Relevant government ministries and agencies)
- The government will encourage a wide range of people to participate in forest development and conservation by promoting voluntary forest development by business corporations, NPOs and urban residents and by enhancing citizens' understanding about forests through forest environment education, forest therapy, and conservation and utilization of community-based forests. (Relevant government ministries and agencies)
- The government will promote forest owners' appropriate forest development and efficient regional forest development linking privately held communal and national forests. (Relevant government ministries and agencies)

1.4 Promotion of appropriate forest conservation and management

(Current Situation and Challenges)

Forests that are required to achieve water-recharging and public forest functions have been systematically designated as protection forests for conservation through appropriate measures such as regulations on felling or diversion.

Meanwhile, mountain disasters still occur due to such weather conditions as local heavy rains. Local floods and droughts have been increasing as a result of widening precipitation gaps between rainy and dry years.

Damage by widespread forest disease and insect pests such as pine weevils and *Platypus quercivorus* beetles has emerged in areas where such damage had not been seen. Any forest fire has the potential to cause serious damage to forests.

Forest conservation and management grows more important for ensuring citizens' safety and security through forests' public functions.

(Specific Measures and Policies)

- Forests that are required to achieve public functions will be systematically designated as protection forests (planned at 12.45 million ha at the end of FY 2018). In order to secure sufficient conservation of functions by protection forests, the government will further promote appropriate management of protection forests by developing a system for utilizing digital satellite pictures and the like for efficient management of protection forest data and regulatory information. (MAFF)
- In order to prevent mountain disasters from being caused by heavy rains, earthquakes, volcanic eruptions, landslides and driftwoods and minimize damage by such disasters to make contributions to improvement of regional safety, the government will promote establishment of forest conservation facilities. Protection forests that serve as important upstream dam water sources or as water sources for communities will be appropriately conserved through promotion of maintenance and development of forests having soil with great water-absorbing and water-retaining capacity (MAFF)
- The government will further promote forest disease and insect pest prevention and removal measures including intensification of pine weevil elimination at edges of damaged areas, selection of priority pine forests for conservation, coordination with regional voluntary activities and measures against *Platypus quercivorus* beetles. The government will also prevent forest fires for appropriate forest conservation and promote development and diffusion of species that resist disease and insect pests. (MAFF)

1.5 Promotion of measures against wildlife damage to forests

(Current Situation and Challenges)

Deer, wild boars and other wildlife populations in Japan have generally increased due to a decline in hunting pressures amid a fall in the number of hunters and a dropping death rate because of less snowfall and warmer winter weather conditions. Areas for their distribution have also expanded as depopulation and aging residents in mountain villages have led to a decrease in human activities and an increase in abandoned agricultural land. Wildlife feeding damage to understory vegetation, trample-caused soil runoff and other wildlife damage are feared to affect multiple functions of forests. Effective countermeasures are required.

(Specific Measures and Policies)

- Regarding wildlife damage to forests, the government will promote installation of damage prevention facilities such as guard fences and feeding damage prevention tubes, hunting for adjustment population sizes, development and diffusion of new wildlife prevention and elimination technologies, and improvement of wildlife surveillance, prevention and elimination arrangements.(MAFF) [Cited in Chapter 2, Section 1, 2.3]
- While ensuring further coordination with wildlife conservation and management measures, the government will implement wide-area effective measures against wildlife damage in view of wildlife habitat conditions and promote development of broad-leaved tree forests in a manner to give considerations to wildlife habitats. (MAFF) [Cited in Chapter 2, Section 1, 2.3]

1.6 Securing and developing forestry workers, promoting exchanges between urban and mountain village communities, and settlements in mountain villages

(Current Situation and Challenges)

Mountain villages (designated as promoted mountain villages under the Act for Developing Mountain Villages) account for 50% of Japan's national land area and 90% of these villages are covered with forests. Mainstay industries at mountain villages are primary industries including forestry. Production in these industries has contributed to maintaining regional vigor and forests have been managed in a routine manner through local residents' operations including utilization of fuel wood.

But mountain village population has declined remarkably since the high economic growth period. While Japan's population increased by 30% from 1965 to 2005, the mountain village population plunged by 40%. In 2000, the mountain village population was limited to only 3.6% of Japan's total population. Forests owned by nonresidents accounted for a quarter of privately owned forests (2005 Census of Agriculture and Forestry). While the mountain village population has declined and aged, forest owners have moved out of villages close to their forests.

Some forests have failed to be managed well due to a forestry production slump. Such a situation is feared to affect forests' achievement of multiple functions. Therefore, Japan is now required to secure new forestry workers and promote exchanges between urban communities and mountain villages and people's settlements in these villages to invigorate these villages.

(Specific Measures and Policies)

- The government will secure and develop new forestry workers by implementing the "Green Employment for Forestry Conservation Project" for young people willing to conserve and develop forests. (MAFF)
- The government will secure diverse employment opportunities by promoting the forestry and timber industry as primary industries, by developing industries utilizing wood biomass and other untapped resources, by improving production infrastructure for special forest products as the precious revenue sources for mountain villages and houses, and by creating special product development and other new businesses (forestry and mountain businesses) taking advantage of forest resources (MAFF).
- The government will implement promotion of development of living infrastructure including agricultural water supply and sewage facilities, support for ambitious and initiative cooperation between urban communities and mountain villages and development of human resources contributing to invigoration of mountain villages. (MAFF)
- The government will promote forest experiences utilizing appeals of mountain villages, forest environmental education linked to educational organizations and forest-using health plans. (MAFF)

1.7 Forestry operations taking account of biodiversity

(Current Situation and Challenges)

Forestry entities that undertake forest development and conservation must take account of conservation of wildlife species and ecosystems in forests as well as timber production in implementing business operations. This is important for conservation of forest biodiversity.

Therefore, the Forest Planning System provides guidelines and the like for operations giving

considerations to protection of precious wildlife species under regional forest plans. Under the forest certification system where private-sector third parties assess and certify sustainable forest management, biodiversity conservation is one of key conditions for the certification. In real business operations, diverse wildlife conservation efforts, including establishment of protected tree zones, have been launched. These specific efforts should be diffused to promote forestry operations taking account of biodiversity conservation.

(Specific Measures and Policies)

- In order to secure forests' sustainable achievement of multiple functions, the government will promote considerations to the conservation of biodiversity in forestry business operations by implementing the forest planning system appropriately and by introducing real efforts including acquisition of forest certificates. (MAFF)

1.8 Promoting forest development with citizens' participation and diverse uses of forests

(Current Situation and Challenges)

Citizens' understanding about and interests in forests have made certain progress over the past years as business corporations, NPOs and other entities have activated forest development and environmental education and as a growing number of citizens have utilized forests for health, cultural and educational activities. In order to encourage the entire society to support the development and conservation of forests with multiple functions including prevention of global warming and conservation of biodiversity, Japan should promote voluntary forest development with participation by a wide range of citizens.

(Specific Measures and Policies)

- In order to encourage business corporations, NPOs and other entities to develop and conserve forests, the government will pave the way for their participation in forest development through preparation of plans and proposals for specific operations, creation of support systems, development of operation assessment methods, utilization of assessments, and collection and provision of field, technology and other information. (MAFF)
- At national forests, the government will promote designation of "corporate forests" for development by business corporations as part of their philanthropy activities, establishment of "friendly forests" to provide opportunities for citizens willing to develop forests on their own, and development of "wood culture-supporting forests" with citizens' participation to make contributions to inheritance of regional historic buildings and traditional cultures. (MAFF)
- The government will further promote national tree-planting campaigns including the nationwide tree-planting ceremony and the Green Fund, as well as regional tree-planting campaigns through upstream-downstream cooperation mainly on the Greenery Day (May 4) and in the Greenery Month (April 15-May 14). (MAFF)
- The government will promote public awareness campaigns for children as leaders of the next generation about the significance of forests, building on regional Junior Green Clubs formed to develop children into people who love and conserve greeneries in nature and have healthy and bright hearts. (MAFF)
- The government will promote development of technologies for and public awareness campaigns about

appropriate conservation and management of giant and old tree forests, community-based forests and other forests or trees familiar to citizens. (MAFF)

1.9 Expanding forest environmental education and human-forest interaction

(Current Situation and Challenges)

In the modern society, opportunities have declined for people to engage with forests, or experience or learn about uses of timbers in daily life. It is now important to provide a wide range of people including children with opportunities for forest environmental education and interaction with forests to deepen understanding about and interests in multiple functions of forests and significance of forestry and timber utilization through various experiences in forests.

(Specific Measures and Policies)

- The government will promote development of personnel and public awareness campaigns for forest environmental education. (MAFF)
- At national forests, the government will promote designation of “Yu-yu-no-mori” forests for school-sponsored experience-based activities, regional and district forest offices’ experience-based activities in forests and forestry, and relevant information services and technical guidance. (MAFF)
- The government will widely publicize information on multiple functions and present conditions of forests through various media to deepen citizens’ understanding about and interests in forests and forestry. (MAFF)

1.10 Development of forestry and timber industry based on expanded use of domestic timbers

(Current Situation and Challenges)

Appropriate forest development is required for forests to play multiple functions including conservation of biodiversity. In this respect, it is important to ensure that timbers supplied through appropriate production operations are used finally by consumers and that earnings from timber sales are used to cover costs shouldered by forest owners and reinvested in development and conservation of forests. For Japan’s forestry and timber industry which plays a key role in developing forests, the timber demand structure has been changing due to expansion of cedar, cypress and other resources available for harvesting in Japan and due to price hikes for foreign timbers amid a recent demand rise in China and foreign exchange rate fluctuations. Overall, however, domestic timber production, processing and distribution have still been limited and dispersed. Particularly, distribution including multiple stages tends to be inefficient and costly. The Japanese forest and timber industry has been behind the curve on structural reform, failing to provide good-quality and good-performing wood products ubiquitously, stably and cheaply as required by users.

(Specific Measures and Policies)

- The government will promote development of arrangements to produce domestic timbers at lower cost and provide them stably through such measures as intensification of related operations. (MAFF)
- The government will promote larger-scale lumbering and processing, development of products meeting consumer needs, and enhancement of supply and sales strategies. (MAFF)
- The government will promote strategic diffusion of products for various sales targets such as business corporations and consumers, as well as comprehensive utilization of wood biomass. (MAFF)

1.11 Promoting administration and management of national forests including protected forests and green corridors

(Current Situation and Challenges)

In the administration and management of national forests, the government has promoted development and conservation of forests according to the categories of their functions while taking account of natural river basin characteristics. Specifically, the government has left forests to natural succession, implemented positive thinning, raised tree ages for felling, carried out mosaic distribution of various trees or mixed coniferous trees with broad-leaved ones through repeated thinning and other measures, depending on specific forest conditions. Various measures have been thus been adopted for national forest development and conservation. The government has also implemented model projects for cooperation with such parties as local residents and nature conservation groups in developing wildlife habitats and other forests taking advantage of local characteristics. Through such varied efforts, national forests have created diverse forest environments, demonstrated national land conservation functions and served as habitats for various wildlife species making contributions to biodiversity conservation.

National forests include forests with excellent landscapes, forests maintaining rich ecosystems as habitats for precious wildlife species, and forests that are combined with mountain streams to form sound environments. The government has designated virgin natural forests and important forests including precious wildlife habitats as “protected forests” for conservation and administration since the protected forest system was created in 1915. Protected forests now include Yakushima Island, the Shirakami-Sanchi Mountain Range and the Shiretoko Peninsula that have been registered as world natural heritages. As of April 1, 2007, forests totaling 780,000 ha (some 10% of national forests) had been designated as protected forests including those subject to conservation left to natural succession.

In wider-area and more effective efforts to protect forest ecosystems, the government launched the “Green Corridor” system in 2000 to form networks linking protected forests by securing migratory routes connecting wildlife habitats to promote exchanges between wildlife populations and ensure species and genetic diversity. As of April 1, 2007, Green Corridors totaled 510,000 ha. In FY 2006, the government established the Eastern Chugoku Mountain Range Green Corridor (some 7,000 ha) linking national and privately owned forests. The government has also made efforts to protect precious wildlife species living in national forests, including collection of habitat data, and maintenance and development of habitats. In efforts to appropriately conserve and administer national forests, the government has also implemented patrol, cleaning, manner enlightenment and other activities in cooperation with related agencies, volunteer organizations, local residents and other stakeholders.

As timber production is forests’ major function having direct relations with national life and contributes to regional industrial development and construction of a sound material-cycle society and as timber utilization is an effective measure to develop forests absorbing carbon dioxide to help prevent global warming, the government has tried to sustainably and systematically provide timbers and other forest products under the basic policy of administering and managing national forests to secure their achievement of public functions. Particularly, the government has provided timbers produced through thinning of artificial forests that were developed just after the war and have become available for utilization. In a bid to inherit Japan’s “wood culture,” the government has also taken advantage of characteristically diverse national forests to systematically

provide building materials for cultural property renovation, materials for traditional artworks and other woods that privately owned forests cannot be expected to provide.

At the same time, the government has promoted utilization of timbers from national forests for their own civil engineering works, including afforestation, and for government buildings and their interiors.

As NPOs and the like have activated their direct forest development activities, business corporations have begun to conduct forest development and conservation under their corporate social responsibilities. Growing in importance is “forest environmental education” in which people learn about the relationship between their life and the environment, and forests, forestry and timbers through various forest experiences.

As national forests are diverse ranging from forests with excellent natural environments to artificial ones and can meet various needs of people seeking to interact with forests, the government has designated “recreational forests” that provide fields for forest development with citizens’ participation and forest environmental education, have excellent landscapes and are suitable for forest bathing, observation of nature and outdoor sports. The government has also used the 11 Forest Environmental Conservation Centers in Japan to support relevant activities by citizen groups. Government operations regarding national forests have thus been diverse.

In administering and managing national forests, the government should develop and conserve diverse sound forests including mixtures of coniferous and broad-leaved trees in order to allow them to achieve biodiversity conservation and other expected functions as the people’s forests. The government should also promote designation of protected forests and green corridors, appropriate conservation and administration through monitoring surveys and patrol operations in cooperation with local residents. At the same time, the government should try to promote sustainable and systematic provision of timbers and other forest products and utilization of timbers and should provide fields for people’s interaction with forests allowing people to deepen their understanding about forests and feel familiar with forests.

(Specific Measures and Policies)

[Promoting appropriate development and conservation of national forests]

- In order to allow national forests to fully achieve their multiple functions, the government will promote diverse forest development operations including systematic and efficient thinning and utilization of natural forces for introduction of broad-leaved trees into artificial coniferous forests through repeated thinning to result in mixed forests. (MAFF)
- As national forests are important for such purposes as national land conservation and recharging of water and as designated protection forests total 6.69 million ha (at the end of FY 2006) accounting for some 90% of national forests, the government will implement appropriate conservation and administration of these forests to achieve purposes for such designation. (MAFF)
- At protection forests that are particularly required to achieve national land conservation, water-recharging, living environment preservation and other public functions, the government will promote construction of conservation facilities, improvement of function-losing forests and other operations under the Forest Improvement and Conservation Works Master Plan. (MAFF)
- The government will promote model projects like the Akaya Project and the Aya Laurel Forest Project in cooperation with local residents and nature conservation groups for regional natural environment conservation. The Akaya Project aims to restore biodiversity and develop a sustainable regional society

under an agreement between a regional council of local residents, nature conservation groups and the Forestry Agency. The Aya Laurel Forest Project is designed to strictly protect Japan's largest virgin laurel forests and redevelop into laurel forests secondary and artificial forests that divide existing natural laurel forests. (MAFF)

- The government will promote development and conservation of community-based forests including red pine woods as the background of the world cultural heritage at Mt. Higashiyama in Kyoto, as well as broad-leaved forests developed as fuel wood forests in Kyushu. (MAFF)

[Maintaining and conserving national forests]

- National forests include many forests that have virgin forest ecosystems and habitats for precious wildlife species. For these forests subject to special conservation and administration, the government will promote fine-tuned designation and reconsideration of protected forests in view of the distribution of precious wildlife species. Protected forests are classified into seven categories according to such designation purposes as protection of forest ecosystems, preservation of genetic resources and conservation of alpine flora and other plant communities. In principle, protected forests are left to natural succession. In order to grasp conditions of protected forests and promote appropriate conservation and administration after the designation, the government will implement monitoring surveys at protected forests throughout the nation. As part of conservation and administration operations, the government will appropriately implement such measures as installation of guard fences to restore vegetation and prevent deer damage to vegetation in order to protect relevant species and maintain and conserve their habitats. (MAFF)
- The government will implement wider-area and more effective forest ecosystem protection measures including designation of "green corridors" networking protected forests. Under the policy of securing balanced mixes of coniferous and broad-leaved trees and diversifying tree ages and canopy layers in green corridors, the government will implement operations giving considerations to wildlife habitats, including maintenance of excellent tree mixes and positive preservation of broad-leaved trees emerging naturally in artificial forests. The government will also carry out monitoring surveys to grasp relations between forest conditions and wildlife habitats and reflect such relations in conservation and administration. If national forests alone fail to secure any sufficient green corridor sizes, the government will try to cooperate with owners of forests neighboring national forests as necessary in designating sufficiently wide green corridors including both national and privately owned forests. (MAFF)
- In order to promote protection of precious wildlife species, the government will patrol habitats for wildlife species given protection priority, survey forest protection and administration methods for maintenance and development of these habitats, set up specific forest handling policies and implement maintenance and development of these habitats.

In order to protect *Picea maximowiczii*, an endangered species identified only in Mt. Yatsugatake and the Minami Alps in Nagano Prefecture's Nanshin Region, for example, the government is implementing protection and conservation operations, including collection of grafts and growing of young trees, in cooperation with relevant organizations.

In Hokkaido, the government has sponsored a panel of experts to work out the "policy for handling the forest where great black woodpeckers live" and will implement forest development and conservation based on the policy. (MAFF)

- In addition to routine inspections for prevention of forest damage including disease, insect and animal damage and forest fires, the government will implement patrol to prevent hunting and other illegal acts in wildlife protection areas or illegal digging of alpine flora for protection of precious wildlife species. (MAFF)
- In world natural heritages, Japan's Hundred Famous Mountains and other national forests where it is feared that high volumes of visitors will deteriorate vegetation, "green support staff" selected citizens will implement effective fine-tuned conservation and administration operations including patrol activities for curbing or preventing artificial deterioration of vegetation and forest functions and public awareness campaigns about manners. (MAFF)

[Promoting systematic and sustainable provision and utilization of forest products from national forests]

- Under the basic national forest administration and management policy aimed at maintenance and promotion of public functions, the government will try to sustainably and systematically provide timbers and other products from national forests while giving sufficient considerations to conservation of natural environments. (MAFF)
- At national forests, the government will promote utilization of timbers for their own civil engineering works, including afforestation, and for government buildings and their interiors. The government will also promote utilization of timbers and wood products of which the legality and sustainability have been identified. (MAFF)

[Providing national forest fields for people's interaction with forests]

- The government will promote designation of national forest fields as "friendly forests" for forest development to meet people's willingness to experience forest development on their own. (MAFF)
- The government will promote designation of "corporate forests" where business corporations take advantage of the revenue-sharing system for forest development to make social contributions and provide opportunities for education of their employees and their interaction with customers. (MAFF)
- In order to protect historically important wooden structures and wood cultures like traditional artworks for inheritance to the next generation, the government will promote the "forest creation to support wood culture" with people's participation. (MAFF)
- The government will promote designation of "Yu-yu-no-mori" forests where schools and relevant forest offices conclude agreements for experiences in nature and learning about nature. (MAFF)
- The government will promote refreshment measures for the "recreational forests" that should be used as attractive fields meeting needs of users. (MAFF)
- The Forest Environmental Conservation Centers will support activities of people engaged in forest environmental education and citizen groups engaged in nature restoration and biodiversity conservation. (MAFF)

1.12 Promoting forest resources monitoring

(Current Situation and Challenges)

In order to collect data regarding the "criteria and indicators" for sustainable forest management and continuously grasp biodiversity and other forest conditions and their changes, the government has launched the

first five-year “forest resources monitoring survey” covering some 15,700 fixed forest observation points every 4 kilometers throughout the nation in FY 1999. In future, the government is required to continue the forest resources monitoring survey and assess and analyze data from the second five-year survey ending in FY 2008 for their reflection in regional forest plans and the like.

(Specific Measures and Policies)

- At about 15,700 fixed observation points throughout the nation, the government will continuously survey site conditions, vegetation, sapless or lost trees, wildlife inhabitation traces, disease, insect and animal damage, etc. (MAFF) [Cited in Chapter 2, Section 5, 2.7]
- Based on data from the first and second five-year surveys, the government will prepare the second national report for the “criteria and indicators” of the Montreal Process in 2009 and promote sustainable forest management in Japan and the world (MAFF) [Cited in Chapter 2, Section 5, 2.7]
- The government will develop methods for the kinetic analysis of forests using the forest resources monitoring survey data, satellite photos and other data. (MAFF)
- The government will attempt to implement effective utilization of forest resources data, including integrated handling of forest space data and forest resources monitoring survey results in the forest Geographic Information System (GIS). (MAFF) [Cited in Chapter 2, Section 5, 2.7]
- The government will consider cross utilization of data from the forest resources monitoring survey and other national surveys such as the National Survey on the Natural Environment and Monitoring Sites 1000. (MOE, MAFF, MLIT) [Cited in Chapter 2, Section 5, 2.7]

1.13 Promoting sustainable forest management in the world

(Current Situation and Challenges)

The world’s forests, including tropical forests where many of species on the Earth inhabit, have been fast declining and deteriorating due to their diversion to farmlands, illegal logging, forest fires and overgrazing. Between 2000 and 2005, forests declined by some 12.9 million ha annually. (On a net basis excluding the reforestation area, the annual deforestation came to about 7.3 million ha, equivalent to one-fifth of Japan’s national land.) Since such large-scale deforestation and forest degradation are one of the major factors causing a global biodiversity crisis, Japan is required to promote cooperation in forest conservation and reforestation in developing regions and actively participate in and contribute to international dialogue.

(Specific Measures and Policies)

- The government will positively participate in international fora including the United Nations Forum on Forests (UNFF) designed to promote sustainable management of all types of forests. (MOFA, MAFF, MOE)
- The government will insist on the significance of illegal logging as a key factor behind the deforestation and forest degradation at the G8 Summit and other international fora to stimulate international efforts against the problem. (MOFA, MAFF, MOE)
- The government will promote bilateral technical and financial assistance and multilateral cooperation through international organizations for forest conservation and reforestation, and measures against illegal logging in developing countries. (MOFA, MOE, MAFF)

- After Canada had served as the secretariat of the Montreal Process since its inauguration, Japan has been the secretariat since January 2007. As the secretariat, Japan will demonstrate its leadership for establishing sustainable forest management in the world and promote international effort for formulating and applying “criteria and indicators” to grasp, analyze, and evaluate sustainability of forest managements. (MAFF) [Cited in Chapter 2, Section 4, 3.4]
- The government will tackle technical cooperation regarding forest tree breeding to support sustainable forest management efforts including appropriate conservation and utilization of tropical forests and restoration of greeneries in developing and other countries. (MAFF)

Section 6 Countryside and Satochi-Satoyama Areas

(Basic Concepts)

Countryside and Satochi-Satoyama areas have paddy fields, water channels, reservoirs as well as coppice, groves, protective trees around residence, hedges, etc. and those diverse environments form a network and provide biologically rich spaces with the help of continuous agricultural or forestry operations, and diverse wild animals and plants inhabit those spaces.

In such countryside and Satochi-Satoyama areas where the environment is close to people due to human commitment and care, any inappropriate use of agricultural chemicals or fertilizers, as well as economy- and efficiency-oriented operation may have influence on biodiversity. In addition, while some native animals and plants that used to be regularly observed in those areas have been decreasing, certain other wild animals have tended to expand their habitat range in recent years as a consequence of the decreased use of community-based forests or the increase in abandoned farming lands due to shortage of manpower in agriculture and forestry. As a result, there is a tendency that damage caused by wild birds and animals on agricultural and forestry activities is getting serious.

In this light, the measures for improvement or conservation of countryside and Satochi-Satoyama areas should be implemented in a way that pays more attention to the promotion of biodiversity-conscious agricultural activities, so that biodiversity will be conserved and people can have safe and good-quality foods as well as a biologically rich environment. It is also necessary to promote measures to increase people's interaction with wildlife and deepen public understanding of the potential influence of agriculture on biodiversity, from the viewpoint that agriculture plays the role of supporting the life of diverse living creatures in addition to the role of providing food, and it is important to vitalize agricultural or mountain villages.

Furthermore, in order to hand over countryside and Satochi-Satoyama areas to future generations in a way that maintains their ability to provide safe, good-quality foods as well as a biologically rich environment, it is essential to address various issues, such as promotion of agriculture and forestry, regional vitalization, conservation of biodiversity and succession of culture, with the utilization of not only ancient wisdom fostered through a long history but also state-of-the-art biomass technology as well as collaborative efforts among all relevant organizations and citizens. In that process, it is also important to attain social consensus based on scientific grounds.

1 Countryside and Satochi-Satoyama areas

(Outline of Measures and Policies)

Countryside and Satochi-Satoyama areas play an important role of providing habitats for diverse living creatures as well as opportunities for interaction with nature for human beings, in addition to the role of supplying safe, good-quality foods to the public. In order to ensure perpetual conservation and utilization of those rural areas into the future, the government will make efforts, in accordance with the "Basic Plan for Food, Agriculture and Rural Areas" adopted by the Cabinet in March 2005 pursuant to the Food, Agriculture and Rural Areas Basic Act," to reduce environmental load associated with agricultural activities, develop and secure manpower for agriculture, promote effective utilization of farming lands, ensure the conservation and formation of a desirable agricultural environment in the process of infrastructure improvement and vitalize agricultural areas through the promotion of exchanges between urban cities and agricultural villages. The government will also promote vitalization of countryside and Satochi-Satoyama areas through the effective utilization of

biomass, pursuant to the “Biomass Japan Comprehensive Strategy” (March 2006).

Also, targeting community-based forests, which constitute people’s recreation/relaxation spaces as well as living environment and also provide essential habitats for wildlife, the government will promote, in accordance with the “Basic Plan for Forest and Forestry” decided upon by the Cabinet in September 2006, pursuant to the “Forest and Forestry Basic Act,” forests improvement activities aiming at a multifaceted utilization of the forests while ensuring the conservation of habitats for diverse living creatures in the course of promoting forestry. Forest therapy is one of the examples of such multifaceted forest utilization. The government will also promote the development of human resources dedicated to the conservation or restoration of countryside and Satochi-Satoyama areas.

1.1 Ensuring an enhanced focus on the conservation of biodiversity in the course of promoting agricultural production

(Current Situation and Challenges)

An appropriate operation of agricultural production would enable us to ensure the conservation of biodiversity and desirable formation of landscape. On the other hand, inappropriate use of agricultural chemicals or fertilizers could adversely affect the environment of countryside and Satochi-Satoyama areas and biodiversity there, and could even harm fishery environment as a result of deterioration of river water quality. Therefore, it is necessary to promote environment-friendly agriculture, such as organic farming, with an enhanced focus on the conservation of biodiversity in countryside and Satochi-Satoyama areas, and introduce the viewpoint of harmony with wildlife in the course of promoting agricultural activities.

(Specific Measures and Policies)

- It is important to ensure an appropriate use of agricultural production tools such as agricultural chemicals and fertilizers, and the government will promote education and ensure farmers’ compliance with a code of agricultural practice that each person engaged in agriculture is supposed to observe for environmental conservation. (MAFF)
- Regarding agricultural chemicals, only registered chemicals can be used, and the registration is made through strict examinations of toxicity, water-polluting level, potential impact on aquatic plants and animals, persistency, etc. In addition, the safe use standard is prescribed for respective registered chemicals to avoid adverse effects on the environment. The government will ensure an appropriate use of agricultural chemicals by requiring users to observe the standard. (MAFF)
- In accordance with the Agricultural Chemicals Regulation Law, the government will establish Registration Withholding Standards on Damage to Aquatic Animals and Plants for each agricultural chemical. (MOE) [Cited in Chapter 2, Section 1, 3.2]
- The government will establish the method of risk assessment and management of agricultural chemicals to control their impacts on terrestrial ecosystems. (MOE) [Cited in Chapter 2, Section 1, 3.2]
- The government will promote the introduction of sustainable agricultural production practices which intend to integrally promote composting-based soil cultivation and reduction of the use of chemical fertilizers and agricultural chemicals. As part of advanced measures, the government seeks to reduce the regional aggregate use of chemical fertilizers and agricultural chemicals. For example, a 50% reduction will be aimed at. (MAFF)

- The government will promote organic farming, which makes it a rule to avoid any chemical fertilizers and agricultural chemicals and aims to significantly reduce environmental load attributed to agricultural activities and contribute to the life of diverse living creatures. As part of this effort, the government will promote technological development for organic farming, improve education and guidance for farmers, and seeks to raise consumers' understanding of and interest in organic farming. Thus, the government aims at environmental improvement that would facilitate farmers' active implementation of organic agriculture. (MAFF)
- Along with the above mentioned efforts of promoting biodiversity-conscious agricultural production, the introduction of GAP (Good Agricultural Practice) would be effective to secure the supply of safe and good-quality agricultural produce. GAP constitutes a cycle of "process management of agricultural production" which consists of work to determine check items throughout the entire range of agricultural activities including an appropriate and timely use of agricultural chemicals or fertilizers, carrying out farm work with following respective check items, making records, reviewing and evaluate records, identifying any necessary improvement and taking corrective action. At present, the population of farmers who employ GAP as well as the areas having such farmers are quite limited. Therefore, the government will promote the application of GAP through the utilization of a GAP model (basic model of GAP), which covers high-versatility check items for respective types of crops and minimal efforts required for environmental conservation. (MAFF)
- The population accredited as "ecofarmers" is 111,273 as of September 2006. The government aims to increase this to 200,000 by the end of fiscal year 2009. (MAFF)

1.2 Promoting soil cultivation, fertilization and pest/weed control with an enhanced focus on the conservation of biodiversity

(Current Situation and Challenges)

Retardation of soil cultivation or inappropriate fertilization or use of agricultural chemicals could degrade soil quality or soil fertility, invite disruption of local ecosystems due to adverse effects on soil microbes or indigenous natural enemies, or could hamper sustainable production. Therefore, it is important to encourage farmers to promote soil cultivation, introduce efficient and effective fertilization and make pest/weed control efforts, so as to ensure biodiversity-conscious agricultural production.

(Specific Measures and Policies)

- As part of efforts to promote appropriate soil cultivation and fertilization, the government will promote the use of compost derived from livestock excreta or food refuse through enhanced cooperation between farming and stock raising business, and will also promote rational fertilization, based on diagnosis of soil and crop, while paying attention to fertilizing elements included in organic substances such as compost, with the aim to maintain or improve soil fertility through the maintenance or improvement of soil's biological features such as the population or diversity of soil microbes. (MAFF)
- The level of soil microbes has much to do with soil fertility, outbreak or control of soil disease and soil damage, and the material cycle of soil. In order to promote the utilization of soil microbes for agricultural production, the government will promote the development of fundamental technologies to analyze their functions, etc. (MAFF)

- The government will promote the efforts to make a good control of pests or weeds in a way that manages surrounding factors, and will also promote IPM (Integrated Pest Management) which aims to combine diverse control methods and materialize timely, optimal control through the utilization of data or information on estimated or predictable outbreaks of pest or field observation. The government will also encourage farmers to use the agricultural chemicals which could have less impacts on natural enemies. Through those measures, the government will ensure that pest/weed control will be promoted in a way that pays enhanced attention to the conservation of biodiversity including diversity of soil microbes and indigenous natural enemies, in the environment of agricultural production. (MAFF)
- There are a variety of agricultural techniques friendly to living creatures such as winter flooding in paddy fields. The government will collect information on those techniques as well as successful regional efforts and make such information available to farmers. (MAFF)
- The government will promote a wide utilization of the above-mentioned agricultural techniques that put an enhanced focus on the conservation of biodiversity. (MAFF)

1.3 Promoting the improvement and conservation of Satochi-Satoyama areas with the aim to mitigate crop damage by wild birds and animals

(Current Situation and Challenges)

In Satochi-Satoyama areas, many wild animals are living and respectively play an important role in ecosystems. Those animals also closely interact with the daily lives of human beings, where humans conveniently utilize animals as essential resources and also seek contact with them through wildlife observation and other activities.

On the other hand, agricultural villages have a long history of suffering crop damage caused by wild boars, and the existence of the banks and fences constructed by farmers illustrate such a long-term struggle and efforts to protect their harvest from animals.

The recent tendency of Satochi-Satoyama areas can be characterized by the decreasing human activities, the increase in abandoned agricultural lands, decreasing hunters and the reduced amount of snow, which all tend to invite the expansion of the habitat range of wildlife. As a result, crop damage caused by wild animals such as wild boar, deer and monkey has been getting increasingly serious.

In addition, alien species such as raccoons not only cause damage to agricultural, forestry and marine products but also threaten the ecosystems of Satochi-Satoyama areas.

Basically, wild animals tend to be timid and easily frightened by human beings, and therefore hide themselves in a bush or other unseen places close to agricultural lands to attack crops. Therefore, it is important to promote habitat segregation between humans and wild animals, and efforts to prevent crop damage by wild birds or animals should be made in a comprehensive way that covers the management of their habitat environment and their population control as well.

(Specific Measures and Policies)

- As parts of efforts to improve and conserve Satochi-Satoyama areas, the government will promote bush cutting in the areas close to farming lands. Also, the government will ensure that close attention is paid to the proportion of conifers and broad-leaved trees respectively in a forest for the purpose of forest improvement and conservation in a way that protects habitat environment for wildlife. In addition, the

government will make efforts to improve and strengthen countermeasures against expanding and aggravated damage caused by wild animals. To this end, the government seeks the development and security of manpower to capture wild birds or animals as necessary, promotes assistance necessary to improve hunting activities, and also promotes installation of fences, elimination of abandoned farmlands and effective utilization of game species. (MAFF, MOE)

1.4 Promoting the conservation of networks of ecosystems and water environments including paddy field, water channel and reservoirs

(Current Situation and Challenges)

Rural waterfront environments including paddy fields, water channels and reservoirs forms organic networks of water and ecosystems. For example, crucians inhabiting small rivers go upstream during a spawning season and appear in paddy fields and agricultural channels to deposit eggs with waterweed in the shallows. Thus, waters constitute habitat environment for a variety of wildlife and they use waters in diverse ways according to their respective life history. Such networks of water and ecosystems are conserved through human activities such as production, maintenance and management by farmers or local residents, and those networks contribute greatly to the conservation of biodiversity.

Also, rural waterfront environment including paddy fields and water channels should be appropriately maintained or renewed to improve farming production efficiency or ensure disaster prevention, and therefore it is important to pay close attention to the conservation of biodiversity when agricultural lands or facilities are modified or renewed.

(Specific Measures and Policies)

- The government will create and improve “water corridors” as a network of water and ecosystems that not only links forests and the ocean through rivers, but also continuously links rivers, paddy fields, water channels, reservoirs and villages. The government will designate indigenous species to be conserved judging from the status of local ecosystems based on a wide field of vision covering the entire areas of the region concerned. By obtaining the understanding and participation of local residents, the government will systematically promote infrastructure improvement in a way that pays close attention to the life history and migration routes of respective designated species, and will also provide assistance to biodiversity-conscious activities of production or maintenance. (MAFF)

1.5 Utilization and conservation of agricultural environment and promotion of agriculture through the effective utilization of regional resources

(Current Situation and Challenges)

The Agricultural environment constitutes the environment that is maintained through human activities such as farming. Promotion of agriculture in rural areas is important from the standpoint of manifestation of multifaceted functions of rural areas such as conservation of rich nature and biodiversity as well as good landscape.

In reality, however, functions of rural villages have been weakening as a result of the decrease in population, increase in aged population and increase in non-farmer residents, and it is feared that the said

multifaceted functions could deteriorate accordingly. Therefore it is necessary to implement corrective measures based on the understanding of the said recent trends.

(Specific Measures and Policies)

- The government will provide assistance to rural mountainous areas, with the aim to support continuous operation of agricultural production, to prevent any further increase in abandoned farmlands and secure the multifaceted functions of those rural areas. The government will also assist region-wide, effective combined efforts of local residents as well as advanced agricultural activities from the viewpoint of appropriate conservation and quality improvement of agricultural resources and environments such as farmlands and agricultural water. Public assistance will also go to NPO activities dedicated to the conservation of terraced paddy fields or nature restoration. In order to facilitate those activities, the government will promote education to raise public understanding of those NPO activities, and also provide assistance to groundwork activities jointly promoted by local residents, companies and government to take voluntary actions to improve the environment in the neighborhood. (MAFF)
- The government will make efforts to raise public understanding regarding the contributions of agriculture and farm villages to biodiversity. The government will promote exchanges between urban areas and farm villages through green ecotourism and also encourage people's settlement in rural areas. In addition, the government seeks to create attractive exchange centers and will promote assistance to those facilities which make effective utilization of regional resources. (MAFF)
- The government seeks to increase the number of visitors to green ecotourism facilities. During fiscal year 2006, the total number of overnight guests was 7.95 million persons, and the government aims to increase it to 8.8 million by fiscal year 2009. (MAFF)

1.6 Promoting the creation of spaces where humans can have contact with nature including rare wild species

(Current Situation and Challenges)

In the 'good old days,' Japanese crested ibises and storks used to be observed regularly in Japanese rural villages and coexisted with human beings. However, those birds have disappeared as a consequence of artificial impacts on their habitat environment as represented by excessive hunting, deforestation of wetlands, decrease in nesting trees, and decrease in feed due to the use of agricultural chemicals. Today, regional efforts are underway to return artificially incubated storks and Japanese crested ibises to the wild. Also, since Japan is one of the countries that have many stopovers for migratory birds, it is important to improve and conserve desirable rural environments, such as paddy fields, to maintain habitats for those birds perpetually into the future.

To this end, the government has been promoting winter flooding in paddy fields as a measure to secure a feeding ground for migratory birds during winter, and also promoting the improvement of fish ladders to secure continuity of paths used by wildlife to travel between water channels and paddy fields. In addition, the government has been promoting organic farming and other environment-friendly agricultural practices. Children benefit from those efforts and are using waterfront environments such as paddy fields and water channels as a place of learning or as play grounds.

Those measures contribute to the protection of habitat environment of extremely rare species such as storks and Japanese crested ibises, and also to the regional expansion of habitat range for diverse living creature

as well as interaction between those creatures and local residents, and ultimately lead to the conservation of biodiversity in the entire country. Therefore, it is important to evaluate and assist those regional measures.

However, despite the promotion of those advanced measures on one hand, deterioration of habitat environment of indigenous wild species is observed in many countryside and Satochi-Satoyama areas, due to the decreased use of community-based forests and an increase in abandoned farmlands due to the shortage of manpower in agriculture and forestry, and it is necessary to take immediate actions. In order to ensure appropriate conservation and utilization of countryside and Satochi-Satoyama areas into the future, participation of diverse stakeholders is needed to ensure their conservation and utilization.

(Specific Measures and Policies)

- The government will promote the environmental improvement of countryside and Satochi-Satoyama areas, by creating spaces for people to have contact with nature, etc, while establishing a consensus on the conservation of biodiversity and promoting infrastructural improvement for the conservation of biodiversity. (MAFF) [Cited in Chapter 2, Section 3, 3.2]
- In order to facilitate the implementation of the measures for conserving biodiversity, the government will further promote regional education activities to raise public understanding of agriculture, forestry, fishery and biodiversity, while promoting the introduction of environment-friendly agriculture such as organic farming, providing assistance to farmers to facilitate their efforts to establish or introduce biodiversity-conscious farming technologies, and increasing the opportunities for people to have interaction with nature through the utilization of rural water environments including paddy fields and water channels as people's learning place about wildlife or as playgrounds. (MAFF)
- It is known that agriculture operated in urban and surrounding areas plays an important role of providing diverse benefits, in addition to the role of providing fresh foods to urban residents. Those benefits include the maintenance of the environment and landscape with water, green and nature-rich spaces, enrichment of people's inner lives, and creation of the opportunities for all generations, from small children to adults, to have a hands-on farming experience or interaction with wildlife. In this light, the government will promote urban agriculture and the creation of spaces for people's contact with wildlife. (MAFF) [Cited in Chapter 2, Section 3, 3.2]
- The government will improve or enhance the implementation of the "Survey of Organisms Living around Paddy Fields" which intends to obtain information on the environment and wildlife in rural areas. Here, rural water environments including paddy fields and water channels are regarded as people's learning place and playgrounds. (MAFF, MOE) [Cited in Chapter 2, Section 3, 3.1]
- Through the implementation of a model project for conservation and restoration of Satochi-Satoyama areas (since fiscal year 2004), the government will deliberate on a desirable practical method or system to promote conservation and utilization of Satochi-Satoyama areas through collaboration of diverse parties including administration, specialists, residents and NPOs as well as on a desirable environmental education in Satochi-Satoyama areas, and will release the deliberation results to the public throughout the country. (MOE, MAFF, MLIT)
- The government will designate about 300 important Satochi-Satoyama areas as heritage areas, and those areas will be selected on multiple criteria such as biodiversity, landscape, cultural significance, useful resources, land conservation, community activities, etc. The government will clarify specific measures to be

implemented in each area and make those measures widely known to the public. (MOE, MEXT, MAFF, MLIT)

- The government seeks new effective methods of utilizing Satochi-Satoyama areas, through the implementation of regional experimental programs such as environmental education, ecotourism and the use of eulalia or timber obtained from forest-thinning for biomass. The government will also establish a framework for an effective, sustainable utilization of common resources shared by diverse stakeholders including urban residents and companies. (MOE, MEXT, MAFF, MLIT)
- As part of the efforts to develop human resources dedicated to the conservation or restoration of Satochi-Satoyama areas, the government will provide information on groups or places engaged in conservation/restoration activities, register and dispatch specialists in the field of ecosystem management in Satochi-Satoyama areas, and provide those specialists with technical training. (MOE)
- Through the implementation of nationwide education activities on the conservation and utilization of Satochi-Satoyama areas, the government will make efforts to raise public awareness for the prevention of illegal dumping or other behaviors of aggravating habitat environment of wildlife, and will also strengthen networks of local governments, etc. for information exchange and mutual cooperation for the prevention of illegal dumping. (MOE)

1.7 Promoting improvement, conservation and utilization of grasslands

(Current Situation and Challenges)

Grasslands constitute precious ecosystems and provide habitats for diverse animals and plants. Grasslands generally have indigenous environment which is managed by human beings for pasturing or grazing purposes, and have the function of conserving ecosystems and genetic resources and protecting wildlife and biodiversity. For example, in grasslands in the Aso-Kuju Highlands, there remain habitats of rare plants such as *Polemonium kiushianum* and *Echinops setifer* as well as rare butterflies such as *Shijimiaeoides divinus asonis*, and human activities such as pasturing, grazing and agriculture make it possible to conserve those habitats.

At the same time, grasslands provide a foundation of feed self-sufficiency based on the material cycle from soil, grass to livestock, contributing to the improvement of food self-sufficiency, effective land utilization, establishment of sound material-cycle stock farming and maintenance of sustainable production of livestock products as well as sustainable operation of livestock business. Therefore, it is important to continue to ensure appropriate maintenance and management of grasslands.

(Specific Measures and Policies)

The government will assist collaborative efforts among producers and village-wide efforts to promote pasturage to maintain productivity and functions of grasslands and will also assist the activities to improve and conserve grasslands. (MAFF)

In order to realize a harmony between human society and nature through the efforts to secure biodiversity in grasslands, the government will implement the following measures in the Aso Highlands: (1) conservation and restoration of the environment of grassland to provide habitats with diverse animals and plants and (2) promotion of environmental education on grassland to develop people's understanding of and interest in grassland protection. Also, for the purpose of improving land utilization and land management from the

standpoint of the conservation of pastures, the government will promote the measures for improvement, conservation and utilization of grasslands. (MOE, MAFF)

1.8 Promoting the activities to improve, conserve and utilize community-based forests

(Current Situation and Challenges)

A variety of wild animals and plants are inhabiting community-based forests. Supporting their habitats is a moderate amount of human activities, such as forestry production, the use of firewood and charcoal and gleaning by local residents. Thus, community-based forests make significant contributions to the conservation of biodiversity. Also, thanks to the vicinity of community-based forests to people's living, those forests are expected to contribute to the creation of opportunities for people to have interaction with nature or nature studies.

In reality, however, due to the recent depopulation as well as the increase in aged populations in mountain villages together with their changing lifestyles, the degree of utilization of community-based forests has been falling. Therefore, it is necessary to encourage diverse parties to promote efforts for improving community-based forests.

(Specific Measures and Policies)

- The government will ensure the conservation of habitat environments for diverse wild species in the course of promoting forestry. (MAFF)
- The government will promote forest improvement based on the participation of the general public, which include collaborative activities among local residents, volunteers and NPOs. Those activities include planting, weeding, thinning, and facility improvement aiming at multipurpose utilization of community-based forests. (MAFF)
- The government seeks to raise public understanding concerning the significance of activities to improve community-based forests. To this end, the government will make efforts to increase opportunities for people to have contact with forests, raise people's awareness and understanding of the conservation of biodiversity, foster an attitude to seek a desirable coexistence with nature, and will also provide assistance for volunteer groups dedicated to forest improvement and the promotion of exchanges between urban cities and mountain villages. (MAFF)

Section 7 Urban Areas

(Basic Concepts)

In cities where dense use of land and many burdens to environment are concentrated, the habitats of organisms are limited to spaces which have natural environment with lush water and greenery. While we have tried to conserve and create these spaces by setting urban parks or designating the Green Conservation Areas so far, privately owned green spaces have decreased year by year because of developments. We need to implement more appropriate conservation, restoration, creation and management of these spaces in order to attempt the conservation of biodiversity in cities.

To do so, from the perspective of building of an ecological network, we need to consider the role of each space, such as areas to provide a core habitat of organisms, areas to conserve and rehabilitate habitats and expand their distribution, corridors to connect these areas, and buffer zones where these spaces survive stably.

And in the future situation of decrease in population and an aging society, it is preferable to make Compact Cities where city functions are concentrated in city centers and connected by public transportation networks. In that case, we need to implement conservation, restoration and creation of green spaces contributing to framework formation and segmentation of the cities.

For conservation, restoration, creation and management of natural environment contributing to the conservation of biodiversity, comprehensive and systematic measures are promoted depending on urban forms and modes of natural environment, following the Master Plan for City Planning Areas and the Master Plan for Greenery, both of which are comprehensive city plans positioning the future outlines of water and greenery.

Definite descriptions are given for closely connected cities like the National Capital Region or Kinki Region, and conservation of green spaces in suburban areas is promoted by designating Suburban Green Conservation Areas and building of water and greenery networks on the basis of a broader view by creating natural environments with project cooperation for urban parks, roads, rivers and sewage lines. Also in a unit of one city, building of water and greenery networks inside the city is promoted consisting of core urban parks, green spaces guaranteed for permanence, roadside greenery, watersides, water channels, terrace cliff greenery, precinct forests or homestead woodlands, and so on.

As it is important to maintain and raise the quality of these conserved, rehabilitated and created natural environments in order for them to contribute to the conservation of biodiversity, approaches to use and appropriate management of local plants are promoted.

Additionally, participation of the various main bodies is important to continuously implement conservation, restoration, creation and management of natural environment, and is promoted through enlightenment activities.

1 Formulation of comprehensive plans on conservation, restoration, creation and management of green space

(Outline of Measures and Policies)

In cities, green spaces with various functions and scales will be distributed, such as homestead greenery, agricultural areas, trees and hedges in residential regions, as well as green public spaces like urban parks. The natural environment contributing to the conservation of biodiversity can be retained by systematically viewing these green spaces and by disposing them in organic coordination. And for conservation, restoration and creation of green spaces, it is essential to develop systematic and well-scheduled measures to treat greening

promotion and greenery conservation in the public-private sector partnership, based on setting of urban parks, greening of public facilities such as roads, rivers and harbors, and greenery conservation by the systems like the Green Conservation Areas, scenic zones, productive green areas, and the Conservation System of Civic Green Spaces. Therefore, “the Urban Green Space Conservation Act” specifies that the municipal governments, who are closest to the lives of residents and appropriately recognize the local situations, can be the main bodies to formulate the Master Plan for Greenery, the comprehensive plan about conservation, restoration and creation of green spaces.

The Master Plan for Greenery specifies that the municipal governments set the goals for conservation and greening of green spaces and formulate the measures for promotion of them with regard to appropriate conservation and greening of green spaces in their own areas.

1.1 Master Plan for Greenery

(Current Situation and Challenges)

The number of municipal governments who formulate Master Plans for Greenery has been steadily increasing since its institutionalization in 1994. As of March 2007, the plan is formulated in about 630 municipal governments in the country, including all of the cities which have 500,000 citizens or more.

This plan is clearly regarded as a master plan concerning promotion of conservation and greening of green spaces in cities including urban parks, and clarifies the concept of the setting of urban parks as the main means to retain greenery in cities, by adding the policies for setting of urban parks disposed by the local public authorities to the mentioned contents of the plan because of revision of the Urban Green Space Conservation Act in 2004. And we are attempting to more appropriately retain the natural environments in cities by adjusting the plan to be harmonized to the associated plans, for example, keeping the balance with the scenery plans based on the Scenery Law, while so far we have attempted to adapt the plan to the Basic Environment Plan and the Municipal Master Plan.

We should take actions to reflect on the residents’ opinions, by holding public hearings for example, on the way to formulate Master Plans for Greenery. In addition to consensus formation inside the administrative bodies for realizing desirable natural environments in cities, we can expect a rise in comprehension, a sense of participation and increased interest in the approaches to conservation, and restoration and creation of greenery by various main bodies including local residents.

It is necessary to keep comprehensively developing the Master Plans for Greenery considering various environmental issues such as mitigation of the global heating and urban heat island, and conservation of biodiversity in order to realize city structures that can live with nature and have less future environmental burdens. And when formulating the plan, it is also necessary to retain quality of greenery and to pay attention to greenery organic coupling by saving the amount of greenery and realizing ecological networks.

(Specific Measures and Policies)

- The government encourages the municipal governments, who have not formulated Master Plans for Greenery yet, to formulate the plan. At the same time, the plans which have already been kept for a certain period should be revised depending on changes of the social conditions. (MLIT)
- In order to realize the Master Plans for Greenery, the government continuously promotes greening and conservation of green spaces where the municipal government should intensively consider further greening,

by the Support Project for Green Space Improvement and the Development Project of Area for Further Greening. (MLIT)

2 Promotion of measures for conservation, restoration, creation and management of green space and waterside areas

(Outline of Measures and Policies)

For conservation, restoration, creation and management of green spaces in cities, the indicators that focus on the functions of various green spaces are being formulated in the Intensive Development Plan of Social Capital (2003-2007) formulated in 2003. Especially the indicators related to conservation and sustainable use of biological diversity demonstrate the retained amount of public spaces for water and greenery in urban areas and the developed amount of parks and green spaces to conserve, restore and create natural environments which contribute to conservation and sustainable use of biological diversity. The goal for the retained amount of public spaces for water and greenery is to retain 13 square meters of spaces systematically guaranteed for permanence per one person during the period of the plan while these spaces should mainly consist of natural environments (forests, grasslands or water surfaces) in urban areas. And parks and green spaces which contribute to conservation and sustainable use of biological diversity will be increased by 2,400ha during the period of the plan. In the Support Project for Green Space Improvement created in 2004, building of water and greenery networks in urban areas is promoted by designating the areas to which the projects are applied on the basis of the Master Plans for Greenery or the scenery plans in the cities where greenery and open spaces need to be developed, such as the cities inside the three major metropolitan areas, and by comprehensively supporting development of urban parks, conservation projects of ancient cities and green spaces, and development of facilities for opening civic green spaces to the public.

In addition, from the perspective of building of ecological networks in cities, core green spaces are conserved and central large urban parks are developed on the basis of the Master Plans for Greenery. Also promoted is the conservation of roads and urban parks playing the role of corridors connecting these spaces, and greening of public spaces and green spaces in private lands as buffer zones.

2.1 Development of urban parks

(Current Situation and Challenges)

Urban parks have various functions such as forming habitats of wild organisms and spaces for interacting with nature. “The Urban Park Law” promotes developments of urban parks to contribute to conservation of biodiversity, for example, as one of its aims is to concentrate on protecting forests that are habitats of animals and plants. As of the end of March 2007, 109,953ha of 93,218 urban parks are already developed and under management in the country.

In the National Government Parks, environments to live together with organisms are being created by conservation, restoration and creation of habitats of animals and plants in cooperation with citizens. In the Hitachi Seaside Park where a precious swamp environment of “Sawada Spring Area” is being restored, weeding and thinning of alien species are being implemented for stable conservation of precious ecosystems such as that of *Isoetes macrospora*, which is an endangered specie. And in the Echigo Hillside National Government Park and the Asuka Historical National Government Park, environmental developments of Satoyama are actively promoted by thinning of thickets or weeding of bottom weeds with participating citizens

in order to restore beautiful environments of Satoyama. As a result, there are growing wildflowers like gold-banded lilies on forest floors. In Showa Kinen Park, greenery is being restored in the land after the American military base. In developing this area, species of organisms in the park were increased, about three times for birds (23 species in 17 families to 68 species in 29 families) and about ten times for insects (77 species in 36 families to 776 species in 181 families) compared to those in 1978 when this area was the land which had just been an American military base, as a result of the developments in which various natural environments like thickets, biotopes and waterside spaces for waterfowl habitats were created and maintenance was conducted such as weeding for organisms for the purpose of protection, increase of *Taraxacum* *Platycarpum* and conservation of the habitats of locust.

In addition, we take advantage of the characteristics of urban parks as spaces for interaction with close natural environments in cities to actively conserve environments of habitats of organisms, by conservation of tidal flats and wetlands, including Yatsu-higata, “the Ramsar Convention” registered wetland, which have various biofacies including rare species and endemic species, forest creation for conservation of habitats of insects and waterside creation for organisms. Especially, good natural environmental infrastructures to contribute to conservation of biodiversity are developed by restoring and creating tidal flats, wetlands and forests in the Green Space Development Project with Nature Restoration, in the areas such as landfill sites and large lands reformed from factory sites where natural environments should be actively created. In the Asahata Green Space in Shizuoka City, conservation, restoration and utilization of secondary natural environments with urban parks are promoted in association between the local public authorities, NGOs and MLIT by organizing the Nature Restoration Committee based on the Nature Restoration Law.

(Specific Measures and Policies)

- The government will enhance multiphase functions of the Urban Greening Botany Garden and the Environment Interaction Park as bases of “Greenery” activities by enhancing networks between the bases including the National Government Parks. (MLIT)
- Good natural environmental infrastructures to contribute to conservation of biodiversity will be developed by restoring and creating tidal flats, wetlands and forests in the Green Space Development Project with Nature Restoration, in the areas such as landfill sites and large lands reformed from factory sites where natural environments should be actively created. (MLIT)
- In order to promote building of water and greenery networks in urban areas, the government will support developments of urban parks and conservation projects of green spaces implemented by municipal governments on the basis of the Support Project for Green Space Improvement. (MLIT)

2.2 Consideration of conservation of biodiversity on road improvement

(Current Situation and Challenges)

Greening is implemented at road slopes, planting zones and center dividers by planting trees in order to contribute to formation of good scenery and absorption of carbon dioxide as well as conservation of biodiversity. And approaches considering biodiversity are promoted by adopting the construction method to use local seed and seeding (seed and seeding produced based on plants that have genetic information specific in each local area) for creation of biotopes and greening of road slopes.

(Specific Measures and Policies)

- The government will promote approaches to contribute to conservation of biodiversity by regarding “greenery” as a main component of road spaces and actively attempting greening on roads. (MLIT)
- The government will attempt to create habitats of various organisms by taking advantage of open spaces such as road slopes and interchanges. (MLIT)
- The government will continuously promote approaches considering conservation of biodiversity including creation of biotopes. (MLIT)

2.3 Conservation of biodiversity in sewage works

(Current Situation and Challenges)

The achievement rates of the Environmental Quality Standards for Water Pollution are low for lakes and closed water areas. To improve the water quality, advanced treatment, improvement of combined sewage system (sewage system where sewage and rainwater is discharged in the same pipe, and untreated sewage may be discharged into public water area when rainfall exceeds a certain level), and Measurement of Non-Point Source (measures against non-point pollutant that is discharged from urban areas to public water areas at the time of rainfall) need to be promoted.

On the other hand, due to progressing urbanization, the area where rainfall does not penetrate into the ground is expanding and the amount of rainfall penetrating into the ground and the amount of springs are decreasing, which is resulting in the decrease in the normal flow rate of rivers and water channels in urban areas. Therefore, the effort for efficient use of treated sewage water, which is positioned as a precious water source in urban areas, needs to be promoted further.

In addition, it is required to use the facility space of sewage systems for the creation of habitats for various living organisms. Comprehensive examination on the impact that sewage systems exert on ecosystems is needed to have eco-friendly consideration.

(Specific Measures and Policies)

- The government will conserve and create waterfronts by establishing Seseragi watercourses and by reusing treated sewage water, on the top of the sewage facilities or with the open space of storm sewers which are important open spaces in overpopulated urban areas, and will thereby provide living spaces for living organisms in urban areas and will recover nature. (MLIT)
- For the water areas where consideration for the ecosystem is necessary, the government will promote friendly discharge (a form of water discharge, such as natural purification, reservoir, and penetration, of treated sewage water that takes the ecology of the place to which water is discharged is taken into consideration in its water quality, water temperature, and prevention of foaming). (MLIT)
- Not limited to the water quality conservation of public water area by construction of sewage facilities, the government will also promote water quality improvement in collaboration with the river projects by the “emergency action plan for improvement of the water environment” and advanced treatment that contributes to the prevention of eutrophication in lakes and closed seawater areas. (MLIT)
- The government will promote projects with an eye towards the construction of sound water circulation system from a wide-area viewpoint, including reuse of treated sewage water and rainwater and discharge

control by storage penetration of rainwater, by using the Water Environment Creation Project under the New Generation Sewage Support System. (MLIT)

2.4 Green Conservation Area, Special Green Conservation Area (Current Situation and Challenges)

The system of Green Conservation Areas was newly established in 2004 by the revision of the Act for Urban Green Spaces. It is a system, while trying to harmonize with a certain level of land usage, to appropriately conserve the natural environment of the green space for which conservation is needed to prevent disorderly urbanization, pollution, and disasters and to secure healthy living environments of regional residents in city planning areas or in quasi city planning areas. Based on the fact that maintenance and management of Satochi-Satoyama in suburban areas and restoration of nature in the surrounding areas of metropolitan areas have become the issues to solve, the system targets to conserve the green spaces from a wide-area viewpoint by approving a certain level of land usage with comparatively mild control in comparison to that for Special Green Conservation Areas.

Special Green Conservation Areas are the green areas that contribute to prevent disorderly urbanization, pollution, and disasters, those with traditional or cultural significance, those excellent in scenic beauty or landscape, or those to be conserved as habitat for animals and plants, of which good environment is conserved by imposing a freeze, by the control on certain activities such as new construction of building and logging of woods and bamboos (system to get governor's permission), compensations resulting by control on acts, and purchases of lands. As of the end of March 2007, 2,034 ha of 355 regions nationwide have been specified as Special Green Conservation Areas.

Recently, Special Green Conservation Areas have a problem, which is that landowners' management is not sufficient and their functions as sound natural environment cannot be performed well. Green spaces in urban areas are precious property of urban residents and a precious basis of habitation of various living organisms, and their management needs to be done not only by landowners but also by the cooperation of local governments and local residents, so that they are left for next generation. The Management contract system (such as Urban Green Space Conservation Law) is the system where local government or green space managing organization signs on a contract with the land owner and attempt to appropriately manage and conserve green space such as Special Green Conservation Areas instead of the land owner, and thus promotes appropriate management and conservation of green spaces.

(Specific Measures and Policies)

- In addition to providing government subsidies to the compensations resulting by control on activities, purchases of lands, and construction of facilities necessary to conserve green spaces such as the facility to prevent landslides, the government will promote designation of Special Green Conservation Areas from the viewpoint of securing biodiversity. (MLIT)
- To conserve natural environment such as Satochi-Satoyama in suburban areas that contribute to biodiversity conservation, the government will promote designation of Green Conservation Areas. (MLIT)
- For favorable green space management by various entities, the government will have them use the system that promotes appropriate green space management such as the management contract system. (MLIT)
- To promote Water and Greenery Networking in urban areas, the government will comprehensively support

the construction and maintenance of urban parks and green space conservation projects implemented by local governments, by Comprehensive Support Project for Green Space Development. (MLIT)

2.5 Suburban Green Space Conservation Area, Suburban Green Space Special Conservation Area (Current Situation and Challenges)

Suburban Green Space Conservation Area is the system to conserve green spaces with good nature in the metropolitan suburban areas in Tokyo metropolitan area and Kinki region for the purpose of preventing disorderly urbanization and conservation of living environment in urban areas according to the “Act to Preserve the Suburban Green Zones in the National Capital Region” and the “Act for the Development of Conservation Areas in Kinki Region.” It imposes the obligation to report on certain activity such as new construction of buildings and structures, reconstruction, and additions to buildings, and contributes to biodiversity conservation through conservation of green spaces.

This Area is a forest within a suburban development area in the Tokyo metropolitan area or within a conservation area in the Kinki region, which is pretty large from the viewpoint of the regional area level and is designated by the Minister of Land, Infrastructure, and Transport. The district for which the necessity for green space conservation is remarkably great for the reason of having especially good natural environment in the region is specified by the prefecture as a Suburban Green Space Special Conservation Area in its city planning.

Comprehensive review on natural environment was conducted in the Tokyo metropolitan area and Kinki region based on the urban renaissance project (The third project was decided in December 2001), and the “Grand Design on Urban Environment Infrastructure in Tokyo Metropolitan Area” (March 2004) and the “Grand Design on Urban Environment Infrastructure in Kinki Region” (August 2006) were formulated. It is necessary to appropriately conserve, restore, and create natural environments based on these designs.

15,861 ha in the Tokyo metropolitan area and 81,212 ha in Kinki region have been specified as Suburban Green Space Conservation Areas, and 759 ha in the Tokyo metropolitan area and 2,697 ha in Kinki region have been specified as Suburban Green Space Special Conservation Areas, as of the end of March 2007.

(Specific Measures and Policies)

- In addition to providing appropriate support for the compensations resulting by control on acts, purchases of land, and construction of facilities necessary to conserve green space such as the facility to prevent landslides, the government will promote designation of Suburban Green Space Conservation Areas from the viewpoint of securing biodiversity. (MLIT)
- For the Tokyo metropolitan area and Kinki region, the government will promote examination to designate the regions positioned as to be conserved in the respective “Grand Designs on Urban Environment Infrastructure” as Suburban Green Space Conservation Areas as necessary. (MLIT)
- To promote Water and Greenery Networking in urban areas, the government will comprehensively support the construction and maintenance of urban parks and green space conservation projects implemented by local governments, by Comprehensive Support Project for Green Space Development. (MLIT)

2.6 Historic landscape preservation district, special historic landscape preservation area (Current Situation and Challenges)

These areas are based on a system to conserve the green spaces in Kamakura City, Zushi City, Kyoto City,

Nara City, Tenri City, Kashihara City, Sakurai City, Ikaruga Town, Asuka Village, and Otsu City, which have historically important status as past political and cultural centers of Japan, as natural environments that are combined with building or as ancient structural remnants which have significance in Japanese history (“Special Measures Law for the Preservation of Historic Landscape in Ancient Capitals”), and are contributing to the conservation of habitat environment for living organisms through conservation of the natural environment.

The specified historic landscape preservation districts, to conserve green space with sound natural environment by imposing an obligation of reporting on a certain activities such as new construction of buildings, totaled 20,083 ha as of the end of March 2007 (including the first class and the second class specified historic landscape preservation districts in Asuka Village). The specified special historic landscape preservation areas, to conserve the green space with sound environment by imposing a freeze by taking a measures such as compensation resulting by control on activities and purchase of land by a permission system for a certain acts, totaled 8,832 ha of 60 regions as of the end of March 2007.

(Specific Measures and Policies)

- The government will give appropriate grants to the compensations resulting by control on activities, purchases of land, and construction of facilities to promote conservation that local governments practice to form water and greenery network in urban areas. (MLIT)
- To form water and greenery network in urban areas, the government will comprehensively support construction and maintenance of urban parks and conservation of ancient cities that local governments practice, by Comprehensive Support Project for Green Space Development. (MLIT)

2.7 Scenic district

(Current Situation and Challenges)

Scenic districts are one of the regional districts prescribed in city planning for the purpose of maintaining scenic beauty in urban areas. Local governments can designate a land that falls under one of the following categories as the district that needs maintenance of scenic beauty to conserve urban environment for planning land use in urban area.

- a. Forest or places with extensive woods (including urban areas) that form good natural landscapes
- b. Waterside areas (including surfaces), agricultural land, or other land where citizens can feel at home as their native land, which forms good natural landscapes

Within a scenic district, prefectural ordinances can control construction of buildings, creation of residential area, logging of woods and bamboos, deposition of soil, stones, and wastes, according to the standards prescribed in the ordinance (Cabinet Order Specifying Standards for the Enactment of Prefectural and Municipal Ordinances for Landscape District Zoning). For the activities prescribed in the ordinance, permission of the prefectural governor is required.

As of the end of March 2006, about 169,511 ha nationwide have been specified as scenic districts.

(Specific Measures and Policies)

- Scenic districts maintain and create sound natural environments such as forests and waterside areas and are providing habitat for living organisms in urban areas. The government, therefore, will attempt to appropriately operate systems and promote measures for designation. (MLIT)

2.8 Civic green space

(Current Situation and Challenges)

Civic green space is the land, artificial ground, or building of 300 m² or larger within a city planning area or a quasi city planning area, for which the land owner and local government or green space managing organization sign a contract, and is managed for a certain period of time (five years or longer) as green space (civic green space) to be used by citizens based on the contract. It secures the green space close at hand as a place for local residents to contact with nature and a habitat for living organisms.

At the end of March 2007, about 72 ha of 129 locations nationwide are set and managed as civic green spaces.

(Specific Measures and Policies)

- The government will positively use the system of civic green space not only for the conservation of existing green space such as flatland forests and premises forests but also for artificial ground and premises of buildings to promote conservation, restoration, and creation of habitat for living organisms in urban areas. (MLIT)

2.9 Urban productive land district

(Current Situation and Challenges)

Urban productive land districts are regional districts prescribed in city planning for the purpose of contributing to the formation of sound urban environments by systematically conserving agricultural land excellent in greening functions in urbanized areas. A district such as a group of agricultural lands, which is very effective in securing good living environments and in prevention of pollution or disasters or in conservation of an urban environment harmonizing with agriculture, forestry, or fisheries, can be designated.

Within an urban productive land district, permission of the mayor of the city, town, or the village is required for a construction of building. Only certain activities necessary to carry on agriculture, forestry, or fishery, which is judged not to deteriorate living environment, can get permission.

As of the end of March 2006, about 14,661 ha of about 64,700 regions nationwide have been specified as urban productive land districts.

(Specific Measures and Policies)

- Agricultural land can be evaluated as habitat environment for living organisms also in urban areas, and the government will attempt to appropriately operate the system of urban productive land districts in the future. (MLIT)

2.10 Conservation of premises forests and coppices

(Current Situation and Challenges)

The greenery around residential areas left in urban areas such as premises forests have been lost due to inheritance tax and developments. Various conservation policies need to be taken based on various intentions of greenery owners and including the prevention of segmentation of residential areas.

Besides the system described so far, for the forests of which the conservation by entire community is

acknowledged to be necessary among the premises forests and coppices in urban areas, designation as “preserved tree” or “preserved forest” is possible based on the “Law concerning Preservation of Trees for Conservation of Scenic Beauty of Cities.” Beside the “greening agreement” based on the “Act for Urban Green Spaces,” in addition to the systems concerning green conservation including ordinances and guidelines of local governments, conservation of green space is promoted and habitat environment for living organisms is conserved by using various systems of donations and the taxation system.

However, green space in urban areas such as premises forests are disappearing due to inheritance tax and developments, and the conservation of greenery paid in kind and large size government-owned lands is a current challenge.

(Specific Measures and Policies)

- By promoting the use of Green Conservation Area and Civic Green Space System, the government will try to conserve even comparatively small size greenery such as premises forests left in urban areas, while appropriately coping with the intentions of land owners. (MLIT)

2.11 Creation of greenery on privately-owned lands, promotion of greening rooftops and greenery on walls

(Current Situation and Challenges)

For forming ecological networks in urban areas, it is considered possible to conserve habitat environments for living organisms, even in the urban area where buildings are clustered, by effectively creating spaces with water and green at various places including rooftops and walls, which play the role to connect key green spaces. By the green rooftops positively implemented nationwide, total 160 ha of about 6,000 spots have been established from 2000 to 2006 (according to MLIT’s survey), for alleviation of the heat-island phenomenon and securing living space for insects and birds in the cities.

To promote greening in urban areas, greening areas can be specified in city planning areas based on the “Act for Urban Green Spaces,” to control the minimum green coverage rate on the premise of a large building. A Greening area is specified for the area where green space necessary to form sound urban environments is not sufficient and greening within the premises of buildings needs to be promoted, and it contributes to the creation of habitat environment for living organisms in urban areas.

The Authorization System for Greening Facility Development Plan based on the “Act for Urban Green Spaces” is the system where mayors of city, town, and village authorize Greening Facility Development Plans on the establishment of greening facilities on building rooftops, open spaces, and other outdoor spaces, and preferential measures for fixed property tax are taken on greening facilities. As of March 2007, 19 locations in Japan have been authorized for Greening Facility Development Plans.

(Specific Measures and Policies)

- Greening area system and Authorization System for Greening Facility Development Plan are effective systems to promote greening of private lands, and the government will attempt to disseminate the system. (MLIT)
- Concerning greening rooftops and greenery on walls, the government will make efforts to grasp their effects by collecting empirical data on the degree of contribution to global warming by measuring alleviation of

heat island phenomenon in the cities and on the effect as habitat environment for living organisms. (MLIT)
[Cited in Chapter 2, Section 6, 1.1]

3 Raising of public awareness of conservation, restoration, creation and management of green space

(Outline of Measures and Policies)

To enhance greenery in urban areas, development of awareness-raising activities and national campaigns are indispensable. Today—the time when the solution of global warming and securing biodiversity are significant challenges—the government needs to positively develop activities to raise public awareness. In addition to promoting nationwide awareness-raising events such as the Greenery Protection Meeting and Urban Greening Fair, various kinds of opportunities will be created to enjoy green in National Government Parks, which act as the bases for awareness-raising and national campaigns and will function as a park green space network. Thus, the activities to conserve, restore, and create greenery by various entities will be promoted.

3.1 Raising of public awareness of greenery

(Current Situation and Challenges)

To promote conservation, restoration, and creation of greenery, the “Greenery Protection Meeting,” “Urban Greening Fair,” commendation for contribution in the “Greenery Protection Meeting,” commendation for contribution in city greening and improvement, conservation, and beautification campaign for urban parks, other commendations related to conservation, restoration, and creation of greenery are held during Greenery Month (From April 15 to May 14) and City Greening Month (1st to 31st of October). Through these activities, efforts are made for awareness-raising to enhance the consciousness of a wide range of people on urban greening and to promote creation of comfortable environment to live with rich green, thereby promoting conservation and creation of habitat environments for living organisms in urban areas.

By evaluating companies’ management on green space from many viewpoints by the Social and Environmental Green Evaluation System (SEGES), effort is made to enhance willingness on greening activities and to strengthen the measures. As of May 2007, 18 sites (regions) have been authorized.

To foster and secure a wide range of human resources to support national campaigns for greening by these awareness-raising activities and to encourage various activities by various entities, focus on publicity is considered to be necessary in parallel with enhancement of the support system.

(Specific Measures and Policies)

- The government will further raise public awareness on green by the meeting method by changing the venue for Greenery Protection Meetings from former National Government Parks to urban parks all over Japan. (MLIT)
- To encourage companies’ effort by evaluating green-related measures in development projects and by authorizing and commending excellent examples, the government will establish a green evaluation system in urban development. (MLIT)
- The government will create greenery that will contribute to the creation of habitat environment for living organisms in urban areas by positively supporting regional groups that practice greening activities in their private projects for supporting seedlings and equipments necessary to create greenery. (MLIT)

3.2 Raising of public awareness of biodiversity conservation on sewage system

(Current Situation and Challenges)

In accordance with the increase in established sewage systems, the quantity of water collected by sewage systems is increasing year by year, and the role of sewage systems in water and material circulation systems has become quite large, including management on urban water circulation and on pollution load discharged to public water areas. Such a role of the sewage system, however, is not widely recognized since there are not many opportunities to see the system. Understanding by the citizens themselves concerning the fact that discharged pollution load is purified by the sewage system will lead to the raising of public awareness on water quality improvement, and further, on ecosystems and environments.

Therefore, it is necessary in the future to deepen the residents' understanding on the sewage system and to make the system such that the community as a whole engages in water quality improvement. By these actions residents' interest will increase and conservation of the ecosystem that is based on the region becomes possible.

(Specific Measures and Policies)

- In collaboration with regional residents, educators, and NPOs, the government will positively provide information and attempt to deepen residents' understanding on the roles of sewage treatment facilities as the place to create habitats for various ecosystems. (MLIT)

Section 8 Rivers and Wetland Areas

(Basic Concepts)

The wetlands of land areas including rivers, lakes, and marshlands are nurturing the rich ecosystem of Japan as habitats for various living organisms, with water, soil, grass and trees indispensable for keeping life of living things. Almost all flatlands in Japan were formed by river floods, and various animals and plants living there have strong relationship with rivers. Thus, rivers are playing the role of corridors in the country level ecosystem as a connector of the factors of the ecosystem—forests, plains, low flat lands, coastal areas—from their upstream, in addition to playing a big role in forming the ecosystems of individual river-basin areas as the axis of water circulation system such as the spring water and groundwater system of the region.

On the other hand, rivers have been involved with people's lives from ancient times as a cause of natural disasters including floods and our ancestors have made constant endeavor to battle with water and to control rivers for use. It may be said that the current status of rivers is the result of such interaction between nature and human acts, and that rivers have fostered culture and natural features unique to the regions. For example, flood wetlands that existed with rivers have changed into the land used by people for agricultural lands, and have formed habitat for various living organisms in close connection with rivers.

However, in the river administration after the World War II, river repairs have been promoted by focusing on coping with flood rapidly and effectively by modern technology under the necessity of protecting people's life and property from frequent natural disasters, and it cannot be denied that there was a lack of consideration on the habitats of living organisms and on regional landscapes of rivers and wetlands in the project methods such as three sides concrete lining and straightening of river channels.

Under the circumstances, "nature-oriented river management" to conserve or create beautiful natural landscapes in addition to having consideration on sound habitat environments of living organisms that rivers originally possess, and the Census of Rivers and Riparian Area to grasp situations of habitation of living organisms, have started in 1990 in succession. Later in 1997, the River Law was revised, and "improvement and conservation of the river environment" was added to its objectives. In 2002, nature restoration projects were established for the purpose of restoring natural environment in the rivers. Furthermore, the Review Committee on Nature-oriented River Management was established to verify the status of the management of nature-oriented rivers and to examine the future direction for nature-oriented river management, and it proposed "development for nature-oriented river management" in 2006. Accordingly, in the same year, the "Basic Policy for Nature-oriented River Management" was decided to newly develop the management of nature-oriented rivers, and thereby "nature-oriented river management" has been promoted as a universal figure of river creation to conserve or create the environment for living, growing, breeding of living organisms* that rivers originally possess and various river landscapes. (* It is clarified here since "breeding environment" is an important environment to characterize rivers in the nature-oriented river management. In this document, however, it is treated as a concept included in "growing and living environment.")

Nature-oriented River Management should target all the activities for river administration from survey to construction, maintenance and management, to conserve and create the habitat environments for living organisms that rivers originally possess and various river landscapes, by putting the working of the entire river natural environment into perspective and by considering harmony with regional life, history, and culture. As the fundamentals of implementation, courses of action are as follows: 1) In addition to using characteristics and mechanism of nature as much as possible, the entire river should be put into perspective when creating the

river; 2) Not only conserving and creating habitat environments for living organisms, life and history/culture in the region should be connected with the creation of the river; and 3) The entire river management including research, planning, designing, construction, maintenance and management should be put into perspective when creating the river.

Based on such a course of action, the restoration of nature such as gravel riverside and wetlands and the securing of continuity of rivers, mountain streams, coastal animal migration, drift of sand, and clear water will be promoted all together.

1 Conservation and restoration of habitat environments of living organisms (Outline of Measures and Policies)

In conservation and restoration of rivers and wetlands, sound habitat environments of living organisms need to be kept unaltered as much as possible while securing residents' safety from flood and damage from the wind, and, even when alteration is unavoidable, it needs to be kept to a minimum, and efforts needs to be made to enable restoration of a good river environment. In places where the river environment has been greatly altered by humans, effort needs to be made to restore it as much as possible to the original sound river environment.

To conserve biodiversity at rivers, it is important to conserve environmental conditions unique to rivers such as disturbance by flood and the dynamism of flow fluctuation in addition to conserving sound habitat space for living organisms.

For example, *Potentilla Chinesis*, *Artemisia Capillaris*, *Aster Kantoensis*, and *Anaphalis Margaritacea var.Yedoensis*, which are plants unique to rivers, grow on sandy land and gravel riverside that are frequently disturbed by floods, and if this disturbance function does not reach them due to leveling of flow rate and sinking of river bed, other plants become predominant and plant cluster is exchanged. Thus, it is necessary to conserve habitat environments of fauna and flora dependant on the environment unique to rivers.

The dynamism at rivers is important also when considering continuity of rivers and river-basin areas. For example, many kinds of fish in downstream river-basin areas move with the rise in the river at the time of floods from river to wetland in river-basin areas and spawn, and fry grow up there and return to the river. From the beginning, many of the low flatlands in Japan were floodplains of rivers, and wetlands existing inside and outside river areas have formed precious habitat environment for living organisms in such a way. Therefore, when securing biodiversity, securing continuity inside and outside rivers and adjustment with the surrounding area where lands are used are necessary. What has been done recently, for example, includes restoration of wetlands practiced when making the surrounding area a flood control area (Matsuura River) and measures against sand inflow into wetlands (Kushiro River).

In addition, management of the river environment will be promoted based on the status of use of the rivers in the regions, to promote continuity in upstream/downstream directions and that with river-basin area and coastal area, and to appropriately conserve river environments in collaboration with the parties concerned in the river-basin area. Furthermore, for construction and conservation of river environments, the examination will be promoted to clarify its target.

As stated above, by promoting nature-oriented river management, not only the conservation of specific rare species but also the conservation and restoration of habitats for various living organisms rivers originally possess will be promoted.

In mountains and mountain streams, erosion control projects to protect people's life and property will be promoted while conserving biodiversity.

1.1 Nature-oriented river management

(Current Situation and Challenges)

Nature-oriented River Management targets all the activities in river administration from survey to the construction, maintenance and management, to conserve and create the habitat environments for living organisms that rivers have by nature and various river landscapes, by putting operation of the entire river nature into perspective and by considering harmony with regional life, history, and culture. As fundamentals for implementation, in addition to using the characteristics and mechanisms of nature as much as possible, its courses of action should be as follows:

- The entire river should be put into perspective when creating the river;
- Not only the conservation and creation of habitat environments for living organisms, but also the life and history/culture in the region should be connected with the creation of the river;
- Entire river management including research, planning, designing, construction, maintenance and management should be put into perspective when creating the river.

(Specific Measures and Policies)

- Extended construction under direct control or by subsidies of the Nature-oriented River Management have totaled about 3,200 km (until FY2004), and the government will promote Nature-oriented River Management as a new phase. (MLIT)
- To solve the river management problems seen so far, the government will take the following measures and policies: (MLIT)
 - Putting together the existing knowledge on the Nature-oriented River Management
 - Implementation of technical support for the Nature-oriented River Management
 - Establishment of evaluation system for the Nature-oriented River Management
 - Reexamination of implementation system of the Nature-oriented River Management
 - Establishment of the system for citizen's positive participation and for various collaborations
 - Dissemination of the Nature-oriented River Management
 - Human resource development to promote the Nature-oriented River Management.
- To improve the entire level of river management, the government will take the following course of action: (MLIT)
 - Improvement of planning and designing technology for the Nature-oriented River Management
 - Improvement of river management skill for the Nature-oriented River Management
 - Establishment of monitoring method for river environment and target setting method for river management
 - Scientific elucidation of the response of environment to alterations.

1.2 Nature restoration projects

(Current Situation and Challenges)

Although the percentage wetlands occupy in the entire land area is limited, the threatened species

depending on wetland environments extracted in accordance with the Red Data Book number 33 kinds of birds, 290 kinds of vascular plants (about 36% of threatened bird species and about 17% of threatened plant species), and thus wetland is playing an important role in biodiversity conservation.

In the wetland areas in Japan, the total area of rivers and wetlands in river's adjacent areas account for about 80% of total wetland area. How to conserve and restore these wetlands existing in connection with rivers is a big issue.

In addition, because of various impacts, gravel riversides—the original status of rivers—have become sandbanks (where water flows over at the time of floods while it is dry at normal time), and further have become groves. The necessity of nature restoration projects to restore such riverside has become stronger.

(Specific Measures and Policies)

- To restore sound nature environments such as lost rivers, the government will focus and concentrate the nature restoration projects on the rivers especially in the region where interest of the nation or regional society is strong. (MLIT)
- In planning and implementing projects, the government will decide the implementation plan by getting the wide-range and positive collaboration of NGOs and related organizations in the region and experts, and thereby promote the projects by the consensus of a wide range of people of the region based on scientific knowledge as much as possible. (MLIT)
- The government will incorporate adaptive management, which checks the response of nature and implements feedback when necessary, in many projects. (MLIT)
- The government will also pay attention to the above points to complete the projects it is currently practicing, i.e. restoration of wetland environment (Kushiro River of Hokkaido), restoration of river mouth and tidal flats (Mukawa of Hokkaido, Arakawa of Tokyo, Kiso Sansen of Mie Prefecture), restoration of meandering river (Kushiro River of Hokkaido), restoration of lakeshore environment (Kasumigaura of Ibaraki Prefecture), and restoration of gravel riverside (Tama River of Tokyo). (MLIT)

1.3 Securing of continuity in rivers and wetlands

1.3.1 Securing of continuity of upstream and downstream of rivers

(Current Situation and Challenges)

Securing continuity in the direction of river's upstream and downstream is still an important issue for the conservation of habitat environments for living organisms in rivers. The Ministry of Land, Infrastructure, Transport and Tourism has been implementing the "Model Project for Creating Rivers That Fish Can Easily Ascend" from 1991 to rebuild the facilities to cross rivers such as sluice, ground sill, dam, erosion control dam, to construct and improve fish ladders, to secure flow rate of fish ladders, and to secure riverside vegetation around the facilities.

The number of the facilities rebuilt or reformed by FY2006 was 234, and the length of the river where movement of fish was enabled by such construction was 755 km, and thus they played an important role in the improvement of rivers' continuity.

(Specific Measures and Policies)

- The government will enhance the measures to establish fish ladders for the facilities that have cut rivers into

upstream and downstream. The government will also make efforts to create rivers livable for fish in a wide area of rivers including the facilities that have cut the rivers, by constructing and improving habitat environments for living organisms—the places for spawning, growing, and feeding. (MLIT)

1.3.2 Securing of continuity of rivers and river basins

(Current Situation and Challenges)

By the fall of riverbed level caused by river repair works and by construction of water gates and sluiceways, many cases are observed where there is a big gap between a river and its connecting channel in the river-basin or between a river and its tributary. There are also cases where continuity is cut between a channel of the river-basin and wetland or paddy fields. As a result, aquatic life dependent oncoming and going between rivers and river-basin areas is decreasing.

(Specific Measures and Policies)

- The related organizations will collaborate to improve continuity as a whole river-basin area (so-called “Ecological Network”), by making efforts to secure continuity of water areas between rivers and channels, ponds, mires, paddy fields of river-basin areas, by means of solving the difference between rivers and flowing in/out water channels by establishing fish ladders and notches and restoring the nature of tributaries by reducing sandbanks. (MLIT, MAFF, MOE)

1.4 Environmental consideration in dam constructions [Cited in Chapter 2, Section 7, 2.1]

(Current Situation and Challenges)

In implementing dam projects, environmental research is conducted beforehand to fully grasp the living and breeding environment of living organisms, and the impact dam projects would exert on the environment is examined. From the planning stage of the project, measures for environmental conservation are taken to avoid, decrease, or compensate for the impact on living and breeding environments of various living organisms as much as possible, by locational changes of the mountain from which rocks for dam construction are extracted and of alternative road, establishment of the facility to change sluice gates, consideration in operation plan, restoration of woods at the construction facility site, and protection and maintenance of biotopes. Thus, natural environment is taken into consideration. Furthermore, during construction and after starting service, environment research is conducted to grasp the degree of the project’s influence and effect of environmental conservation measures.

(Specific Measures and Policies)

- When implementing dam projects, the government will conduct careful examination for paying sufficient attention to the natural environment from its planning stage. In addition, by taking environmental conservation measures such as previous environmental research and environmental impact assessment, the government will try to avoid and decrease the impact on inhabitation, growth, and breeding environment of various living organisms as much as possible. The government will also try to reflect the results of the environmental research in the dam projects plans and environmental impact assessments. (MLIT)
- The government will promote environmental conservation in the region and interaction between upstream

and downstream of the basin based on the visions on water sources development in order to move forward the conservation of natural environment in water sources. (MLIT)

1.5 Consideration on the environment in landslide disaster prevention for mountain streams and slopes (Current Situation and Challenges)

Erosion control projects are the projects to protect human life and property from landslide disasters caused by the conditions such as Japan's high precipitation land form and the world's heaviest rainfall and urbanization of mountain and hillside areas, in addition to restoring green in wastelands. The projects are implemented all over Japan from the wastelands at headwater points to the slopes on the back of the houses in the cities. In the construction of the facilities related to erosion control, efficiency and necessary matters for conserving environment and landscape are fully considered, nature environments and biodiversity in the mountains and mountain streams are conserved, and erosion control projects to protect people's life and property from landslide disaster are promoted.

(Specific Measures and Policies)

[Creation and Conservation of Green on the Wastelands and Slopes]

- The government will establish woodlands as green belts on the mountain slopes around urban areas and promote greening projects to establish woodlands on wastelands, and thereby enhance safety against landslide disasters, in parallel with contributing to the conservation of good landscapes by conservation, restoration, and creation of biotope spaces. Steep slopes in urban areas are precious green lands and habitats for living organisms. Therefore, with steep slope landslide prevention projects, the government will promote the measures to make slopes full of green for positively introducing green slope conservation method and establishing buffer woodlands. (MLIT)

[Creation of Mountain Stream Space with Abundant Water and Green]

- To improve living environment and accessibility to water and recovery of ecosystems by securing good green land and waterside space in mountain streams in the regions with excellent natural environment and social environment, the government will promote erosion control projects for mountain stream with abundant water and green.(MLIT)

[Creation of Mountain Stream Space with Frequent Landslides]

- In addition to prevent harmful landslides to protect human life and property from landslide disasters at the time of torrential rains, to conserve continuity of mountain stream environments at normal times and to conserve habitat environments of living organisms made by drift of sand, the government will promote establishment of permeable erosion control dams or making existing erosion control dams permeable by taking the prevention of bank erosion into consideration. (MLIT)

1.6 Comprehensive landslide control from mountains to seashores

(Current Situation and Challenges)

Japan has a large quantity of sand drift due to its topographical and geographical features. This drift of sand was qualitatively or quantitatively prevented by the cut of drift from upstream to downstream, and the

riverbeds of rivers and mountain streams and coastlines have dramatically changed, and some river and coastline environments have changed.

(Specific Measures and Policies)

- The government will promote technical development for sand drift in rivers and mountain streams, supply of river sands, and use of drift sand of coastal area and dredged sand. Based on the environment and status of use in rivers and coastal areas, the government will also work on comprehensive sand management from mountains to seashores by the collaboration with related organizations. (MLIT, MAFF)
- The government will promote establishment of permeable erosion control dams that can discharge quantitatively and qualitatively appropriate sand to downstream or make existing erosion control dams permeable, while controlling production and trapping earth and sand that cause damage downstream. By the combination of various types of measures such as the control on the quantity of drift sand to dam reservoirs, the establishment of sediment dams at directly upstream of reservoirs, artificial removal of sediment in reservoirs, sand discharge pipes and sand discharge gates, the government will promote landslide prevention measures with life cycle cost taken into consideration, thereby maintaining dams' function as long as possible and securing safety and environment by appropriate supply of earth and sand to downstream. (MLIT)
- The government will implement the collection of existing data on the status of past drift of sand, a monitoring survey on the dynamic mechanism of the quantity and quality of sand, soundness assessment on the drift of sand through mountain streams, rivers, and seashore by the analysis on the survey results, and make predictions using a simulation model of sediment and sand drift by which drift of sand can be traced and change in landform can be assumed. In addition, the government will examine and evaluate more effective technologies. (MAFF, MLIT)

1.7 Designation and conservation of wetlands

(Current Situation and Challenges)

Since wetlands are playing an important role for the entire ecosystem maintenance, registration criteria for Ramsar wetlands which focused on the population of water birds at the beginning of the Ramsar Convention has been changed to those focusing on biodiversity conservation. The wetlands in the Convention target various types from shallow sea areas and coral reefs to artificial wetlands including paddy fields. In the future, implementation of the Convention needs to be promoted by making efforts for wetland conservation.

In the light of decisions in the Conferences of the Parties to the Convention and of the growing necessity for wetland conservation in Japan, the Ministry of the Environment has conducted research to select important wetlands in accordance with the selection criteria for Ramsar wetlands. Among “500 Important Wetlands” including marshlands, rivers, lakes, tidal flats, seaweed beds, mangrove forests, and coral reefs, which have been selected according to experts' opinions from the viewpoint of biodiversity conservation, 34.6% have been designated as protection areas such as National and Quasi-National Parks and National Wildlife Protection Areas, and protection areas need to be added in the future as necessary. In addition, it is important that not only the regulatory method of specification as protection areas but also various methods to conserve wetlands need to be taken, such as the collaboration of the central government and local governments and, furthermore, of regional residents and NGOs.

When examining concrete measures for wetland conservation, it is important to build consensus in the society by standing on the viewpoint of a wide surrounding area including river-basin areas and of a network based on migration of living organisms and the function of wetlands while promoting the use of the land surrounding wetlands that has close connection with the maintenance of wetland environment, forest management and water flow, outflow and drift of sand, and water quality.

(Specific Measures and Policies)

- The government will reexamine the assessment method by the Comprehensive Review Project for National and Quasi-National Parks (from FY2007), taking also the viewpoint of biodiversity conservation into consideration, and promote examination on characteristic wetlands and wetlands with excellent landscape, including the groups of springs, groups of reservoirs, and natural areas with clear streams, concerning whether there are areas valuable enough to be designated as National and Quasi-National Parks. (MOE)
- For the wetlands in Kushiro and Sarobetsu where aridification by the inflow of sands and invasion of alien species are exerting serious impact on the National Parks, the government will conserve and restore wetland ecosystems by using Nature Restoration Projects. (MOE, MLIT, MAFF)
- For the regions designated as necessary protection areas among the “500 Important Wetlands,” the government will further collect information for conservation and promote conservation by specifying them as National Wildlife Protection Areas, natural parks, or by registration as Ramsar wetlands, obtaining the understanding of the region. (MOE)
- For the wetlands that are important habitats for migratory water birds, the government will make efforts for conservation and awareness-raising of the regional residents through building and maintaining network among wetlands. (MOE)
- By using Monitoring Sites 1000, the government will grasp the change in wetland ecosystems and status of conservation. (MOE)

1.8 Conservation of fishing ground in inland water [Cited in Chapter 1, Section 9, 2.9]

(Current Situation and Challenges)

Inland water such as rivers and lakes is indispensable for peoples' lives, since it is the place of production for fish and culture and creates the opportunity for people to contact with nature through recreations such as fishing and outdoor sports. In these days, however, in addition to the deterioration of habitat for aquatic plants and animals, feeding damage by foreign fish such as largemouth bass (*micropterus salmoides*) and common cormorants and the spread of Ayu cold water disease are causing harsh environments surrounding inland water fisheries and aquaculture. To cope with these issues, it is important to further enhance conservation of inland water biodiversity.

(Specific Measures and Policies)

- By cultivation of fishing grounds and use of paddy fields and water channels, the government will improve habitat environments of aquatic animals and plants such as common carps, crucians, eels, and common reed grass. (MAFF)
- Taking a wide area perspective including the viewpoint of biodiversity conservation, the government will promote effective exclusion for preventing feeding damages by foreign fish and common cormorants and

measures against diseases such as Ayu cold water disease and Koi Herpes Virus. (MAFF)

- By implementing establishment of the place for spawning, larvae culture facility, and larvae release, the government will promote the effort of resource increase with consideration on biodiversity by local people, mainly fishermen, and thereby promote biodiversity conservation of inland waters. (MAFF)

1.9 Measures against alien species at rivers and wetlands

(Current Situation and Challenges)

With rivers, not only the environment is different from the headwater point to the river mouth or from inside the water, via waterside, to riverside but also the places, where environments are physically different due to small difference in land shape or frequency of flood, exist intermingled. Such variety of environments is providing a variety of habitats to various living organisms. Invasion of alien species exerts impact on native species, destroys the purity of native species by cross breeding, and damages the ecosystem unique to rivers, and thus may deteriorate the quality of river ecosystems.

The environment of lakes and rivers can be said to be isolated in a wide area and is in that sense comparatively similar to that of islands. Especially the native species that can live only in the lakes and rivers are vulnerable to the invasion of alien species.

Therefore, the “Research Committee on Negative Affects of Alien Species and Countermeasures thereof” consisting of academics and experts has formulated “Measures for Invasive Species in River (draft)” (2001) and “Basic Idea and Examples of Alien Species Control Measures in Rivers” (2003), which compiled basic information on alien species and examples of the measures from all over Japan, and they are referred to at the sites. They describe, showing examples, the following as the concept for the countermeasures against alien species:

- (1) Publicity and awareness-raising to get understanding and cooperation on alien species;
- (2) Preventive measures to prevent invasion of or bringing in of alien species;
- (3) Countermeasures against the alien species that have already invaded;
- (4) Promotion of research and survey to accumulate knowledge and technology necessary as the measures against alien species.

(Specific Measures and Policies)

- Recent rapid expansion of distribution of alien species in the rivers has become a big problem for some rivers. The government will continue the measures against alien species in the rivers, in addition to promoting research and survey on foreign vegetation and foreign fish and to examine effective measures. (MLIT, MOE)

2 Improvement of water environments

(Outline of Measures and Policies)

Water quality of rivers exert a great impact on the habitat environments of living organisms not only of rivers but also of sea areas. Therefore, efforts are made to secure appropriate water quantity and quality in the rivers. Also, rivers have their features in their dynamism rivers themselves have—disturbance by floods and flow fluctuation—and in the natural environment formed under such an environment. When thinking about

river environment, in addition to how much water is flowing, how much fluctuation the flow has is also important.

Until today, we have focused on the conservation of water quality based on the environmental water quality standard for protecting human health and for conserving the living environment, and the securement of a certain flow rate as a normal flow rate. Furthermore, the water quality standard will be set, achieved, and maintained for the conservation of aquatic life. In addition to securing a certain flow rate, what kind of flow fluctuation is to be given to the rivers is an important point of view, and the measures for this point needs to be examined and promoted.

2.1 Improvement of water quality in rivers and lakes

2.1.1 Setting of water quality target with consideration on aquatic life and its achievement

(Current Situation and Challenges)

Environmental water quality standard for conserving aquatic life included zinc in its target items in November 2003, and established water area types to specify standard values depending on the habitat status and the situation of spawning of aquatic life for each public water area (For rivers: Living organism A, Special living organism A, Living organism B, Special living organism B), to designate water area type for individual water areas.

As of November 2007, four water areas have been designated (Kitakami River, Tama River, Yamato River, and Yoshino River) their types, and effluent standard values for zinc based on the Water Pollution Control Act have been strengthened (enforced in December 2006).

The future issue is to examine the type designation for the rest of the water areas (33 rivers and lakes and 10 sea areas) one after another.

In addition, according to the set environmental water quality standard for conserving aquatic life, necessary environmental management measures and policies such as effluent control need to be appropriately implemented to maintain and achieve the standards, and the achievement of the environmental water quality standard always needs to be monitored.

In March 2005, “Indicators for Future River Water Quality Management (Draft)” to evaluate rivers from various viewpoints was formulated, and the indicators were set to evaluate habitat environments of living organisms in rivers by the inhabitation status of aquatic life as the viewpoint of “Securing Rich Ecosystems.”

(Specific Measures and Policies)

- Concerning the water areas for which the government has not yet designated the type, the government will collect and organize the information on the water areas, submit it to the deliberation of the Special Committee for the Type Designation of Environmental Standards for the Conservation of Aquatic Life, and examine one after another for type designation. (MOE) [Cited in Chapter 2, Section 1, 3.2]
- The water areas designated as the types for the environmental water quality standard for conserving aquatic life are four as of November 2007, and the number of the water areas targeted to be designated by the end of FY2011 is 40 inclusive. (MOE)
- By notifying “Prefectural Standards for Water Category Designation” (June 2006), the government will disseminate the matters related to prefectural standards for water category designation. (MOE) [Cited in Chapter 2, Section 1, 3.2]

- The government will review the necessary scientific knowledge on the substances considered to be highly toxic and promote toxicity assessment. (MOE) [Cited in Chapter 2, Section 1, 3.2]
- In accordance with the setting by the environmental water quality standard for conserving aquatic life, the government will appropriately take necessary environmental management measures and policies to maintain and achieve the settings such as effluent control, and will always monitor the achievement of the environmental water quality standard in public waters. (MOE) [Cited in Chapter 2, Section 1, 3.2]
- Based on the “Indicators for Future River Water Quality Management (Draft),” the government will implement researches from the viewpoint of “Securing Rich Ecosystems” that is an environmental indicator for living, growing, and breeding of living organisms in rivers. (MLIT)

2.1.2 Measures for water purification

(Current Situation and Challenges)

The result of Water Quality Monitoring in Public Waters in FY2005 shows the long-term improvement of the achievement of the Environmental Quality Standards for BOD (biochemical oxygen demand) or COD (chemical oxygen demand) in public waters was 87.2% in rivers. On the other hand, achievement rates in enclosed water areas remain low, without significant improvement—76.0% in sea areas and 53.4% in lakes. Based on the Law Concerning Special Measures for Conservation of Lake Water Quality, the Lake Water Quality Conservation Plans have been formulated for designated lakes, and the pollutant load is in a declining trend by various measures such as construction of sewage systems. Although water quality improvement is observed in some lakes such as Lake Inba, the environmental water quality standard has not been achieved with many lakes, and the measures to conserve water quality of lakes need to be further strengthened including introduction of sewage treatment facilities with advanced treatment.

Furthermore, in addition to the quantity and quality of water, various environmental problems of lakes have arisen recently, such as decreases in waterside vegetation and endemic fish species.

As the measures for water purification for rivers, the Ministry of Land, Infrastructure, Transport and Tourism is implementing “introduction of purification water,” “dredging,” “construction of direct purification facility,” and “clean water-course construction.” “Introduction of purification water” is to apply clean river water and the sewage water after advanced treatment to the rivers that have small flow rate and pollution and to lakes. It is one of the effective water purification measures since water quality is directly improved by dilution in polluted water area, and great effect is observed in Teganuma of Chiba Prefecture. “Dredging” is dredging bottom sediment that causes offensive odor and eutrophication by dissolution of nutrients, and is implemented in closed water areas such as Kasumigaura and in polluted urban rivers.

As the methods for “direct purification,” vegetation purification and soil purification, which use absorption by aquatic plant or soil, are utilized in addition to the contact oxidation method, where contact media such as gravels are used to fill up a water tank, water is run through the tank so that pollutant deposits, sticks, and decomposed by microorganisms. “Clean water-course” is to create clean water flow for the river where water is used very much, by setting a new low watercourse within a river channel to separate the water of polluted tributaries flowing into a river from that of the original river, purifying water as necessary, and joining the water to the downstream river. It is implemented in the Edo River that flows between Tokyo and Chiba Prefecture and is achieving great effect in the improvement of water quality of the headwater of Tokyo and Chiba Prefecture.

(Specific Measures and Policies)

- The government will continue efforts on the treatment of night soil and domestic effluent by sewage system, etc. (MOE, MLIT, MAFF)
- The government will implement the measures against water pollution by the measures against non-point pollutant (effluent control) in agricultural land and cities, the use of the System for Conservation of the Lakeshore Environment, and the pollution load control on newly built and existing factories and other commercial facilities. (MOE, MAFF)
- As for the water quality of lakes, despite the reduction in inflowing pollutant load, notable improvement of water quality has not been observed. The government will make efforts to analyze water pollution mechanisms to promote more effective and efficient measures. (MOE)
- In addition to continuing water purification measures for rivers, the government will formulate an action plan (emergency action program to improve the water environment) for quantity and quality of water to focus on water quality improvement, in regard to the rivers, lakes, or dam reservoirs with heavy pollution that deteriorate living environments or exert great impact on the water supply, for the purpose of comprehensively, urgently, and intensively implementing water environment improvement projects by the local municipalities that positively tackle the issue of water quality improvement, the party managing the river, the party managing sewage system, and related organizations all working together. (MLIT)
- At 30 locations as the targets for the First Plan (Clear Streams Renaissance 21) for FY2000, as a result of improvement in water quality, examples of returned sweetfishes by the improvement in habitat environment for living organisms as seen in Uji River, a tributary of Niyodo River, and those where a tourism resource was newly created by waterside restoration in cities as seen in Matsue-Horikawa of Matsue City have been reported. For FY2001 and FY2002, 34 locations have been selected as the target rivers for the Second Plan (Clear Streams Renaissance II), and the government will continue to positively promote the plan in collaboration with related parties. (MLIT)
- As the measures to reduce pollutant load of agricultural sewage drains discharged to rivers and lakes, the government will promote the construction of water purification facilities within channels and the construction of circular irrigation systems that reduces pollutant load by reusing agricultural wastewater and by the absorption of growing paddy rice and denitrification in paddy fields. (MAFF)
- In addition to conventional water conservation measures, targeting the lakes where improvement of water quality is unfavorable recently, the government will take new measures as trials from FY2007 in Kasumigaura and Inbanuma to restore the connection between the natural environment of lakes and regions, to conserve and restore ecosystem, and to make efforts for the improvement of water quality. (MLIT)
- To improve water quality of closed water areas, the government will implement adjustment of water level and restoration of waterside ecotone at lakes and will comprehensively promote improvement of water quality in lakes and dam reservoirs. (MLIT)
- The government will continue to implement the conservation measures for groundwater by a ban on the permeation of effluents into the ground, restriction on the pumping of groundwater, monitoring, and promotion of construction of rainwater filtering facilities. The government also takes measures to promote conservation and restoration activities of groundwater and springs in the regions. (MLIT, MOE)

2.1.3 Measures to conserve water quality of dam reservoirs

(Current Situation and Challenges)

As the problems of water quality of dam reservoirs, “cold water discharge,” “prolonged muddy water,” and “eutrophication” can be pointed out. In addition to solving these problems and conserving and improving water quality of dam reservoirs, the government is implementing various measures to avoid or decrease impact on downstream.

Regarding cold-water discharge, if a dam forming thermal stratification in summer discharges the cold water of the lower layer of the reservoir, the discharged water is colder than the water flowing into the reservoir and it may exert influence on agricultural products and river ecosystem.

Prolonged muddy water is the phenomenon of a dam’s discharged water being muddy for a long time, which occurs when a large quantity of earth and sand with small particle diameter flows into the reservoir with flood water and causes remaining muddy water in the reservoir.

Concerning eutrophication, if water stays in the reservoir for many days and pollutant load flowing into the reservoir from the river-basin area is heavy, phytoplankton of the reservoir proliferates abnormally and causes deterioration of landscape and offensive odor.

(Specific Measures and Policies)

- As a measure against cold water discharge, the government will establish a facility to change sluice gates so that the depth of water in the reservoir where water is discharged can be selected, thereby selecting the layer of water where the temperature is close to that of water inflow. (MLIT)
- For prolonged muddy water, the government will try to shorten the period of time muddy water is discharged, by establishing the facility to change sluice gates that can select the water layer with appropriate density of mud, and establishing and operating clear water by-pass, by which the low density water at the end of flood period flowing into the reservoir can bypass the reservoir and directly flow into downstream. (MLIT)
- As the measure for eutrophication, the government will establish and operate the facility such as an aeration circulation device that blows air up within a reservoir to mix the water at the bottom and surface and lower the water temperature and cause water convection, to control proliferation of plankton. (MLIT, MAFF)

2.2 Securing clear streams at rivers

2.2.1 Setting normal flow rate

(Current Situation and Challenges)

Basic Policy for River Development, prescribing the basic policy for river development from a long-term viewpoint, prescribes that the items concerning the flow rate necessary to maintain the normal function of flowing water (hereinafter “normal flow rate”) should be specified. As the flow rate to be secured at the time of water shortage, normal flow rate is set by examining a flow rate that can satisfy both “maintenance flow rate,” which is necessary to keep the conditions of habitats for fauna and flora and landscape and cleanliness of flowing water, and “utilization flow rate,” which is necessary for using the flowing water.

(Specific Measures and Policies)

- With Class A Rivers, among 73 river systems that Basic Policy has been formulated so far (as of July 2007), normal flow rate has been set for 61 river systems, which are used as the judgment basis for approval on

new rights to the use of water and foundation for supplementary flow rate from dam facilities. In addition, to secure normal flow rate, the government will examine effective use of existing facilities such as dam and rationalization of water usage. (MLIT)

2.2.2 Restoration of clear streams by solution of low water zones caused by hydroelectric power generation

(Current Situation and Challenges)

With hydroelectric power generation, low water zone where river flow is remarkably low is caused by bypassing of water used for power generation from water intake to power plant. With such a zone, problems with habitat environment for living organisms may occur from the viewpoint of flow continuity and conservation of water quality.

Power Generation Guidelines were made in 1988, and efforts have been made to restore clear streams of the low water zone caused by power generation. Within the low water zone of about 9,700 km in total with 1,571 hydraulic power stations of Class A Rivers, about two third have been improved.

(Specific Measures and Policies)

- As an example of clear stream restoration, the trial water discharges to prevent a rise in water temperature in summer and to consider upstream migration of salmons were implemented in the midstream area of Shinano River, and, as a result, the effect of upstream migration of salmons has been confirmed. In the future, in the opportunities such as renewal of the right to the use of water, the government will make effort to restore the clear streams of the low water zone caused by hydroelectric power generation. (MLIT)

2.2.3 Restoration of clear streams of channels by water conveyance of environmental water

(Current Situation and Challenges)

Clear streams left in water channels in the regions are the space for the people to relax, to play, and to communicate. They are also spaces that provide precious habitats for living organisms. However, due to the changes in water usage, clear streams that flow in the rivers or channels near the people have been lost in many regions.

(Specific Measures and Policies)

- In the past, introduction of purification water has been examined and implemented in various regions. Water source and water quality of purified sewage, stored rainwater, and groundwater have been researched in 7 model regions nationwide from 2005, and based on the result, recovery of flow rate of normal time, construction of channel to improve water quality, and examination on the measures for maintenance management and use have been promoted. In addition, the “Handling of Permission to Use the Rights to the Use of Water on Environmental Water” (March 2006) clarifies the standard related to the handling in the River Law, which is necessary when passing and using river water as environmental water, and restoration of clear streams depending on the regional characteristics is expected. (MLIT)
- By using agricultural irrigation facilities, and by water conveyance of environmental water, the government will support regional effort to restore clear streams. (MAFF)

2.3 Improvement of river environments by flexible management tests on dams

(Current Situation and Challenges)

As a result of dam constructions, influence on habitat environments of aquatic life such as fish caused by decrease in the flow rate in downstream rivers or by leveled flow rate is seen with some dams. To conserve the environment of downstream rivers of dams, the flexible management test has started in FY1997 and it is implemented in 24 dams in FY2006.

With a multi-purpose dam that has flood control as one of its purposes, during flood season, space is secured by lowering the water level of a reservoir for flood control. Dams' flexible management test is to the temporary reserve of flowing water in a flood control capacity and, by using such reserved water, to try to restore clear streams and to improve flowing status in the downstream rivers by releasing the reserved water. Its precondition is that it is possible to safely and certainly secure the capacity of flood control by releasing water when flood is expected due to the weather forecast.

(Specific Measures and Policies)

- The government will promote the measures for improvement of river environments by dams' flexible management tests and advance the examination of the method of water release to make it more effective. (MLIT)

3 Coordination and collaboration with residents

(Outline of Measures and Policies)

Rivers are natural public property that foster various living organisms and support ecosystems unique to the region, and are "regional common and public property," which not only the party managing the river but also regional residents themselves should protect and nurture in the activities in the river-basin areas. Recently, the sentiment is gathering momentum to use rivers for creation of communities as the space where nature can be felt immediately. It is indispensable for regional residents and governments to have common understanding that "the rivers are regional common and public properties" under the ideology to realize better rivers and collaborate together. With the revision of the River Law in 1997, the procedure was adopted to take the measures to ask opinions of experts as necessary and to reflect opinions of related residents when making river construction plans. The Ministry of Land, Infrastructure, Transport and Tourism is promoting measures for rivers in collaboration with many citizen's groups by role-sharing in the stages of formulating plan, implementing projects, and managing after project implementation.

(Current Situation and Challenges)

Since rivers are "regional common and public property," not only reflecting residents' opinions in the formulation of river construction plans but also positive involvement with rivers on day-to-day basis are important.

In accordance with the growing desire of regional residents to participate in citizen's activities and the heightened momentum to formulate an independent regional society with distinctive characteristics, expectation of the society regarding the activities by citizen's groups have become greater. Also with rivers, citizen's groups have become active in various fields including environmental conservation activities and the activities for creating towns utilizing rivers.

Under such momentum, the government is making efforts also for rivers to construct biotopes and restore waterside vegetation by the collaboration with citizen's groups.

(Specific Measures and Policies)

- The government will continue its effort of environment conservation activities for restoration of nature and of creating towns that use rivers by the collaboration with residents. (MLIT)

4 Environmental education and hands-on nature experiences using rivers

(Outline of Measures and Policies)

Rivers are the basis of people's lives that have unique and vibrant natural. The rivers existing close to us have excellent conditions for us to learn nature and to have activities, and recently environmental education and hands-on nature experiences have become popular. To foster the will for the activities for coexistence of human beings and nature and to nurture the ability to solve environmental issues, practical experience is necessary. To promote environmental education and hands-on nature experiences, the Ministry of Land, Infrastructure, Transport and Tourism is developing various measures in collaboration with citizens' groups.

4.1 Children's Waterfront Rediscovery Project

(Current Situation and Challenges)

The Ministry of Land, Infrastructure, Transport and Tourism, the Ministry of Education, Culture, Sports, Science and Technology, and the Ministry of the Environment are cooperating to promote the "Children's Waterfront Rediscovery Project." To enhance hands-on experiences of regional children, "Children's Waterfront Council," consisting of the party managing the river, Board of Education, and citizen's groups, was established, the waterfronts suitable as the playground and for nature experience of children have been registered as "Children's Waterfronts," thereby promoting hands-on nature experiences in rivers with this project. The project also supports hands-on experiences that use rivers, by lending equipment and materials necessary for waterfront hands-on experiences and providing various information useful for waterfront activities. As of March 2007, 248 locations have been registered and various kinds of activities have been held in regions all over Japan.

In addition, by the coordination and collaboration within the regions, the relationship between children and waterfront is considered and plans for a waterfront school project that uses regional characteristics will be made. Based on the plan, when river construction is necessary, while keeping natural status as much as possible, construction is conducted for improving accessibility to riverbanks (making bank slope milder, construction of river banks where children can come close to the waterfront), for restoration of rapids, abyss, and stagnation, so as to make the waterfront accessible to nature for children.

Among the waterfront school projects, there is an example that children themselves thought what type of waterfront they wanted and construction was made using the children's viewpoint. There is another example that citizen's group is inviting children to visit rivers.

(Specific Measures and Policies)

- To expand the opportunities for children for hands-on experiences and environmental learning using rivers and to enhance hands-on experience of regional children, the government will continue to promote the

“Children’s Waterfront Rediscovery Project” together with the “training of instructors” who can teach the natural environment and dangers of rivers. (MLIT, MEXT, MOE) [Cited in Chapter 2, Section 3, 3.1 and 4.2]

4.2 Promotion of hand-on nature experiences using rivers by citizen’s groups

(Current Situation and Challenges)

While rivers have the charm to attract people, they also have danger. “River instructor” who has correct knowledge and rich experience on rivers, is necessary, for people to safely enjoy rivers.

All over Japan, there are citizen’s groups that have various activities in the rivers as the field of activities and positively practice environmental learning and hands-on nature experiences. The style of activities varies: some groups focus on the region-oriented activities and some focus on exchanges with other groups or wide-area activities. A nationwide council has also been established, and lectures for instructor training, waterfront safety lessons for children, and nationwide conferences to learn from rivers are held in various regions in Japan.

It is considered that people’s sensitivity can be heightened if citizen’s groups in various regions invite not only children but also a wide range of generations to rivers and promote rich hands-on nature experiences set in rivers, including the above activities.

On the other hand, there seems to be no end to water accidents as the number of people who have hands-on nature experiences using rivers are increasing. It is important to be fully aware that contact with nature is comfortable and gives energy to live, but it is dangerous at the same time.

The Study Group on the Use of River Based on the Nature of Rivers Where Danger Resides and on How Security Should Be has formulated “To Enjoy River Knowing its Danger” as its proposal in 2000. It describes that, free use and self-responsibility are the basic principles concerning rivers, but improvement in daily provision of information is needed for the people to take appropriate behavior to secure their safety.

(Specific Measures and Policies)

- In collaboration with citizen’s groups and councils nationwide, the government is comprehensively developing all kinds of activities to support and promote hands-on experiences in rivers in line with the times. The government will promote in particular “training of instructors” to foster instructors who correctly understand the danger of rivers and have skills to teach, “waterfront safety lessons for children” where children can learn basic knowledge for crisis management through hands-on experiences from the viewpoint that security is what oneself has to be secured by oneself, and “awareness-raising activity” to confirm the significance of hands-on experiences in rivers and to provide the place for the people who have activities in the rivers nationwide to develop exchanges. (MLIT)
- The Ministry of Land, Infrastructure, Transport and Tourism, is providing real time information on rainfall, water level in rivers, etc. via the Internet and mobile devices. To prevent river water accidents caused by a sharp rise of water, the government will urgently make an action plan of the measures and promote the measures in collaboration with related organizations and implement awareness-raising by flyers on safe use of rivers. (MLIT)

4.3 Kodomo Hotaranger (Child Firefly Ranger)

(Current Situation and Challenges)

The light of the firefly that flies in darkness has been appreciated as original Japanese scenery for a long time. Even though such scenery has been lost in many regions, people have expanded activities to restore the lost fireflies and protect remaining fireflies.

The Ministry of the Environment named the children as “Kodomo Hotaranger,” who will bear the next generation regarding the conservation of water environments through fireflies, and from FY2004 has invited examples of their activities, with the Minister commending leading and unique activities in Japan.

This provides a good opportunity for children to strengthen their interest in the conservation of water environments, as well as to improve understanding and thinking by themselves by contact with familiar rivers through fireflies.

Representative examples of their activities are: making a habitation map of fireflies, studying the creation of living environments for fireflies and having contact with people in the community.

We chose one elementary school and one junior high school for the Minister of Environment prize, and two elementary schools and one group for the excellent prize from 31 groups, held a commendation ceremony and received activity reports in 2006.

(Specific Measures and Policies)

- The government will continue to promote the Kodomo Hotaranger’s activities by commending remarkable activities and activity report meetings so that these activity examples lead to further interest and activity in water environment conservation activities in various regions. (MOE)

5 Survey and research on river environments

(Outline of Measures and Policies)

To contribute to the construction and conservation of good river environments, various research and surveys are practiced in collaboration with experts and various organizations, including the Census of Rivers and Riparian Areas, river ecology scholarly research, and work at the Aqua Restoration Research Center that has world’s largest experimental channel (about 800 m length).

5.1 Census of rivers and riparian areas

(Current Situation and Challenges)

With the start of the “nature-oriented river management” in 1990, the Ministry of Land, Infrastructure, Transport and Tourism is conducting the “Census of Rivers and Riparian Areas” that periodically and continuously surveys the inhabitation status of living organisms in rivers and dam reservoirs to grasp basic information on river nature environments.

So far, with 109 Class A Rivers, 166 Class B Rivers, and 88 dam reservoirs that the central government or Water Resources Development Organization manages, researches have been practiced on the habitat status of fish, benthic life, plants, birds, amphibia, reptiles, mammals, and land insects, and on rapids and abyss, and the status of river at waterside areas. The survey on living organisms has been promoted so as to finish one cycle in about five years, and three cycles of the survey have been completed by FY2005.

Census of Rivers and Riparian Areas has the following features:

- It is a nationwide overall survey where data quality is managed by using a unified survey time, cycle, and method all over Japan.
- It is a periodical, continuous, and unified survey on the rivers and dams nationwide.
- Regarding the survey content, data quality is managed sufficiently by: 1) each river getting support of an adviser who is a scholar, and 2) species to be checked being checked by a screening committee consisting of scholars.
- Survey manual and a list of living organisms have been prepared so that the level of the survey is kept at a certain level.
- It is data collected and analyzed regarding the accumulated information on what type of living organism was living in what kind of physical environment. It is also the data that meets to (is useful for) the actual river management such as conservation and restoration of river environment.

The result of the Census of Rivers and Riparian Areas is used to make a river environment information map. A River environment information map is a map of the status of river beds and vegetation in which checked living organisms, habitat environments and living history of living organisms are organized on a drawing in a way easy to understand, for the purpose of appropriately grasping information on river environment necessary when constructing and managing rivers. River environment information maps are expected to be very much useful in formulating and managing river construction plans. By using the map with a river improvement construction drawing, for example, the impact the improvement construction would exert on the environment can be grasped.

Furthermore, the past Census of Rivers and Riparian Areas targeted to check the type of living organisms at the census points, aiming at knowing what kind of living organisms are living in each river. Now that three cycles of the research have been completed and grasping rough biota on what living organism is living where has progressed substantially. Now, a so-called target-oriented census is required, which can be a clue for the solution for the environmental problem each river has, in addition to implementing a fixed-point continuous census.

(Specific Measures and Policies)

- The government will promote the formulation of environmental information maps to easily grasp environmental characteristics as a whole, distinctive places, and important habitat environments from the information gained from the result of the Census of Rivers and Riparian Areas, and use it for construction and management of rivers. (MLIT)
- The government will promote computerization and GIS of the survey results, to immediately grasp all the information of nationwide Censuses of Rivers and Riparian Areas, to dramatically shorten the time to grasp the analysis on nationwide distribution and chronological trends, to enable multi-faceted analysis on river environments, to promptly cope with information disclosure, and thereby practice more efficiently the organization, analysis, and use of the huge volume of data gained by the Census of Rivers and Riparian Areas, and enable provision of the information to the public. The government will also promote mutual usage with other nationwide research data such as the National Survey on the Natural Environment. (MLIT, MOE, MAFF) [Cited in Chapter 2, Section 5, 2.8]

- The government revised in March 2007 the manual for the Census of Rivers and Riparian Areas, so that among the basic census, a round of the research on fish and benthic animals should be made in about five years and a round of the researches on plants, birds, amphibia, reptiles, mammals, and land insects should be made in about 10 years. In addition, it has adopted the “theme survey” to collect basic information that need to be intensively and urgently grasped, and a “monitoring survey” that is implemented by the cooperation of citizen’s groups in the river-basin area to deepen people’s interest and understanding concerning the waterside environment. In the future, the government will promote an enhanced census in accordance with the revised manual. (MLIT)

5.2 River ecology scholarly research

(Current Situation and Challenges)

The knowledge on the natural environment in rivers is not yet sufficient and accumulation of information and academic research is indispensable. To promote comprehensive academic research on river environments, the Ministry of Land, Infrastructure, Transport and Tourism has been implementing river ecology scholarly research from FY1995.

With this research, concrete fields are set, the following themes are promoted by the researchers at universities in the field of biology, ecology, and river engineering and the researchers of National Institute for Land and Infrastructure Management of the Ministry of Land, Infrastructure, Transport and Tourism and of the Public Works Research Institute. Research reports are made based on the results of field researches.

- (1) To understand the response of rivers to the historical changes in river-basin areas and river structures.
- (2) To typify habitats and clarify their mechanism of formation and maintenance and ecological functions.
- (3) To clarify the structure and function of river ecology and the role of living organisms for rivers, by clarifying existing quantity of living organisms, structure of species, biological diversity, material circulation, and energy flow. To assume the environmental capacity of rivers by using this information.
- (4) To clarify the influences of natural impact that rivers originally have such as the disturbances of floods and water shortage and of human impacts such as management of flow rate of river channels and inflow of substances.
- (5) To introduce the methods for conservation and restoration of river environments and to grasp and evaluate their effects.
- (6) To put the result of the above (1) to (5) together and to examine how the river management should be based on ecological viewpoint.

(Specific Measures and Policies)

- As research fields, six rivers have been used, i.e. the Tama River where the flow status is comparatively stable, the Chikuma River of which fluctuation of flow rate is big, the Kizu River that has a large quantity of running-down sands and where a beautiful sandbar is formed, the Kita River where large-scale repair was underway by the special emergency project for river disaster, the Shibetsu River for which remeandering of river channel is implemented by nature-restoration type river creation, and the Iwaki River that has a vast field of reed and a brackish area at the river mouth. The government will promote joint research in the future based on fieldwork. (MLIT)

5.3 Aqua Restoration Research Center

(Current Situation and Challenges)

The Aqua Restoration Research Center of the Public Works Research Institute was established in Kakamigahara City of Gifu Prefecture, for the purpose of implementing basic and applied researches for the conservation and restoration of natural environments in rivers and lakes and to widely disseminate the results.

To research on the technical issue of securing sound habitat environment for living organisms while securing safety against flood, the Aqua Restoration Research Center has established three water channels of 800 m length, making it the world's largest experimental water channel, and has set 6 experimental ponds. The size of facilities are almost similar to the scale of real ones, and the conditions including quantity of flow can be artificially controlled, so that experiments can be made under the conditions close to a real river's.

Among the experimental rivers, one is almost straight and has an embankment at a part of the river. The other two have five zones, including meandering zones, for respective research themes, i.e. meandering zone (upstream), natural environment restoration zone, source of flood zone, stagnant zone, and meandering zone (downstream). These two rivers were constructed with the same shape, and flow rate fluctuation is given to one and not given to the other, and thereby the environmental impact is researched.

The purposes of researches by the Aqua Restoration Research Center are:

- Research on the river creation by using nature
- Research on normal flow rate by giving fluctuation
- Development of water purification technology for lakes by using nature.

Practically, research on the relationship between river shape such as rapids and abyss and living, growing, and breeding status of living organisms, research on the relationship between frequency of flood and the growing of plants, research on the influence the flow rate fluctuation exerts on river environments, etc. are made in collaboration with the researchers in various fields.

(Specific Measures and Policies)

- Until today, it has been confirmed concerning the habitat and habitation environments for fish that quantity depends more on the riverbed shape of abyss and rapids than on waterside vegetation, and consideration on the structure of rapid and abyss, therefore, is important in river repair constructions. It has also been confirmed that propagation of foreign plants causes decrease in native species, not only quantitatively but also qualitatively (number of species), and thus exerts impact on riverside plants. The government will continue to verify the effect of various construction methods on river restoration. (MLIT)

5.4 Aquatic Life Survey

(Current Situation and Challenges)

The Ministry of the Environment and the Ministry of Land, Infrastructure, Transport and Tourism have been implementing the "Aquatic Life Survey" from 1984 to survey the degrees of "cleanliness" and "dirtiness" of rivers by aquatic life in rivers, by the participations of elementary schools, junior high schools, senior high schools, and the general public.

Inhabitation status of aquatic life in rivers such as stonefly and Japanese Freshwater Crab reflects water quality, and water quality can be judged by using such aquatic life as indicators. Such a water quality survey is

easy for general public to understand and does not need expensive equipment, and anyone can participate. Contacting familiar nature through such surveys is a good opportunity to strengthen the interest in natural environments.

The Aquatic Life Survey evaluates water quality by four levels by using 30 species, among aquatic life in rivers, as indicators that are (1) distributed widely everywhere in Japan, (2) easy to classify, and (3) highly indicative concerning water quality.

74,968 participants of 2,013 participating groups collected aquatic life at 3,489 survey points in FY2006. The result of identification and classification of indicator species was I (clean water: 60%), II (a little dirty water: 25%), III (dirty water: 11%), and IV (very dirty water: 2%), and big change has not been observed since FY2003.

(Specific Measures and Policies)

- As an opportunity for interest in river environments to be enhanced among the general public, the government will continue the aquatic life survey in collaboration with residents. (MLIT, MOE) [Cited in Chapter 2, Section 3, 3.1]

Section 9 Coastal Areas and Oceanic Areas

(Basic Concepts)

Animals and plants specific to landforms such as sand dunes and cliffs can be seen on the complicated coastlines of the Japanese archipelago. In neritic areas land areas, inland water areas, and sea areas are in contact and they interact with each other, seaweed beds, tidal flats, underwater forests, and coral reefs are distributed, and they provide diverse inhabitation and growth environments for breeding, spawning, growing, and feeding for various marine life.

Marine life around the Japanese archipelago is quite diverse from the world standard, influenced by quite diverse oceanic structures such as the Japan Sea, which was isolated in the history, and the Japan trench, which is 10,000 meters deep, and by the cold water mass and the warm water mass, and the remote life the water masses can provide us.

Such coastal/oceanic area with high biological productivity is a rich fishing ground, and is supporting our life by fishery products and supporting fisheries as an industry. Especially in the coastal area, the sea, where high productivity and rich biodiversity have been conserved by the modification implemented while keeping harmony with natural ecosystems, is known as Satoumi areas, and needs to be kept appropriately. Therefore, this section describes fisheries in coastal/oceanic area as “2. Fisheries in Satoumi and Oceanic Areas.”

Beach forms excellent natural landscape combined with land area as seen in white beaches and green pines, and is used for recreations. Beaches therefore are important also from the viewpoint of contacting and appreciating nature.

On the other hand, in Japan where population and industries concentrate on the coastal flatland, coastal areas have heavy environmental burdens. In the post-war economic development, sandy beaches, tidal flats, seaweed beds of coastal area were lost in exchange for a rich and safe life, and contact between human beings and the sea has become tenuous compared to the past. When red tide and oxygen-deficient water masses (blue tide) are generated by the changes in the condition of material circulation caused by various human acts, it causes a drastic decrease in biodiversity. The oceans are connected each other, and special care is needed concerning the point that environmental change in a limited space exerts influence on the population of living organisms over a wide area.

Influenced by developments and climate change, ecosystem in such coastal areas still tends to decrease and deteriorate nationwide, and it is necessary to take measures to strengthen the conservation of and to restore already lost sandy beaches, tidal flats, and seaweed beds. Also, for the coasts with sandy beaches or rocks that has a concentrated population and assets behind it, it is important to simultaneously secure safety of life by disaster prevention and to conserve the environment.

Furthermore, concerning migratory birds and sea turtles that use Japan’s coasts while traveling long distances beyond the national boundaries, marine mammals including whales, and fish, it is important to take measures on the conservation of their habitats not only from the domestic viewpoint but also from a wide-area and international viewpoints and by the cooperation and collaboration of each related country.

In the Basic Act on Ocean Policy established in April 2007, the importance of the conservation of marine biodiversity is described in the first basic principle of its six marine policies, which is “Harmonization of the Development and Use of the Oceans with the Conservation of Marine Environment.” Based on the Act, the ministries and agencies concerned need to promote coastal and oceanic policies in further cooperation.

1 Comprehensive conservation of biodiversity in coastal areas and oceanic areas

(Outline of Measures and Policies)

The policies to conserve ocean environment including conservation of marine biodiversity need to be promoted based on the Basic Act on Ocean Policy. For the sea area that is important for biodiversity conservation in particular, such as tidal flats, seaweed beds, and coral reefs, protected areas such as National Parks will be enhanced as necessary based on the adjustment with related organizations.

In addition, collection and preparation of basic data necessary to make and implement conservation measures needs to be enhanced in the future. At that time, preparation of information needs to be done efficiently by further strengthening the collaboration among the ministries and agencies concerned, by sharing information on coasts, ports, fishing ports, and oceans, collected by each ministry and agency concerned.

1.1 Conservation of oceanic biodiversity based on scientific knowledge

(Current Situation and Challenges)

The Basic Act on Ocean Policy, which passed the Diet in April 2007, prescribes to promote the policies and measures on the conservation of marine environment including its biodiversity in light with the trend in international discussions for the United Nations Convention on the Law of the Sea and the Convention on Biological Diversity, in addition to make efforts for the necessary research and information provision to make and implement those policies and measures. In the 8th meeting of the Conference of the Parties to the Convention on Biological Diversity held in March 2006, the major topic was the conservation of marine biodiversity, such as integrated management of ocean and coastal area and sustainable use of genetic resources in the high sea.

However, there is not enough data in Japan to form the basis for the conservation policies on oceanic biodiversity including inhabitation status of marine life. Such information needs to be collected and prepared in the future to promote scientific conservation policies. In promoting conservation policies, it is also important to comprehensively consider the relationship between the broad ocean and land area and what the use depending on the purpose of marine resources should be.

(Specific Measures and Policies)

- In addition to enhancing natural environment data by continuing monitoring research on the biota of neritic ecosystems in seaweed beds, tidal flats, and coral reefs, the government will collect and prepare various kinds of information on the biodiversity of marine life, primarily of the habitation status of those within Japan's 200 nautical miles. (MOE)
- The government will promote the basic establishment of scientific data on important ecosystems and marine life in the ocean by the collaboration of the ministries concerned, and based on the data, will comprehensively promote the conservation of biodiversity for the entire ocean including coastal areas. (MOE, relevant government ministries and agencies)

1.2 Protected areas to conserve marine biodiversity

(Current Situation and Challenges)

Marine protected areas are the targets of the policies for biodiversity conservation in the world. In practice, the World Summit on Sustainable Development (WSSD, 2002) included in its Plan of Implementation the

establishment of marine protected areas consistent with international law and based on scientific information, including representative networks, by 2012 and time closures for the protection of nursery grounds and periods. In addition, the 4th meeting of the Conference of the Parties to the Convention on Biological Diversity (1998) adopted the Programme of Work on marine and coastal biological diversity, and its 7th meeting (2004) has set the time limit for the establishment of marine protected areas network as 2012.

In Japan, the current situation of designation of neritic areas, such as seaweed beds, tidal flats, and coral reefs—neritic ecosystem important for the conservation of marine biodiversity—as National and Quasi-National Parks and National Wildlife Protection Area shows that 40 to 50% of seaweed beds and coral reefs have gained designation. However, almost all of them are designated as the “Ordinary Zone of National and Quasi-National Parks,” where the regulation is relatively generous, and only 10% of the tidal flats have gained designation.

With neritic ecosystems, the area is decreasing due to developments, and quality is rapidly deteriorating due to the increase in environmental burden such as inflow of earth and sand and nutritive salt from land areas. Its restoration and conservation, therefore, are required.

At National Parks, the efforts for marine conservation and restoration will be made by integrated coastal management combined with land area, including elimination of the source of occurrence of earth and sand and nutritive salt.

To enjoy the blessing of the ocean with the rich natural ocean environment in the future as well, it is important to improve people’s understanding and interest concerning the sea areas that are important for biodiversity conservation. It is necessary to examine what the conservation and use of sea areas should be and to promote awareness-raising for sea area usage.

(Specific Measures and Policies)

- By referring to the cases such as the Sea Area Control Plan for the Shiretoko World Natural Heritage Area, where conservation of biodiversity in the sea area is pursued while fishery resources are maintained principally by fishermen’s self-imposed control based on the concept of adaptive management, the government will examine what marine protected areas should be to aim at reconciling biodiversity conservation and multiple use based on the agreement within the community. (MOE)
- By the Diversified Evaluation Project on National and Quasi-National Parks (from FY2007), including the viewpoint of biodiversity conservation, the government will reexamine the evaluation method concerning excellent sea area, and by making adjustment with the organizations concerned, will designate/rearrange National and Quasi-National Parks and reexamine the designated area of Marine Park Zones. The government will also reexamine the Natural Parks Law when necessary to promote appropriate conservation and use of sea areas. For Marine Park Zones, the government will reexamine the species to be the target of capture control to promote conservation. (MOE)
- In the sea area of National Parks where coral reef ecosystems are deteriorating with coral breaching and generation of crown-of-thorns starfish, the government will control crown-of-thorns starfish and restore the coral community. For the sandy beaches where sea turtles lay eggs, the government will conserve and restore the marine ecosystem positively and will make effort in management, by the activities of cleaning beaches and monitoring spawning through National Parks. (MOE)

- The government will positively hold nature observation programs at coastal area of National Parks, examine what appropriate conservation and use of the sea areas of National Parks should be, provide necessary information by pamphlet and websites, and thereby promote awareness training for the use of the sea area. (MOE)
- To eliminate the source of occurrence of earth and sand and pollutants that exert bad influence on natural landscapes and the conservation of biodiversity in the National Parks of sea areas, the government will examine necessary measures by adjusting and collaborating with related organizations. (MOE, relevant government ministries and agencies)
- To attempt conservation and recovery of marine biodiversity and sustainable use of marine resources through adaptive management, the ministries concerned will examine in cooperation on necessary policies and measures including enhancement of various protected areas and collaborations and using the framework of the Basic Act on Ocean Policy. (MOE, relevant government ministries and agencies)
- The government will try to designate wildlife protection areas and special protected areas so that various ecosystems and various types of biological groups are included, from the viewpoint of securing habitat environments for various wild animals. As one of such efforts, by trying to designate protection areas for important breeding area of sea birds in coastal and oceanic area, the government will promote the conservation of natural environment in coastal and oceanic areas. With the National Wildlife Protection Area, the government will promote designations of the regions important for wildlife protection from nationwide or international viewpoint, by making adjustment with relative organizations. (MOE)

1.3 Conservation and restoration of seaweed beds and tidal flats

(Current Situation and Challenges)

The Seaweed bed—the community of sea grass such as eel grass and of seaweed such as kelp, ecklonia cava, and Sargassum fulvellum—and tidal flats where fine earth and sand carried by rivers accumulated, are the places for breeding, spawning, growing, and feeding for many kinds of marine life. For example, tidal flats developed in inner bays have a remarkable quantity and variety of small animals, thus they are important feeding places for various coastal fish and shorebirds.

These wetlands of neritic areas may be playing an important role, regardless of its size, when larvae of shellfish, crustacean, and fish move and disperse. Therefore, it is necessary, based on scientific knowledge, to know the mutual connection of such wetlands and the forming of network and attempt to conserve seaweed beds and tidal flats that are left. It is also important to know the current status of pollution by chemical substances and to take measures to restore the functions that were lost in the past.

(Specific Measures and Policies)

- By using the National Survey on the Natural Environment and Monitoring Sites 1000, the government will promote preparation of information on seaweed beds and tidal flats. (MOE)
- Through the implementation of the policies shown in “1.2 Protected Areas to Conserve Marine Biodiversity,” the government will conserve seaweed beds and tidal flats. (MOE)
- The government is implementing the restoration of tidal flats at the Gamo Tidal Flat in Miyagi Prefecture. Including this, the government will promote nature restoration of tidal flats in National and Quasi-National Parks and National Wildlife Protection Areas. (MOE)

- In parallel with the promotion of conservation and formation of seaweed beds and tidal flats by the method depending on the sea area environment, the government will have various parties, mainly fishermen, promote control on living organisms feeding on seaweeds and maintenance and management activities to secure genetic diversity and local endemism such as dispersion/transplant of seaweeds/bivalves and cultivation of fishing ground. By March 2012, about 5,000 ha will be prepared for conservation and restoration of seaweed beds and tidal flats. (MAFF) [Cited in Chapter 1, Section 9, 2.1]
- The government will effectively use dredged sand generated by construction of ports and harbors, and promote restoration of tidal flats and seaweed beds and backfilling of large pits. (MLIT) [Cited in Chapter 1, Section 9, 4.1]
- For the deterioration of the growing environment for aquatic plants and animals caused by domestic effluent, the government will make effort to reduce water quality burden from the land through the facilities such as community sewerage systems. (MAFF) [Cited in Chapter 1, Section 9, 2.1]
- For the bad effect on fisheries by the increase in marine litters, in addition to the promotion of the activities of fishermen and NPOs done voluntarily such as cleaning of beaches and rivers and planting activities, the government will promote the measures such as collection and disposal of marine litters and development and dissemination of recycling technology for fishery-related materials. (MAFF) [Cited in Chapter 1, Section 9, 2.1]
- The government will strengthen the observation system on generation of red tide and oxygen-deficient water masses to prevent damages on fisheries. (MAFF) [Cited in Chapter 1, Section 9, 2.1]
- The government will remove sediment that will contribute to the recovery of use of fishing ground for about 250,000 ha by March 2012. (MAFF) [Cited in Chapter 1, Section 9, 2.1]

1.4 Conservation and restoration of coral reef

(Current Situation and Challenges)

Coral reefs of subtropical water areas is said to have ecosystems as diverse as that of tropical rain forests, and many kinds of marine life including fish abundantly live and grow there. They are the places for spawning and feeding of marine resources and for growing of fish larvae, and also a resource for tourism including diving and for recreations. They are also playing the role of breakwater to curb violent waves lapping from the broad ocean.

Destruction of coral reefs is progressing all over the world. According to the 2004 report published by Global Coral Reef Monitoring Network (GCRMN), 20% of the coral reefs in the world have been destroyed and a further 24% is in danger and is highly likely to be destroyed in one or two decades. In the subtropical sea area such as Okinawa in Japan and the tropical sea area such as the Palau Islands abroad, the area of coral distribution is decreasing and the effect on aquatic plants and animals is concerned. Immediate restoration and recovery of coral reef ecosystems is required. Causes of destruction are the impact of human activities such as inflow of red soil and coastal development, coral breaching influenced by high water temperature, damage by natural enemies such as crown-of-thorns starfish, and diseases such as the White Syndrome of unknown causes, by which coral organism become necrotic in a strip. It is also concerned that, especially due to global warming, coral breaching will occur more frequently in the future.

In the General Meeting of the “International Coral Reef Initiative (ICRI)”—an international framework aiming at the ecosystem conservation of coral reef and related coastal area—held in April 2007 in Ikebukuro,

Tokyo, the “Resolution on Coral reef and Climate Change” and “Recommendation on Developing Marine Protected Area (coral reef) Network” were adopted.

(Specific Measures and Policies)

- Based on the decision of ICRI to make 2008 International Coral Reef Year, the government will practice awareness-raising on coral reef conservation by the participation of various entities. (MOE)
- Based on existing guidelines and status of activities, the government will formulate Japan’s coral reef conservation activity plan by the participation of various entities within 5 years on the issues of designation of protected areas, style of conservation and restoration, measures against disease, rules for use, and monitoring. (MOE)
- By using the National Survey on the Natural Environment and Monitoring Sites 1000, the government will promote preparation of information on coral reefs. (MOE)
- Through the implementation of the policies shown in “1.2 Protected Areas to Conserve Marine Biodiversity,” the government will conserve coral reefs. (MOE)
- The government is implementing the natural restoration of coral community at Sekiseisho-ko coral-reef lagoon in Okinawa Prefecture, Tatsukushi in Kochi Prefecture, and Takegashima in Tokushima Prefecture. Including this, the government will promote nature restoration of coral community in natural parks. (MOE)
- To prevent inflow of red soil from agricultural land in Okinawa Prefecture and Amami Islands, the government will promote the repair work to revise land slope angle and construction of sand basin. (MAFF)
- To promote prevention of erosion at the origin of red soil in Okinawa, the government will grasp the status of red soil erosion, examine the technology to prevent erosion, and have the River Basin Council perform awareness-raising activity, and thereby implement research and survey projects. (Cabinet Office)
- Based on the resolution by the ICRI on coral reef and climate change, the government will examine adaptive measures for climate change such as the research to improve coral reef resilience against climate change and the support for activities. (MOE) [Cited in Chapter 2, Section 6, 1.1]
- With Okinotori Island as its target, which is difficult as a growing condition for coral reef and where coral decrease is a concern, the government will grasp the current status, examine larval culture technology, and make guidelines for coral cultivation methods, and thereby develop the technology concerning coral cultivation that can be widely applied to other sea areas. (MAFF)

1.5 Conservation of ecosystem on islands

(Current Situation and Challenges)

Japan’s land consists of the 4 major islands of Hokkaido, Honshu, Shikoku, and Kyushu and more than 3,000 islands. Ecosystem on islands has been formed within a limited geographical space isolated from the outside world for a long time, and has been kept on a delicate balance of the elements of ecosystem. It has unique biota with many endemic species, and is quite vulnerable for human activities and impact by invasive alien species.

More than half of 38 species (as of August 2007), for which Programmes for Protection and Breeding is currently made based on the Law for the Conservation of Endangered Species of Wild Fauna and Flora, are living and growing on islands, and many of species on islands are designated as threatened species.

In conserving the ecosystem of islands, the above characteristics need to be taken into account to conserve threatened species and implement the measures against invasive alien species.

(Specific Measures and Policies)

- Regarding the species for which Programmes for Rehabilitation of Natural Habitats and Maintenance of Viable Populations is made based on the Law for the Conservation of Endangered Species of Wild Fauna and Flora, the government will enhance the measures to establish the populations bred in captivity for return to wildlife for ibises and Tsushima cats, and will start from FY2008 the full-fledged measures for captive breeding for Okinawa rail (*Gallirallus okinawae*), and thereby enhance and strengthen the projects. (MOE)
- The government will continue to conserve habitats on the remote islands that are important as breeding area for sea birds such as the Rishiri Island and Teuri Island of Hokkaido and the Nanatsujima islands of Ishikawa Prefecture. (MOE)
- For the species the latest Red List specified as the ones for which the priority for protection is quite high, the government will collect information in detail and will take appropriate measures according to the status including that based on the Law for the Conservation of Endangered Species of Wild Fauna and Flora. (MOE)
- Among the threatened wild fauna and flora unique to Japan, mainly for the species living on the islands where deterioration of habitat is concerned or in Satochi-Satoyama, the government will implement an overall check on living conditions and emergency measures. In addition, for the Programmes for Protection and Breeding currently practiced for 38 species, overall check and evaluation on its implementation will be made and effective programme promotion will be examined. (MOE)
- In Ogasawara, the government is implementing the conservation of endemic species and rare species left on oceanic islands and the unique ecosystem and the rehabilitation of the ecosystem disturbed by foreign species. In addition to these, the government will promote nature restoration projects for the island ecosystem unique to oceanic islands in nature parks. (MOE)
- Mainly in priority areas which play an important role in nature conservation, such as habitats of endangered species, national parks and protected forest, the government will promote invasive alien species control projects, including the one on the small Indian mongooses that are the threat to rare species on Amami-oshima Island. Here, the government aims to eliminate them by fiscal year 2014. (MOE, MAFF)
- The government will continue to remove foreign plants such as *Rudbeckia laciniata* on Rishiri Island and Rebun Island. (MOE)
- The government will establish measures for preventing invasive alien species from adversely affecting island areas with indigenous ecosystems, such as the Ogasawara Islands and Nansei Islands. (MOE)
- As for the Ogasawara Islands, which Japan plans to recommend as a world heritage candidate in the future, the government will cooperate with the relevant organizations in expanding protection guarantees, promoting measures against alien species and conserving rare wildlife species over three years from 2007, to make visible achievements before making the recommendation. (MOE, MAFF, MEXT) [Cited in Chapter 1, Section 2, 9.1 and Chapter 2, Section 4, 2.4]
- As for the Ryukyu Islands (covering the Tokara and southern islands), Japan is required to expand protection guarantees for important areas, including habitats for endangered species. Therefore, the government will analyze and assess the value of the islands as a natural world heritage site and cooperate with local

organizations in setting up and expanding protected zones. (MOE, MAFF, MEXT) [Cited in Chapter 1, Section 2, 9.1 and Chapter 2, Section 4, 2.4]

1.6 Protections and management of marine life

(Current Situation and Challenges)

To keep a good environment of oceans including the maintenance of ecosystems where aquatic wildlife exists is quite important also for the sound development of fishery. Therefore, it is important not only to protect rare aquatic wildlife but also to cope with the problem of mass generation of big jellyfish that is exerting damage on the fishery production caused by ecosystem imbalance.

(Specific Measures and Policies)

- In addition to continuing various researches such as Monitoring Sites 1000 to collect information on a wide range of oceanic ecosystem including habitat of sea turtles, sea birds, and sea mammals, the government will promote the measures for appropriate conservation of oceanic life based on such scientific data. (MOE, MAFF)
- The government will accumulate and enrich scientific findings on rare aquatic wildlife from the viewpoint of keeping a sound ecosystem through protection of aquatic wildlife, and develop the methods for conservation and management. (MAFF) [Cited in Chapter 1, Section 9, 2.7]
- For bycatches such as sharks, sea birds, and sea turtles, the government will promote impact assessment on bycatch, and try to reduce bycatches by developing appropriate technology to avoid bycatches, improving technologies, and disseminating and enhancing awareness among fishermen. (MAFF) [Cited in Chapter 1, Section 9, 2.7]
- In preventing fishery damages cause by sea lions that are rare species, the government will promote measures to prevent damages by taking biodiversity into consideration and based on scientific knowledge such as migrating number of sea lions. (MAFF) [Cited in Chapter 1, Section 9, 2.8]
- The government will grasp the actual situation of predation of useful marine resources by large living organisms such as whales, and promote the measures to alleviate this influence based on scientific knowledge. (MAFF) [Cited in Chapter 1, Section 9, 2.8]

2 Fisheries in Satoumi and oceanic areas

(Outline of Measures and Policies)

Japan is an archipelago stretching from south to north with complicated coastlines. It is surrounded by sea and has the world sixth largest exclusive economic zone. Its surrounding sea area has many converging points of warm and cold currents making it a highly productive fishing ground with bountiful biodiversity.

Fishery is an environment-dependent industry relying on the blessing of bountiful seas, and it is therefore necessary to keep sound ecosystems supporting its productivity, and the conservation of biodiversity is important also for this reason. The coastal areas of our country are particularly associated with human activities, and shellfish and seaweed gatherings have been conducted for a long period. The sea where high productivity and rich biodiversity have been conserved by modification while keeping harmony with the natural ecosystem is known as Satoumi areas, and needs to be conserved appropriately.

On the other hand, sustainable use of marine resources is possible from offshore to the high seas by

appropriate resource management. Therefore, it is important to attempt appropriate conservation and sustainable use of marine resources on a scientific basis through the frameworks such as regional fisheries management organization.

Thus, it is necessary to provide a stable supply of aquatic products, which have played an important role in the Japanese eating habits, over many years to come, and to promote establishment of vigorous fishery and vitalized fishing villages, through the conservation of Satoumi and oceans.

Based on the Basic Plan for Fisheries decided by the Cabinet in March 2007, the government will promote increase and cultivation of aquatic plants and animals, conservation and improvement of habitat for aquatic plants and animals, establishment of basis for fishery, and comprehensive development of fishing villages.

Also in the Basic Act on Ocean Policy promulgated in April 2007, the basic concept is to harmonize the development and use of the ocean and the conservation of ocean environment, and it describes that securing marine biodiversity and conserving other good ocean environments are the basis of human existence. The government will conserve Satoumi and oceans based on this idea.

2.1 Promotion of conservation of seaweed beds and tidal flats that are important as fishery environments (Current Situation and Challenges)

To realize highly productive and sound Satoumi with abundant biodiversity, the conservation of seaweed beds and tidal flats is one of the important issues. Seaweed beds are also called “sea forests,” and there are those with eel grass or those with kelp. Tidal flats are the place where people can play in water, and also many migratory birds come for feeding and resting. Coastal area including the above are the living and spawning place for various kinds of living things including fish, and is greatly contributing to the conservation of biodiversity by conserving environment through water purification function conducted by absorbing and decomposing organic substances, nitrogen, phosphorus, etc. that are contained in domestic effluent from land areas. In subtropical water areas, coral reefs are the place of spawning, feeding, and growing of fish larvae for fishery resources.

However, because of coastal developments and land reclamation during the period of high economic growth, seaweed beds and tidal flats have drastically decreased. In addition, feeding damage by herbivorous fish is causing barren grounds—significant deterioration of seaweed beds—all over Japan, while longheaded eagle rays that feed bivalves have increased in tidal flats and are causing concern on the maintenance of a sound ecosystem. Therefore, to realize sustainable fishery production, conservation of fishing ground environment including seaweed beds and tidal flats is needed.

(Specific Measures and Policies)

- In parallel with the promotion of conservation and formation of seaweed beds and tidal flats by the method depending on the sea area environment, the government will have various parties, mainly fishermen, promote control on living organisms feeding on seaweeds and maintenance and management activities to secure genetic diversity and local endemism such as dispersion/transplant of seaweeds/bivalves and cultivation of fishing ground. By March 2012, about 5,000 ha will be prepared for conservation and restoration of seaweed beds and tidal flats. (MAFF) [Cited in Chapter 1, Section 9, 1.3]
- For the deterioration of the growing environment for aquatic plants and animals caused by domestic effluent,

the government will make effort to reduce water quality burden from the land through the facilities such as community sewerage systems. (MAFF) [Cited in Chapter 1, Section 9, 1.3]

- For the bad effect on fisheries by the increase in marine litters, in addition to the promotion of the activities of fishermen and NPOs done voluntarily such as cleaning of beaches and rivers and planting activities, the government will promote the measures such as collection and disposal of marine litters and development and dissemination of recycling technology for fishery-related materials. (MAFF) [Cited in Chapter 1, Section 9, 1.3]
- The government will strengthen the observation system on generation of red tide and oxygen-deficient water masses to prevent damages on fisheries. (MAFF) [Cited in Chapter 1, Section 9, 1.3]
- The government will remove sediment that will contribute to the recovery of use of fishing ground for about 250,000 ha by March 2012. (MAFF) [Cited in Chapter 1, Section 9, 1.3]

2.2 Promotion of fishery infrastructure project with biodiversity consideration

(Current Situation and Challenges)

Fishing ports and fishing grounds are not only production basis for fishery but also are greatly contributing to environmental formation as the places for spawning and fish larvae growing for oceanic life by creating quiet water areas and highly-productive environments. The establishment of fishing ports and fishing grounds that take biodiversity into consideration is necessary.

(Specific Measures and Policies)

- In promoting fishery infrastructure project, the government will fully consider the impact on the natural environment of the implemented location and examine the use of various natural materials in each level of planning, designing, and construction. The government also tries to grasp the influence by conducting monitoring as much as possible, and promoting the establishment of fishing ports and fishing grounds for which natural environments including biodiversity is taken into consideration. By March 2012, the government will prepare about 75,000 ha of fish reef and farms, and remove sediment of about 250,000 ha, that will contribute to the recovery of fishing grounds. (MAFF)
- To promote making powerful producing centers, for the distribution centers and for the core producing centers the government will focus on the construction of facilities necessary for hygienic control of fishing products to be handled there. In establishing fishing ports, the government will try to minimize the change in surrounding natural environments as much as possible. In implementing projects, the government will construct fishing port facilities that adopt construction method and structures where fish and shellfish can live such as a sea wall where seaweed beds are formed and aquatic plants and animals can live and breed, and will prepare beaches to alleviate impact on natural environments, and thereby positively promote creation of fishing ports that harmonize with the surrounding natural environment. (MAFF)
- The government will strengthen the measures for the conservation of water quality of the surrounding water areas of fishing port, by constructing a fishing community effluent treatment facility as measures to alleviate the burden of sewage water inflow into the water area surrounding fishing ports and by removing the sludge of fishing ports. Specifically, the government will improve the ratio of fishing community effluent treatment to the population to 60% by March 2012. (MAFF)

2.3 Promotion of conservation and use of fishing villages by using regional resources

(Current Situation and Challenges)

Fishing villages not only function for the fishing industry but also have multi-faceted functions such as the formation of good natural environments and landscapes, inheritance of traditional culture in the region, and provision of comfortable space for people. They are also the places where the importance of nature can be learned. The environment of fishing villages, therefore, needs to be conserved and used.

(Specific Measures and Policies)

- In addition to promoting creation of fishing villages that use charming regional resources including rich biodiversity, the government will deepen people's understanding and interest in the fishing industry and fishing villages by promoting the exchanges between cities and fishing villages through hands-on experiences and contact with nature and promoting settlement of residents, and thereby activate fishing villages. (MAFF) [Cited in Chapter 2, Section 3, 3.1]
- The government will promote conservation and formation of good fishing village landscape that is approachable for people and inheritance of historical and cultural heritage. (MAFF) [Cited in Chapter 2, Section 3, 3.2]

2.4 Promotion of conservation and management of marine resources with consideration of biodiversity

(Current Situation and Challenges)

Sustainable use is possible for marine resources. Appropriate conservation and management of marine resources is the responsibility imposed on the coastal countries by the UN Convention on the Law of the Sea, and it is important also from the viewpoint of securing a stable supply of fishing products for the nation and of biodiversity conservation.

While there are negative international opinions against bycatches of sharks, sea birds, and sea turtles, and against tuna longline fishing and high-sea trawl fishery for the reasons of fishery's influence on biodiversity in the abyssal sea, discussion under the Convention on Biological Diversity to establish marine protection area at the high seas, and the move to manage living marine resources under the control of international trade by CITES, it is important to continue to advocate not only conservation of biodiversity but also an appropriate conservation and sustainable use of marine resources based on scientific basis.

(Specific Measures and Policies)

- The government will practice various researches on marine resources by research ship to grasp the trend of resources and to promote assessment. (MAFF)
- Concerning sustainable use and management of highly migratory fish including tunas, whose stock conditions are a source of concern, the government will establish conservation and management measures on a scientific basis and will strive to eliminate IUU (illegal, unreported and unregulated) fishing, through regional fishery management organizations and by fully recognizing Japan's position in production and consumption of fish. (MAFF)
- For whales as well, the government will make effort to internationally establish conservation and sustainable use based on scientific researches. (MAFF)

- The government will promote fishery management taking the ecosystem into consideration, by setting fishing prohibition periods and protection water areas for resource protection and by promoting measures to avoid bycatches by tori-pole and circle hook. The government will also show scientifically that biodiversity conservation and sustainable use of marine life are compatible through fishery activities and will attempt to form appropriate international opinions. (MAFF)
- The government will keep the annual number of bilateral and multilateral fishery agreements as 47 or increase them, targeting securing of fisheries by Japan's fishing boats and sustainable use and appropriate management of resources. (MAFF)

2.5 Further promotion of resource management and introduction of post-resource recovery plan

(Current Situation and Challenges)

Recently, many marine resources are at low level and biodiversity has been lost, and it is necessary to strengthen resource management and recovery of lost resources.

(Specific Measures and Policies)

- The government has set Total Allowable Catch (TAC) for major types of fish from 1997. From 2002, the government has been promoting the Resource Recovery Plan as the policy to comprehensively promote 1) reduction of total allowable effort to reduce the number of fishing boats and fishing days for the fish resource where recovery is urgently needed and for the types of fishery that targets such fish, 2) larvae release, and 3) improvement measures for fishing ground environment. In addition to continuing such promotion, the government will promote introduction of the "Post-Resource Recovery Plan" for the resources where the recovery target has been achieved, to promote stable maintenance of the level and its rational use based on the common view among the parties concerned. (MAFF)
- The government will promote the measures done by the private sector for the fishery eco-label that shows the product is an aquatic product captured by the method where the ecosystem and sustainability of resources are taken into consideration. (MAFF)

2.6 Breeding with consideration of biodiversity and sustainable aquaculture production

(Current Situation and Challenges)

Recently, marine resources in the water areas surrounding Japan are at a low level as a whole, and it is necessary to recover and increase resources by developing the policies for breeding and culture such as larvae release and sea surface culture. In implementing those, consideration on biodiversity conservation is important.

(Specific Measures and Policies)

- In formulating release plans, producing and releasing seeds, the government will promote the increase that harmonizes with the environment and ecosystem by considering the influence on genetic diversity and phylogenetic group. (MAFF)
- For aquaculture industry, the government will promote formulation of fishing ground improvement plans for the improvement of regional independent aquacultural fishing grounds to realize sustainable aquaculture production that does not deteriorate fishing ground environment. (MAFF)

- The government will establish combined aquaculture technology that combines aquaculture of fish and seashells and that of seaweeds to enable stable material circulation of carbon and nitrogen and will promote development of feed with low environmental load. (MAFF)
- The government will implement salmon and trout aquaculture project by harmonizing with the ecosystem of North Pacific and considering conservation of characteristics as living things and diversity of species, in addition to enhancing technologies for artificial larvae release compatible with natural fish and considering ecosystems of rivers and their surroundings, and thereby promote aquaculture project of salmon and trout. (MAFF)
- The government will increase the percentage of the products produced in the sea surfaces applicable to the fishing ground improvement program in the entire products produced by sea surface culture from 60% of 2006 to 70% by 2011. (MAFF)

2.7 Promotion of biodiversity conservation with consideration of the conservation and management on rare living organisms

(Current Situation and Challenges)

To keep the good environment of oceans including maintenance of ecosystems where aquatic wildlife exists is quite important also for the sound development of fishery.

(Specific Measures and Policies)

- The government will accumulate and enrich scientific findings on rare aquatic wildlife from the viewpoint of keeping a sound ecosystem through protection of aquatic wildlife, and develop the methods for conservation and management. (MAFF) [Cited in Chapter 1, Section 9, 1.6]
- For bycatches such as sharks, sea birds, and sea turtles, the government will promote impact assessment on bycatch, and try to reduce bycatches by developing appropriate technology to avoid bycatches, improving technologies, and disseminating and enhancing awareness among fishermen. (MAFF) [Cited in Chapter 1, Section 9, 1.6]

2.8 Promotion of preventive measures against fishery damages by wildlife

(Current Situation and Challenges)

It is pointed out that the cause of mass generation of wildlife such as big jellyfish that gives big damage on the fishery production is the change in habitats of living organisms caused by marine pollution and overfishing of marine resources. It is also a concern that imbalanced ecosystem decreases biodiversity, including feeding damage by foreign fish and common cormorants. Therefore, it is important to promote the measures to prevent fishery damage by wildlife based on scientific knowledge to conserve appropriate biodiversity.

(Specific Measures and Policies)

- The government will avoid bad influence of environmental change on fishery and take appropriate measures such as effective exclusion to prevent feeding damage by foreign fish and common cormorants keeping biodiversity conservation in mind. (MAFF)
- In preventing fishery damages cause by sea lions that are rare species, the government will promote measures to prevent damages by taking biodiversity into consideration and based on scientific knowledge

such as migrating number of sea lions. (MAFF) [Cited in Chapter 1, Section 9, 1.6]

- The government will grasp the actual situation of predation of useful marine resources by large living organisms such as whales, and promote the measures to alleviate this influence based on scientific knowledge. (MAFF) [Cited in Chapter 1, Section 9, 1.6]

2.9 Promotion of inland water fishery with consideration on biodiversity [Cited in Chapter 1, Section 8, 1.8]

(Current Situation and Challenges)

Inland water such as rivers and lakes is indispensable for peoples' lives, since it is the place of production for fish and culture and creates the opportunity for people to contact with nature through recreations such as fishing and outdoor sports. In these days, however, in addition to the deterioration of habitat for aquatic plants and animals, feeding damage by foreign fish such as largemouth bass (*micropterus salmoides*) and common cormorants and the spread of Ayu cold water disease are causing harsh environments surrounding inland water fisheries and aquaculture. To cope with these issues, it is important to further enhance conservation of inland water biodiversity.

(Specific Measures and Policies)

- By cultivation of fishing grounds and use of paddy fields and water channels, the government will improve habitat environments of aquatic animals and plants such as common carps, crucians, eels, and common reed grass. (MAFF)
- Taking a wide area perspective including the viewpoint of biodiversity conservation, the government will promote effective exclusion for preventing feeding damages by foreign fish and common cormorants and measures against diseases such as Ayu cold water disease and Koi Herpes Virus. (MAFF)
- By implementing establishment of the place for spawning, larvae culture facility, and larvae release, the government will promote the effort of resource increase with consideration on biodiversity by local people, mainly fishermen, and thereby promote biodiversity conservation of inland waters. (MAFF)

3 Coastal environments

(Outline of Measures and Policies)

Coastal area is the space where land area and sea area in contact, which provides a variety of habitat environments for living organisms such as sandy beach, cliff, and tidal flat. Many kinds of unique living organisms depending on the peculiar environment exist there, and it forms a part of excellent natural landscape including the places noted for scenic beauty with white beaches and green pines and nature parks, thus having a precious natural environment. In Japan, where the total land area is small, the population, property and infrastructure are concentrated in the areas behind the coast, and seacoasts in Japan are vulnerable to the disasters of tsunami, high wave, and erosion. Coastal areas with beach play an important role of not only protecting human life and assets behind it from these threats but also as the place for various usages including festivals and events of the regional society, sea bathing, sports, and hands-on experiences. Coastal area is the place required for various uses, and, at the same time, the space easily influenced by various kinds of human activities.

3.1 Conservation, restoration, and creation of coastal environment

(Current Situation and Challenges)

Recently, with the development of coastal areas, natural beaches and the above precious natural environment have declined. Because of the decrease in the earth and sands supplied to beaches and worsened beach erosion due to various factors such as imbalance of coming and going sand at beach area, sandy beaches, important as habitats of living organisms, as seawater purifiers, and as important elements in a scenic coastal landscape of white sands and green pines are disappearing. Some beach environment has been lost due to contamination and motor vehicle entries.

In addition to conserving ecosystem of beaches, it is required to establish beaches that protect the place behind it from the threat of disasters such as tsunami, high wave, and coastal erosion, to form regional society that is safe and active, and thereby create beaches which can answer to the raising awareness on environmental problems by the public and the request for spiritual richness.

Based on such a background, a part of the Seacoast Law was revised in 1999, and two purposes—"environment" and "use"—were added to the previous "protection." "Basic Policy for Coastal Conservation" (formulated in 2000), which was formulated as a result of this revision of the Law, prescribes "to hand down beautiful, safe and lively coasts to the next generation as public property" as its basic concept. It prescribes that comprehensive and harmonious measures for coastal conservation should be implemented to protect seacoasts from hazards, improve and conserve the coastal environment, and promote proper use of the coasts by the public.

Based on this concept, the government has promoted the measures of the Eco Coast Program that takes ecosystem and natural landscape into consideration. However, there are many issues to be solved in the future, that include the trade-offs among the three purposes of the Seacoast Law—protection, environment, and use—and the lack in technical knowledge for seacoast upgrading for which natural environment is taken into account.

Concerning the future seacoast upgrading and management, in addition to answering to the needs in the aspect of protection and of use, it is necessary to pass onto coming ages the seacoast environment where diverse plants and animals live and grow.

(Specific Measures and Policies)

[Promotion of Creation of Beaches in Harmony with Nature]

- Aiming at the harmony of protection, environment, and use that are the purposes of the Seacoast Law, the government will promote "promotion of creation of beaches in harmony with nature" that attempts to conserve and restore seacoast environment based on regional seacoast characteristics in collaboration with river management through forming agreement among the people concerned in the region. (MLIT)

[Conservation and Restoration of Sandy Beaches, Creation of Beaches]

- The government will take measures against coastal erosion by artificial beach nourishment, submerged breakwaters, and artificial reefs, conserve and restore sandy beaches, and thereby promote creation of comfortable spaces where people can contact with nature. (MAFF, MLIT)
- With the "Creation of Beaches" project, the government will restore beautiful beaches by the material-cycle method that avoids man-made structure's impact on environment as much as possible, by diverting the sand

accumulated in river mouths, river channels, and dams, abnormally accumulated in sand-trap facilities, the accumulated sand in fishing ports and harbors, and the sand accumulated at seacoast to eroded seacoast (sand by-pass). In addition, the government will implement efficient and effective measures against coastline erosion, in parallel with the conservation of nature environment and landscape. (MAFF, MLIT)

[Conservation and Upgrading of Seacoast Environment]

- For the beaches that are important habitats for marine life such as sea turtles and horseshoe crabs (*Tachypleus tridentatus*) and wildbirds such as little terns and laughing thrushes (*Garrulax canorus*) and the beaches essential to harmonize with natural landscapes, the government will devise arrangement and structure of facilities, conserve sandy beaches, and thereby promote the Eco Coast Project that forms beaches harmonizing with the natural environment. (MAFF, MLIT)
- The government will protect the beaches where sea turtles lay eggs, by specifying, as necessary, the zone where vehicles and horses are not allowed to enter without permission in the special area based on the Natural Park Law. (MOE)

[Area-type Protection Method]

- In constructing coastal conservation facilities, the government will further promote the change from the “line-type protection method,” which protects coastline just by banks and wave suppressors, to “area-type protection method,” which combines offshore facilities and sandy beaches and is excellent not only in the aspect of protection but also in environment and usage from the points such as sandy beach restoration and improvement of access to the beaches. (MAFF, MLIT)

[Consideration for Use and Contact with Nature]

- To make beaches easy to use for all Japanese people to contact with nature, the government will promote construction of facilities and surrounding environment that contribute to the increase in beach use by improvement of accessibility to beaches, barrier-free modification of facilities, and planting and greenway construction, and will promote collaboration with various policies implemented at beaches and their surrounding areas. For example, by implementing beach project to solve erosion including sandy beach conservation together with afforestation projects to prevent damages by blown sand and sea breezes, the government will promote the creation of beaches easy to use with beautiful and rich nature typified by white sands and green pines (Project to recover sea and forest with bountiful nature “Recovery of White Beaches and Green Pines”). (MAFF, MLIT)
- In collaboration with education-related facilities and various environmental education projects under the control of Ministry of Education, Culture, Sports, Science and Technology, the government will promote the creation of the beaches easy to use for environmental education and for intergenerational exchanges (Project for recreation and hands-on experience). (MAFF, MLIT)

[Measures against Litter and Residents’ Participation]

- In regard to the measures against litter and cleaning on beaches, the government will promote them by getting cooperation of regional residents, volunteers, and NGOs, and make effort to enhance awareness-raising activity to improve morals to avoid deterioration of coastal environment by disorderly use

and garbage dumping. Furthermore, by collaboration with such regional residents, the government will implement beach protection activities and enhance environmental education. Practically, with the Eco Coast Project, the government will promote in the future the environmental conservation measures coping with the environmental issues unique to the region by bringing the public and private sector together with the participation of residents and NGOs from the planning stage. (MAFF, MLIT)

- Big marine litter will be the cause to prevent functions of beach conservation facilities by declining wave suppression function of beach banks and sandy beaches or disturbing tide prevention function of water gates. The government will promote the treatment by the emergency program for disposal of the driftwoods and wastes extensively drifting due to disasters. (MAFF, MLIT)
- To examine the survey on driftage status and the measures based on regional characteristics, the government is implementing a model survey on domestic methodology for reduction of marine litter. The government will separate drifts ashore, assume drift stream and origin, in addition to the monitoring on effective and efficient cleaning and disposing method including participation of local volunteers and on the status of drifts coming ashore at the beaches concerned, will analyze the mechanism of driftage ashore, and examine the frequency and method of effective cleaning. Furthermore, in addition to holding various study group meetings, the government will exchange opinions with NGOs, and use them for the promotion of collaboration among the people concerned and examination on effective measures. The government is also supporting municipalities that treat driftage ashore outside the beach conservation areas. (MOE)
- For the beaches within National Parks, by the cooperation of local residents, the government will implement cleaning work and removal work of driftage ashore by Green Worker Project. (MOE)

[Promotion of Research and Survey]

- To realize high quality beach that is safe and harmonizing with nature, the government will collect and organize basic information on beaches, and will promote with related research institutions the research and survey on wide area coastal erosion and those on the construction of beach conservation facilities that take the natural environment including the ecosystem into consideration. Also, the government will make effort so that the parties concerned have common awareness on the coastal environment to be conserved. For example, the ministries and agencies related to beaches will grasp the influence and effect that beach conservation facilities exert on the natural environment including the ecosystem, in addition to the research and examination on the beach construction into which the consideration on ecosystem based on Creation of Beaches in Harmony with Nature is taken. (MAFF, MLIT)
- The change in weather and oceanic phenomena due to global warming and long-term increased sea level are concerns, and serious impacts are concerns also for beaches, including aggravation of coastal erosion, increase in Zero-Meter Zones, escalation of damage by high tide, and change in habitats of living organisms. For these reasons, the government will monitor tide level and ocean waves, and promote examination as necessary to cope with those changes. (MAFF, MLIT) [Cited in Chapter 2, Section 6, 1.1]
- Through these various policies and measures, the government will continue its efforts to secure biodiversity on beaches and seacoasts. (MAFF, MLIT, MOE)

4 Port environments

(Outline of Measures and Policies)

Concerning ports, The Environment Division of the Port Sub-Committee of the Council for Transport Policy has compiled the “Greening of the Port/Harbor Administration (Port Environmental Development Projects)”—a report on the basic direction of the future port environment policy—in 2005. This report views the development/use of ports and conservation/restoration/creation of environment as wheels of a vehicle to promote “Greening of the Port/Harbor Administration.” Based on this idea, in addition to positively implementing conservation, restoration, and creation of tidal flats and seaweed beds, the government should positively create comprehensively good marine environments by improving water quality by dredging of sediments and by preparing a green belt at ports, that is the habitat for various kinds of living organisms and is an important place where local residents can contact with nature.

As concrete measures to improve coastal area water quality, it prescribes that various functions of tidal flats need to be evaluated, and important tidal flats need to be conserved as much as possible from the viewpoint of ecosystem conservation, nature’s purification ability, contribution to fishing industry, effect of disaster prevention, as well as positive implementation of tidal flats restoration where it is required. Furthermore, it states that the government should positively create comprehensively good marine environment by improving water quality by dredging of sediments and by preparing green belt at ports, which is the habitat for various kinds of living organisms and is an important place where local residents can contact with nature.

4.1 Conservation, restoration, and creation of port environments

(Current Situation and Challenges)

Conservation and restoration projects for tidal flats and shallow water have been implemented until today at 55 locations at 29 ports and 4 bays (among which 33 locations have already been completed: as of March 2007). In the restored tidal flats at Mikawa Bay and Onomichi-itozaki Port, for example, water quality has been improved and the effect of increase in living organisms has been confirmed.

However, in the closed water areas such as Tokyo Bay and Osaka Bay, the achievement on COD standard is still low and red tide and blue tide are generated. In three major bays and Seto Inland Sea, large pits are left scattered at the bottom of the sea by sand extraction for reclamation work and for making aggregate concrete and have become the places to generate oxygen-deficient water masses that cause blue tide. To solve these problems, sand covering, filling of large pits, and development of tidal flats need to be promoted, by more effectively using dredge soil by separating sand by particle diameter and by using recycled materials. In addition, many of the walls stand vertical and the only living organisms seen are attached organisms inhabitable on the walls. Therefore, the consideration on biodiversity conservation need to be taken also in the structure as much as possible, by using mildly-sloped sea walls, for example, in addition to restoring and creating tidal flats, shallow waters, and beaches.

(Specific Measures and Policies)

- The government will promote dredging of organic bottom sediment accumulated at the bottom of the sea. (MLIT)
- The government will effectively use dredged sand generated by construction of ports and harbors, and

promote restoration of tidal flats and seaweed beds and backfilling of large pits. (MLIT) [Cited in Chapter 1, Section 9, 1.3]

- The government will implement experiment for verification at the site to use recycle material for tidal flats creation. (MLIT)
- The government will examine the methods for quality adjustment and demand and supply adjustment of wide area dredged sand. (MLIT)
- The government will promote green belt at ports, which are the habitats for various kinds of living organisms and is an important place where local residents can contact with nature. (MLIT)

5 Measures against marine pollution

(Outline of Measures and Policies)

As the measures to conserve marine environment, for the prevention of marine pollution, oil, hazardous chemical substances and wastes discharged from ships are controlled by the Law Relating to the Prevention of Marine Pollution and Maritime Disaster (hereinafter “Prevention of Marine Pollution Law”), which is the domestic law of the “Protocol of 1978 Relating to the International Convention for the Prevention of Pollution from Ships, 1973 (MARPOL73/78).” For the prevention of marine ecosystem disturbance by foreign species transported in ballast water of ships, International Maritime Organization (IMO) in 2004 adopted the International Convention for the Control and Management of Ships’ Ballast Water and Sediments, 2004 (BWM) to solve the problem. At present, the work to make the Convention enter into force is underway, and Japan will continue to contribute to the necessary work.

In heavily polluted sea areas, by removing sludge (soft mud containing organic bottom sediment at the sea bottom) that is its cause, water purification measures at sea area will be promoted.

Furthermore, closed water area exert great impact on coastal biodiversity, because when its water quality deteriorates, because of its geographical factor, when its seawater does not circulate, and its social factor: that pollution load concentrates due to the concentration of population and industries. The improvement of the water environment at the area, therefore, will be targeted.

5.1 Measures against pollution caused by marine activities

(Current Situation and Challenges)

As the load on the marine environment caused by marine activities such as ships, there are the problems of sea pollution by spilled oil and chemical substances from ships and by wastes caused by activities on ships and discharged effluent and the problems of foreign aquatic organisms that get in ship’s ballast water, are carried to distant places, discharged with ballast water, settle there, and cause disturbance to the ecosystem such as a decrease of endemic species.

(Specific Measures and Policies)

- The government will continue to actively participate in the discussion of the International Maritime Organization (IMO), in preparation for making the International Convention for the Control and Management of Ships’ Ballast Water and Sediments, 2004 (BWM) entering into force. (MLIT, MOE, MOFA) [Cited in Chapter 2, Section 4, 2.9]

- For ratification of the Convention, the government will promote the examination on the preparation to ratify the Convention at an early stage, by collecting information on environmental influence caused by ballast water, collecting and analyzing basic information on the technology to treat ballast water. (MOE, MLIT) [Cited in Chapter 2, Section 4, 2.9]

5.2 Measures to purify water in sea area

(Current Situation and Challenges)

Japan's high economic growth that started in 1950s contributed to the improvement of the people's living standard with the development of industries and science. At the same time it caused huge consumption of resources, and resulted in industrial effluent or domestic effluent flowing into sea area via rivers, thus the deterioration of coastal environment in inner bays and sea pollution have rapidly progressed. This sea pollution brought about sludge accumulation and water pollution in some sea areas, and it is not only preventing use of coastal areas but also exerting big impact on the habitat of living organisms at coastal areas.

(Specific Measures and Policies)

- By the sea area purification program and the sea area environment creation and nature restoration projects, the government will implement the measures for water purification in the sea areas, by removing sludge—the cause of pollution—in highly polluted sea areas, by sand covering, and by removing left stranded ships, and thereby implement measures for water purification in the sea areas. (MLIT)

5.3 Conservation of water environment in closed sea area

(Current Situation and Challenges)

In regard to the conservation of closed water areas, heavy pollution was solved, but oxygen-deficient water masses are generated in some sea areas, which is disturbing the use of water and living and growing of aquatic life. In addition, loss of tidal flats and seaweed beds are resulting in the deterioration of habitat for living organisms. Thus, the ecosystem including fishing resources is deteriorating.

For Tokyo Bay, Ise Bay, and Seto Inland Sea, where population and industries concentrate, total pollutant load control for water quality has been implemented six times since 1979, and thereby improving water environment. However, oxygen-deficient water mass and red tide are generated even now, and improvement of water environment is not enough. Therefore, it is necessary to examine more effective measures to improve water environment of closed water areas together with clarifying pollution mechanism in the closed water areas.

Aiming at rejuvenation of the sea—the third decision (December 2001) of the urban renaissance project—the ministries and agencies concerned and related local governments collaborated to formulate the “Action Plan for the Rehabilitation of Tokyo Bay,” “Action Plan for the Rehabilitation of Osaka Bay,” and “Action Plan for the Rehabilitation of Ise Bay,” and are promoting various policies to reduce pollution load from land areas, to improve environment in the sea areas, and environment monitoring. Furthermore, in accordance with the Environmental Action Plan of the Ministry of Land, Infrastructure, Transport and Tourism (June 2004), the Action Plan for the Rehabilitation of Hiroshima Bay was formulated also for Hiroshima Bay, and measures based on this Plan are promoted. A Future issue is to develop the project for rejuvenation of the sea also for other closed water areas that need water quality improvement.

Ariake Sea and Yatsushiro Sea, which have huge tidal flats and big tide ranges, have unique ecosystem and many endemics, but recently have problems of the generation of oxygen-deficient water mass and red tide and of decrease in fish and shellfish. Therefore, conservation of marine environment and recovery of biological resources of both sea areas are urgent issues to solve.

(Specific Measures and Policies)

- The government will implement research on water quality and living organisms and the monitoring of citizens' participation type, and, through the publications by making manuals for "Satoumi" creation and symposiums, will transmit information on the concept of "Satoumi" not only within Japan but also to other Asian countries. (MOE)
- For Tokyo Bay, Ise Bay, and Seto Inland Sea, the government will steadily implement the sixth total pollutant load control for water quality, of which target year is FY 2009, and thereby promote the policies for the reduction of pollution load and the conservation and restoration of tidal flats. In addition, the government will research on the pollution mechanism of the influence of outer sea water, and formulate mid- and long-term vision by setting long-term targets for each water area to comprehensively promote the improvement measures for the environment of closed water areas in the future. (MOE)
- Concerning the sea areas where action plans have been formulated to improve water quality, the government will follow up the status of progress of the action plans, make efforts to implement them steadily, and reexamine the plans as necessary. (MLIT)
- Aiming at realizing the "rejuvenation of the sea"—the third decision of the urban renaissance project—the government will promote various policies based on the "Action Plan for the Rehabilitation of Tokyo Bay," "Action Plan for the Rehabilitation of Osaka Bay," and "Action Plan for the Rehabilitation of Ise Bay." In addition, based on the "Action Plan for the Rehabilitation of Hiroshima Bay," the government will promote various policies, and will develop the project for rejuvenation of the sea also for other closed water areas that need water quality improvement. (Cabinet Office, MLIT, MAFF, METI, MOE)
- Based on the committee report made in December 2006 by the Ariake Sea and Yatsushiro Sea Comprehensive Investigation and Evaluation Committee, the government will clarify the factor of decrease in fish and shellfish, examine optional measures on oxygen-deficient water masses, and formulate comprehensive research promotion plan, and thereby promote the collaboration of each research organization. (MOE)

Chapter 2 Cross-Sectoral and Fundamental Measures and Policies

Section 1 Conservation and Management of Wildlife

(Basic Concepts)

It is estimated that the number of wildlife species known to be living in Japan exceeds 90,000. Wildlife is an important constituent of biodiversity. Wildlife is also indispensable to people's rich life and their cultural activities, as humans enjoy the blessings of wildlife in the form of resources such as food and medicine, and the existence of wildlife enriches people's inner life.

For the conservation of wildlife, it is necessary to be aware of endangered species accurately and constantly. From this perspective, the "Red List" (the list of those wildlife species threatened with extinction) has been established. As far as vertebrate is concerned, Japan has already lost at least 21 wild species including the Japanese wolf and Ogasawara Islands wood pigeon (*Columba versicolor*). Lost species can never be restored. It is our responsibility to protect wildlife from extinction and conserve them as the nation's common assets to be handed over to the next generation. It is important to make efforts to recover the population of individual threatened species so that they can be removed from the Red List or can be downlisted (moved to a lower rank of extinction risk) under the Red List and also prevent any new entries to the Red List.

In the recent years, despite the continued efforts to conserve wildlife, the number of threatened species has tended to increase, partly due to deteriorated habitat environments in island areas including the Ogasawara and Nannsei Islands as well as decreased activities of nature restoration and management in Satochi-Satoyama areas. Regarding conservation measures, the principal effort should be placed on *in situ* conservation measures, but it is also important to secure *ex situ* population as an option for conservation, and in this light, breeding projects have started on some of critically threatened species in captivity with the ultimate goal to reintroduce them to the wild.

With the increasing tendency of threatened species on the one hand, frictions between humans and wildlife have also begun surfacing on the other hand, where we see specific wildlife increasingly causing damage to agricultural, forestry or fishery activities as well as to ecosystems, as that wildlife seems to be increasing and expanding the scope of its habitats. In order to manage such troubles caused by that specific wildlife, it is necessary to promote comprehensive and systematic measures, such as population management, environmental management of their habitats and damage prevention measures, through joint efforts among all relevant parties.

In order to establish a desirable relationship between mankind and wildlife on the basis of the long-lasting survival of diverse wild species ranging from rare species to easily observable species in respective regions, it is important to promote appropriate protection and management of wildlife based on the sufficient understanding of the significance of interaction between mankind and wildlife instead of a one-way approach from mankind to wildlife. Also, in order to prevent our agricultural, forestry and fishery activities from being damaged by population increase of specific species and also prevent wildlife from population decrease and extinction, it is necessary to improve or enhance protection and management measures flexibly, through constant understanding and analysis of inhabiting and growing statuses and through the use of accumulated scientific knowledge, assuming that those statuses may change continually and spatially. In addition, for the sake of such appropriate protection and management of wildlife, it is necessary to pay attention not only to endangered species but also to those invasive alien species and pet animals that could disturb ecosystems and affect habitats of wildlife. Non-biological elements such as chemical substances have the potential to disturb

ecosystems as well. For example, we already know the influence of DDT on birds, as suggested by *The Silent Spring* published in the U.S. in 1962 and that of tributyltin on shellfish that was detected in Japan. In order to prevent such adverse influence on ecosystems from occurring, we will implement measures to deal with non-biological elements including chemical substances.

1 Protection of threatened species

(Outline of Measures and Policies)

Wildlife species constitute an important factor of biodiversity, and it is our responsibility to prevent their extinction. In order to conserve wildlife, it is important to know accurately and specifically which species are being endangered. That's why we have established the "Red List" (list of those species threatened with extinction) and have released the List to the public to deepen people's understanding of the threatened species.

Also, in accordance with the Law for the Conservation of Endangered Species of Wild Fauna and Flora (hereinafter referred to as the "LCES"), the "national endangered species of wild fauna and flora" have been designated, to ensure that the capture or transfer of those designated species are restrained and that their habitats are appropriately protected. In addition, targeting critically endangered species, for which extra measures seem to be necessary to promote breeding or improvement of habitats, etc., the "Programs for the Rehabilitation of Natural Habitats and Maintenance of Viable Populations" are planned and implemented.

Furthermore, in order to protect those species which are considered to be difficult to survive only through *in situ* conservation measures, "*ex situ* conservation" measures are promoted, where they are artificially raised or bred outside their natural habitat in a zoological or botanical garden, etc., with the ultimate goal to reintroduce them to the wild while restoring their natural habitats at the same time.

1.1 Red List

(Current Situation and Challenges)

The work for the second revision of the Red List was launched during fiscal year 2002, and the List was reviewed based on the up-to-date knowledge on inhabiting conditions and environmental changes of wildlife living in Japan. The revised Red List, composed of ten taxonomical groups, was published in August 2007.

As the environment surrounding wildlife and their population are changing continually, it is necessary to continue to review the Red List on a regular basis and collect relevant information constantly.

(Specific Measures and Policies)

- The government will revise the Red List again by the end of 2012, by making any necessary changes to the listed species, including change of rank, deletion or addition, based on the up-to-date data concerning inhabiting statuses, extinction probability, etc. (MOE)
- The Red Data Book (a summary of inhabiting statuses, etc. compiled from the Red List) will be also revised to include up-to-date information on inhabiting statuses, etc. shortly after the above-mentioned revision of the Red List. (MOE)
- In order to ensure the appropriate implementation of protection measures especially for those endangered species shown on the Red List, the government will establish cooperation with relevant administrative organizations, local governments, public organizations and specialists, to conduct continuous monitoring of inhabiting statuses and inhabiting environments. (MOE)

1.2 Conservation of the designated endangered species of wild fauna and flora

(Current Situation and Challenges)

In accordance with the LCES, a total of 73 species are designated as the “national endangered species of wild fauna and flora” (hereinafter referred to as “National Endangered Species”) including albatross, Japanese crested ibises and Tsushima cat (as of November 2007). Of those designated National Endangered Species, 38 species are applied to the Programs for the Rehabilitation of Natural Habitats and Maintenance of Viable Populations, under which projects of breeding and habitat improvement are being carried out.

Regarding the natural habitat conservation areas, there are a total of 9 designated areas (as of November 2007) with the aggregate area of 885 hectares, covering seven National Endangered Species, and the areas include two new entries added following the establishment of the New National Biodiversity Strategy, which are the Yonehara Natural Habitat Conservation Area for *Platypleura albivannata* added in November 2003 and the Zennoji Nagaoka Natural Habitat Conservation Area for *Hynobius abei* added in July 2006. Each area has its own conservation guidelines depending on ecological characteristics of the species concerned, but some improvements are considered to be necessary, including the improvement of surveys on inhabiting statuses of National Endangered Species and an introduction of rehabilitation measures in case of discovery of the invasion of invasive alien species, etc.

The Red List has a total of 3,155 species of wildlife threatened with extinction (as of November 2007). Of those listed species, some are benefiting from conservation measures that improved their inhabiting condition, while some others suffer growing danger of extinction as a result of the impact of invasive alien species or environmental changes of their habitats. Especially for those species which suffer a rapid decrease of population and are need high-priority protection measures, it is necessary to collect detailed information and implement appropriate measures addressing the status concerned including the measures provided for by the LCES. For example, targeting dugongs, surveys on their inhabiting condition have been launched and efforts to establish their coexistence with fishermen have been promoted.

(Specific Measures and Policies)

- Of those species newly designated to be in danger of extinction under the revised Red List, the government will select those which are considered to be critically endangered on the grounds that population has been significantly decreasing owing to human activities to a degree that threatens their survival and are therefore in need of some legal action including restrictions. The government will designate such species as the national endangered species of wild fauna and flora (National Endangered Species) under the LCES. Specifically, target species which are supposed to be preferentially designated as the National Endangered Species include the vertebrate species categorized into the Category IA, that means the highest level of danger of extinction, and the critically endangered or endangered vascular plants and insects categorized into Category I whose decreased population is mainly attributed to capture or collecting pressure. The government is planning to newly designate about 15 species as the National Endangered Species. (MOE)
- Targeting those endangered species of wild fauna and flora indigenous to Japan, the government will conduct a comprehensive review on their inhabiting conditions, etc. In particular, intensive examinations and measures will be implemented for those species living in the island areas or Satochi-Satoyama areas where habitat environments are expected to become worse. In addition, the government will review and

evaluate the ongoing Programs for the Rehabilitation of Natural Habitats and Maintenance of Viable Populations, which is being applied to 38 species, for the purpose of improving the contents and efficiency of the Programs. (MOE)

- The above-mentioned Program will be also newly planned and applied to those National Endangered Species whose survival is considered to be difficult without extra projects to promote breeding and improve habitats, based on scientific knowledge, in addition to the removal or mitigation of the factors oppressing the species. (MOE, MAFF, MLIT and MEXT)
- The government will make efforts to raise and expand people’s awareness and understanding of the Red List. (MOE)
- Since it is essential to secure habitats of threatened wildlife to ensure their stable survival, the government will designate more habitats of the National Endangered Species as Natural Habitat Conservation Areas, with a focus on those places having well-maintained environments, in a way that seeks any necessary tie-up with other protection programs for national wildlife protection areas and natural parks. (MOE)
- The government will ensure appropriate management of the Natural Habitat Conservation Areas in accordance with conservation guidelines prescribed by respective areas, and also promote maintenance and improvement of habitant environments in those areas. (MOE)
- The government will promote the conservation and restoration of the priority areas selected via the comprehensive assessment on biodiversity (biodiversity hot spots) in a way that establishes intragovernmental cooperation and joint efforts with local governments, NGOs and private enterprises to the maximum possible degree, and through the implementation of diverse programs, including those for nature restoration, conservation and restoration of Satochi-Satoyama areas, protection and breeding of rare species, protection and management of specific birds and animals, elimination or prevention of the intrusion of invasive alien species, etc. (MOE)
- While making use of “Monitoring Sites 1000,” the government will conduct monitoring activities focused on the status of endangered species of wild fauna and flora inhabiting such area as alpine zones and coastal areas, which are considered vulnerable to the effects of global warming. (MOE) [Cited in Chapter 1, Section 2, 1.1; Chapter 2, Section 5, 2.2 and Chapter 2, Section 6, 1.1]
- The government will protect the inhabiting environment of rare species in “protected forests” and make efforts to improve the environment of “green corridors” by creating good feeding environments for endangered wildlife through thinning of forest plantation and introducing the project to improve the inhabiting environment for those animals that will be food for wildlife. In addition, the government will carry out monitoring surveys to understand the condition of forests and inhabiting status of wildlife there. Targeting those species in need of priority protection, the government will promote surveys on their inhabiting status and enhance the efforts of maintenance and improvement of their inhabiting environments. (MAFF)
- Targeting dugongs, the government will continue to promote monitoring surveys on their inhabiting environment and efforts to establish their coexistence with fishermen. (MOE)

1.3 Ex situ conservation

(Current Situation and Challenges)

Conservation measures with *ex situ* breeding have been promoted targeting the 16 critically threatened

species (as of November 2007) whose survival is considered to be difficult only through *in situ* conservation measures. Those species include stork, for which efforts to reintroduce them to the wild are underway in Hyogo Prefecture, Japanese crested ibis, Tsushima cat, Okinawa rail and others.

At the same time, deliberation on a desirable systematic implementation of those *ex situ* conservation measures have been made since fiscal year 2007, with the aim to clarify basic concepts of how *ex situ* conservation should be promoted in Japan and secure the effective and efficient promotion of the measures as well as necessary coordination of each measures. In addition, starting from fiscal year 2008, a model project will be launched for the purpose of establishing *ex situ* conservation techniques, based on the results of the said deliberation.

For implementing *ex situ* conservation measures, wide-range participation involving local public bodies, diverse research institutes and private organizations is essential, where zoological and botanical gardens in particular play the central role.

For example, the Japanese Association of Zoos and Aquariums organizes the Species Survival Committee to manage a studbook and control a removal of animals from their natural environment, and has attained significant achievements regarding breeding of animals in captivity.

Also, the Japan Association of Botanical Gardens set the goal to “collect and conserve 50% of endangered plants by 2012” in response to the Global Strategy for Plant Conservation (GSPC) adopted during the 6th meeting of the Conference of the Parties of the Convention on Biological Diversity held in 2002. The Association has also established a network to collect and conserve endangered plants by designating “National Network of Botanic Gardens for the Conservation of Plant Diversity” nationwide. Each of those core gardens has been given a mission to collect and conserve endangered plants in its own regions and promote regional efforts in cooperation with local public bodies and educational institutions.

The Association also organized the Committee for the Conservation of Plant Diversity to promote the project of compiling database on those endangered plants being conserved by each botanical garden. This project has attained significant achievements and is highly evaluated by the world as a globally adaptable model project.

In order to promote *ex situ* conservation measures, it is necessary to continue to improve breeding techniques and basic knowledge on *ex situ* conservation, while further enhancing combined *in situ-ex situ* measures including the efforts of technical improvement and information collection regarding the reintroduction of animals and plants to the wild and the improvement of their inhabiting environment.

(Specific Measures and Policies)

- In enhanced cooperation with relevant parties such as zoological and botanical gardens, the government will identify those endangered wild species whose survival is considered to be difficult only through *in situ* conservation measures. At the same time, *ex situ* conservation efforts will be enforced by introducing a model project targeting those species in need of high-priority protection. (MOE, relevant government ministries and agencies)
- Targeting the Japanese crested ibis, the government will promote breeding projects with the aim to increase their population in captivity. At the same time, the government is planning to reintroduce them to the wild in Sadogashima, Niigata Prefecture, which used to be their habitat, once a good inhabiting environment is prepared there. The government aims for a test release to be conducted during FY2008 at the earliest, with

the goal to have the population of about 60 settled in the eastern part of the Kosado area (in the island of Sadogashima) by around 2015. (MAFF, MLIT, MOE)

- Targeting the Tsushima cat, the government will promote dispersion of their population in captivity as well as breeding, in cooperation with the Japanese Association of Zoos and Aquariums and respective zoos, with the aim to secure the sustainable population in captivity having desirable genetic diversity. Also, based on the “basic plan for reintroduction to the wild” established in fiscal 2004, the government will enhance preparations for reintroducing Tsushima cats to the wild, where it is planned that adaptation training will be started in 2011. (MOE)
- Targeting the Okinawa rail, the government will launch a full-fledged project for *ex situ* breeding during fiscal year 2008, to establish techniques, understand ecological characteristics and secure a certain scale of population in captivity. (MOE)
- Targeting those plants in danger of extinction, the government is currently pursuing the cultivation project using greenhouse, etc. at the Shinjuku Gyoen National Garden in Tokyo. The government plans to further enhance this project, with the aim to promote genealogical conservation, protection, breeding and exhibition of the endangered plants. (MOE)

2 Management of wildlife (wild birds and animals)

(Outline of Measures and Policies)

Based on the “Basic Guidelines for the Implementation of Wildlife Management Projects” established by the national government and the wildlife protection programs established by each governor in accordance with the above guidelines, comprehensive protection projects will be implemented including the designation of wildlife protection areas, surveys on inhabiting statuses, conservation and improvement of habitat environments, hunting regulations and educational activities. Through the enhancement of wildlife management measures, we will make efforts to conserve biodiversity.

To this end, more areas will be designated as the wildlife protection areas and appropriate management measures will be promoted there. Regarding those designated areas where inhabiting environment becomes worse, conservation programs will be introduced as necessary for environmental improvement.

Management of wildlife should be implemented scientifically and systematically based on the knowledge of their inhabiting statuses. Therefore, surveys and researches on inhabiting conditions will be promoted and appropriate hunting regulations will be carried out.

Some species, such as deer and wild boar, have been rapidly increasing their population, while some others, including certain species of bear indigenous to a specific region of Western Japan, can be characterized by a small population. Regarding the increasing species such as deer and wild boar, population control measures will be introduced based on scientific and systematic, comprehensive assessment, with the aim to avoid frictions between wildlife and human activities represented by agricultural, forestry and fishery damage. Regarding the said bears in some regions of Western Japan, on the other hand, systematic management measures will be promoted with using the protected area system while implementing measures for the conservation of their inhabiting environment.

Since hunting plays a role of controlling the population of wildlife to a certain degree, manpower for hunting will be secured as part of the forces engaged in wildlife management. At the same time, management for appropriate hunting will be promoted.

In addition, in those areas affected by deer damage concerning vegetation in a core area of a national park, measures will be introduced.

Efforts to prevent illegal hunting will be promoted, and the relief system for wildlife will be improved in cooperation with local governments.

Coordination with relevant measures will be also secured.

2.1 Wildlife protection areas [Cited in Chapter 1, Section 2, 3.1]

(Current Situation and Challenges)

Japan has 66 national wildlife protection areas, totaling 547,840 ha (as of November 2007), following an increase in the number of designated sites such as wetlands of international importance as migratory bird habitats. In addition, there are 3,831 prefectural wildlife protection areas, totaling 3,102,427 ha (as of March 2007).

In wildlife protection areas, it is important to accurately grasp the wildlife population conditions through monitoring and other surveys for appropriate management. Over recent years, the wildlife habitat environments in wildlife protection areas have deteriorated due to sediment inflow from their surroundings or rapid increases in some animal populations, leading to a growing need for improvement of such environments in some protection areas. Therefore, the Wildlife Protection and Appropriate Hunting Law was amended in 2006 to launch conservation programs that improve the habitat environment, including lake water quality improvement and the installation of facilities to prevent the penetration of animals affecting wildlife habitats in wildlife protection areas. In FY 2007, conservation programs started at national wildlife protection areas such as Katano Kamoike and Manko.

(Specific Measures and Policies)

- The government will promote designation of wildlife protection areas and special protection areas, which is a core system for wildlife protection, to secure wildlife habitats and contribute to maintaining, restoring and improving regional biodiversity. In this respect, the government will try to grasp important wildlife habitats based on scientific knowledge about wildlife population conditions and habitat environments, and give priority to such important habitats in designating wildlife protection areas. In order to secure habitats for a wide diversity of wildlife species, the government will try to give the designation to areas that cover a variety of ecosystems and wildlife communities. For example, the government will try to designate important coastal and marine bird colonies as wildlife protection areas to promote the conservation of coastal and marine natural environments. The government will promote designation of wildlife protection areas that are important from a national or international viewpoint, in coordination with the relevant organizations. (MOE)
- Since it is important to secure international networks of migratory bird habitats and other ecological networks by designating bird migration grounds and the like as wildlife protection areas, the government will promote designation of wildlife protection areas, and build up a close connection with other relevant protection measures such as natural park management. (MOE)
- The government will appropriately manage wildlife protection areas by implementing management operations such as regular patrolling and wildlife inhabitation surveys, and promoting appropriate guidance of human use of the areas, public awareness campaigns on wildlife ecology and conservation and

development of suitable environments for wildlife inhabitation, in order to ensure harmonious coexistence between humans and wildlife. For national wildlife protection areas, in particular, the government will work out master plans indicating protection and management guidelines to enhance their management. When wildlife habitat environments deteriorate in wildlife protection areas, the government will construct wildlife breeding and feeding facilities, lake water quality improvement facilities and the like, and fences to prevent penetration by wildlife-affecting animals as necessary to conserve, develop and improve wildlife habitats. (MOE)

2.2 Regulations on the capture of wildlife

(Current Situation and Challenges)

In Japan, comprehensive management measures are implemented pursuant to the Wildlife Protection and Appropriate Hunting Law, including protection of wildlife, control of their population and management of their inhabiting environment, for the purpose of establishing appropriate relationship between mankind and diverse birds and animals and maintain biological diversity.

Regarding hunting, which is not only a means to acquire resources or a hobby but also significant for wildlife population control, restrictions are applied to the season and methods of capture for the purpose of preventing any danger linked to hunting activities. Also, the number of species permitted for hunters to capture is legally limited to 49 (29 for birds and 20 for animals) (as of November 2007), which reflects inhabiting statuses and harmfulness of each species. In addition, as part of wildlife protection measures, some areas are designated as the temporary game preserve area for the purpose of recovering the wildlife population decreased through hunting activities.

In order to promote those management measures and appropriate hunting practice, there is a position called “wildlife protection leader” dedicated to control on hunting and guidance for wildlife protection, having the status of part-time prefectural employee (there are a total of 3,144 wildlife protection leaders as of fiscal year 2006).

In the recent years, some wild species, such as deer and wild boar, are respectively increasing their population in certain regions, causing serious damage to people’s agricultural, forestry and fishery activities as well as on ecosystems. At the same time, hunters, who play a role of controlling the population of wildlife, are tending to decrease. Also, due to the deteriorating inhabiting environment for wildlife, some migratory birds are observed less than before and some regions are experiencing a declining population of wildlife.

Based on the above statuses, hunting regulations prescribed by the Wildlife Protection and Appropriate Hunting Law were reviewed, and as a result, the Law was revised in 2006 for the purpose of further promoting wildlife protection measures while utilizing hunting for the appropriate management of wildlife. The revised Law has introduced the hunter approval system, exceptions applied to Temporary Game Preserve Areas, Certain Hunting Equipment Prohibited Areas and hunting licenses for nets and traps respectively.

Enforcement Regulations for the Wildlife Protection and Appropriate Hunting Law were also revised in 2007, to strengthen regulations on trapping device such as steel trap and binding rope, revise the list of game species to include the great cormorant whose habitat range has been expanding, lift a ban on the capture of female deer and introduce a ban on the capture of Japanese quails whose habitat range has a narrowing tendency.

(Specific Measures and Policies)

- For the purpose of maintaining the appropriate population of wildlife, the hunter approval system will be utilized to control the number of hunters active in specific hunting zones for the purpose of further promoting wildlife protection. (MOE)
- The government will use the rules of exceptions applied to Temporary Game Preserve Areas, which would allow hunters to capture designated species such as deer and wild boar, to effectively promote population control through hunting. (MOE)
- The former hunting license for nets and traps collectively has been divided into two separate licenses for nets and traps respectively, for the purpose of allowing those farmers suffering agricultural damage caused by wildlife to capture such wildlife by themselves by using trapping device. By utilizing this new licensing scheme, the government will secure manpower for wildlife management. (MOE, MAFF)
- Through the efforts to secure hunters' observation of hunting regulations, the government will ensure an appropriate use of trapping devices to prevent any mistaken capture and any hunting-associated danger. (MOE)
- Through monitoring of inhabiting statuses of game species, the government will review the list of game species on a regular basis. (MOE)
- In order to promote efficient and effective prevention of wildlife damage, the government will appropriately select and deploy wildlife protection leaders and will train them systematically so that their performance will be improved. (MOE)

2.3 Scientific and systematic management

(Current Situation and Challenges)

Some wild species are observed to cause serious damage on our agricultural, forestry and fishery activities and on ecosystems as well. For example, deer, wild boars and other wildlife whose population and habitat range have been significantly increasing are observed to tear up agricultural produce or destroy rare plants. During fiscal year 2006, affected farmlands suffering wildlife damage amount to about 106,000 hectares, registering the total loss of about 19.6 billion yen. At the same time, hunters who play an important role of controlling wildlife have been decreasing for the past thirty years from a high of 530,000 persons in 1975 to 200,000 persons in 2005. Thus, we need to accurately understand inhabiting statuses of wildlife and also address the issue of the decreasing specialists dedicated to wildlife management through human resources development.

On the other hand, we also need to pay attention to some specific decreasing species such as bears in the Western Chugoku region and the Shikoku region, whose population is small and observed in only limited, isolated areas. To such species, maintenance of a sound level of local population is a challenge.

The expanding distribution of deer's habitats and the rapid increase of their population have led to deterioration of natural vegetation of national parks, as deer damage vegetation by eating it, and it is necessary to implement appropriate management of deer to protect ecosystems and landscapes.

To this end, it is important to introduce scientific and systematic management efforts through well-balanced, careful introduction of measures for population control, inhabiting environment management and damage prevention respectively, pursuant to the Specified Wildlife Management Plan (hereinafter referred to as the "Specified Plan").

At present (as of November 2007), a total of 90 Specified Plans designed respectively by prefectural

governors are being implemented in 46 prefectures targeting deer, bear, wild boar, serow, monkey and great cormorant. However, as the targets are living wild creatures, their inhabiting statuses and conditions are changing day by day, and it is quite difficult to measure the expectable effects of the Plans. Therefore, it is important to constantly monitor the statuses of population, inhabiting environment and damage prevention measures and their results, so as to have the results reflected in the Plans flexibly.

Regarding damage caused by crows, it can be divided into agricultural damage and disturbance to people's living environment in urban areas. The frictions between crows and humans in urban areas are mainly represented by disturbed amenity such as crows' messing up garbage.

(Specific Measures and Policies)

- The government will promote effective and efficient monitoring of inhabiting statuses of wildlife, human resources development to secure core workers dedicated to wildlife management, wildlife population control, protection of inhabiting environment through the installation of buffer zones, and damage prevention through the installation of fences or cleaning of crop refuse, etc. At the same time, the government will promote assistance for the efforts of local communities. (MOE, MAFF)
- Targeting those species whose population and habitat range have been remarkably increasing and causing damage of agricultural, forestry and fishery activities and disturbance to ecosystems, the government will implement comprehensive measures under the Specified Plans scientifically and systematically, including population control through hunting, installation of damage prevention facilities and improvement of inhabiting environment. (MOE, MAFF)
- Targeting those species which travel over a wide area ranging over multiple prefectures, such as the great cormorant and bear, the government will establish wide-area management guidelines in cooperation with relevant prefectures and have the guidelines reflected in each prefecture's Specified Plan. The government will also introduce damage prevention measures based on the understanding of inhabiting statuses of local population. The government will ensure consistency among wildlife management measures implemented by respective prefectures. (MOE, MAFF)
- In areas where deer damage to vegetation is seen at the cores of national parks, such as the Minami Alps National Park and the Kirishima-Yaku National Park, the government will work out protection and management plans based on scientific data and adaptively implement measures such as installing vegetation protection fences and capturing deer for adjustment of the deer population. [Cited in Chapter 1, Section 2, 2.2]
- The government will promote education and publicity activities to address crow-causing damage on our living environment. For example, the government recommends the use of a lid or cover for garbage containers. (MOE)
- The government will promote the establishment of Specified Plans with taking into consideration opinions of relevant parties. The government will also utilize the revised manual on technical matters to support the Specified Plan in order to facilitate smooth implementation of the Plans. The government seeks to increase the number of established Specified Plans to 170 by 2012. (MOE)
- For the purpose of securing the human resources dedicated to wildlife management measures and solution of wildlife damage problems, the government will establish the specialist registration system, by which experts

having special knowledge and skills in the field of wildlife management will be registered and effectively utilized. (MOE, MAFF)

- In 2006, the Wildlife Protection and Appropriate Hunting Law was revised to separate the hunting license for nets and traps collectively into the two licenses for nets and traps respectively. Based on this revision, the government encourages those farmers suffering crop damage by wildlife to capture damage-causing species by themselves using trapping devices. (MOE, MAFF)
- Since hunting plays a role of controlling population of wildlife to a certain degree, the government will secure and utilize the forces of hunters contributing to wildlife management. The government will also promote an appropriate management of hunting activities by implementing measures to prevent hunting-associated danger and promote the effective utilization of captured game. (MOE, MAFF)
- When a community needs to secure extra forces for hunting in addition to its local manpower, wide-area cooperation, beyond municipal jurisdictions, would be required to collect and organize hunters. In such case, the government will establish cooperation with relevant organizations and groups to make it possible. (MOE, MAFF)
- Regarding wildlife damage to forests, the government will promote installation of damage prevention facilities such as guard fences and feeding damage prevention tubes, hunting for adjustment population sizes, development and diffusion of new wildlife prevention and elimination technologies, and improvement of wildlife surveillance, prevention and elimination arrangements.(MAFF) [Cited in Chapter 1, Section 5, 1.5]
- While ensuring further coordination with wildlife conservation and management measures, the government will implement wide-area effective measures against wildlife damage in view of wildlife habitat conditions and promote development of broad-leaved tree forests in a manner to give considerations to wildlife habitats. (MAFF) [Cited in Chapter 1, Section 5, 1.5]
- In promoting the above mentioned measures, the government will secure coordination with other relevant policy measures and seek combined effects.

2.4 Survey and research on inhabiting status of wildlife

(Current Situation and Challenges)

As part of the National Survey on the Natural Environment, surveys on the distribution of major wildlife have been conducted to roughly understand the overall inhabiting status of wildlife.

In promoting scientific and systematic wildlife management, it is important to comprehend a regional status as specifically as possible through information and data on wildlife habitats, population and its increasing/decreasing tendency, inhabiting environment, ecological condition, etc.

(Specific Measures and Policies)

- The government will continue to conduct the National Survey on the Natural Environment, and also promote information collection and comprehension of the nationwide inhabiting status of major wildlife as part of the survey project. With the aim to promote carefully designed management measures especially for deer, bear and wildlife that have significant impacts on ecosystems or our agricultural, forestry and fishery activities, the government will promote intensive surveys on such specified wildlife to estimate their nationwide population and understand their increasing/decreasing tendency in a way that allows for quick comprehension of the latest trend. (MOE) [Cited in Chapter 2, Section 5, 2.1]

- The government will utilize the reports on captured game species submitted by licensed hunters or those having hunting permits, to compile mesh data on their location. (MOE)
- The government will promote database improvement through the utilization of GIS (Geographic Information System). (MOE)
- Targeting those wild species causing damage on agricultural produce or ecosystems, the government will promote researches and studies concerning population control methods, methodologies to comprehend their population and population density, damage prevention techniques, etc. in order to prevent further damage expectable from those species and promote appropriate control of such wildlife. (MOE, MAFF)
- As part of efforts to promote protection of migratory birds, the government will continue to conduct banding surveys at bird observation stations and the national census on goose, duck and swan to comprehend the status of their inhabiting environment in tidal flats or lakes. Also, as part of the project of comprehensive ecosystem monitoring system (having Monitoring Sites 1000), the government will conduct monitoring surveys on major stop-over points of waterfowl such as goose and duck as well as shorebird such as sandpiper and plover. Those surveys and researches concerning wildlife management will be implemented effectively through collaboration with private organizations, etc. (MOE)

2.5 Prevention of illegal hunting

(Current Situation and Challenges)

The list of wild species permitted for the public to catch and keep as a pet has been gradually downsized, and at present, only one species, Japanese white-eye, is on the list, where only one bird may be caught and kept per household. However, many illegal hunting incidents are reported, and it is necessary to deliberate on the necessity of the said existing permission system.

Regarding imported birds, there is no import certificate. Therefore, there are many cases that birds are illegally hunted in Japan and kept as a pet where they are falsely reported as imported. In response to such fact, the revised Wildlife Protection and Appropriate Hunting Law enforced in 2006 has introduced the rule that pet owners of any of the designated 21 species specified by the ordinance of the Ministry of the Environment (as of November 2007) are required to put the leg band issued by the Minister of the Environment on their imported bird, and those designated species include the Japanese white-eye and the blue-and-white flycatcher which are often discovered to have been illegally hunted in Japan.

(Specific Measures and Policies)

- In accordance with the “Basic Guidelines for the Implementation of Wildlife Management Projects” established in 2007, the government will ensure an appropriate enforcement of the rules on hunting methods and hunting zones applied to certain pets. (MOE)
- With the effective utilization of wildlife protection leaders as well as cooperation with police and civic groups dedicated to nature protection, the government will enforce the control on illegal hunting and illegal breeding. (MOE)
- The government will deliberate on the necessity of the existing hunting permission system applied to certain pets, with taking consideration the current situation. (MOE)

2.6 Relief system for wildlife

(Current Situation and Challenges)

It is feared that harmful substances such as lead released to a natural environment by humans could damage habitats of wildlife. In this light, lead shot hunting restricted areas have been established in 45 prefectures (as of November 2007), in accordance with the rules of prohibition or restriction on the use of lead shot pellets and the Designated Hunting Prohibited Area under the Wildlife Protection and Appropriate Hunting Law.

In cooperation with local governments and private organizations, the relief system for rescue or rehabilitation of sick or wounded wildlife will be improved with deliberating on the designation of target species.

The Training Center for Waterfowl Rescue, Ministry of the Environment provides oil spill contingency training programs for public employees of local governments, etc. in order to be well-prepared for any accident of oil pollution that could generate a large number of injured wildlife in a short period of time and be ready for quick actions in affected areas.

(Specific Measures and Policies)

- The number of lead poisoning incidents affecting large-sized raptorial birds in Hokkaido has been decreasing, with the reported number of Steller's sea eagles or white-tailed sea eagles discovered to be poisoned and rescued in a year declining from a high of 26 in 1998 to only one in 2005. But the government will continue to make efforts to understand accurately the impacts on wildlife of lead and other harmful substances released to a natural environment through examination of rescued wildlife, and designate more areas as the lead shot hunting restricted areas under the system of the Designated Hunting Prohibited Area pursuant to the Wildlife Protection and Appropriate Hunting Law, as part of efforts to protect waterfowl and large-sized raptorial birds from lead poisoning. Also, the government will make sure that hunters are strictly instructed not to leave dead bodies of hunted wildlife. (MOE)
- In cooperation with local government and private organizations, the central government will continue to make efforts to improve the wildlife relief system such as rescue and rehabilitation of sick or wounded wildlife, while deliberating on the designation of target species. Also, the government will effectively utilize the information obtained through rescued wildlife, to improve understanding of the impacts of chemical substances, etc. on wildlife. (MOE)
- The Training Center for Waterfowl Rescue, Ministry of the Environment, will continue to provide oil spill contingency training programs for public employees of local governments, etc. in order to be well-prepared for any accident of oil pollution that could generate a large number of injured wildlife in a short period of time and be ready for quick actions in affected areas. (MOE)

2.7 Raising public awareness

(Current Situation and Challenges)

In areas where understanding about wildlife of local residents or tourists is insufficient, we often see excessive feeding, inappropriate disposal of food waste or unattended agricultural crops, which could respectively invite problems such as dependence of wildlife on people's feeding and their close approach to the sphere of people's lives. Such phenomena could lead to damage of people's living environment or agricultural,

forestry or fishery activities, and this could in turn adversely affect our efforts of protection of ecosystems and wildlife.

(Specific Measures and Policies)

- Understanding and cooperation of local residents are essential to ensure appropriate management of wildlife, and voluntary participation of local residents in management measures is also needed. Therefore, the government will promote education and publicity activities including instructions and guidance for the purpose of improving and expanding people's awareness of appropriate relationship between humans and wildlife. Those activities include the creation of opportunities for people to contact with wildlife, seminars on natural environment conservation and teaching on the facts of adverse impacts of excessive feeding and damage caused by wildlife on ecosystems and agricultural, forestry or fishery activities. (MOE, MAFF)
- Cooperation among the national and local governments, research institutes and private organizations is essential to the promotion of appropriate management of wildlife, and the government will ensure that such cooperation will be increased and improved. (MOE, MAFF)

2.8 Avian influenza

(Current Situation and Challenges)

During January and March in 2004, an outbreak of highly pathogenic avian influenza (HPAI) hit Japan for the first time in 79 years with affected areas including Yamaguchi, Oita and Kyoto Prefectures, and this incident caused significant damage to the livestock industry. HPAI virus was detected in crows also, which was considered as a secondary infection from poultry.

Later in January and February 2007, HPAI virus was detected again in poultry in Miyazaki and Okayama Prefectures, damaging the livestock industry, etc.

Since around 2004, HPAI virus has been repeatedly detected in wild birds worldwide. Especially in 2005, at the Qinghai Lake in the Province of Qinghai, China, more than 5,000 Bar-headed geese were found dead and confirmed to be infected with HPAI virus. In January 2007, a wild hawk eagle rescued in Kumamoto Prefecture was found to be infected with HPAI virus, although this virus was not detected from any of the specimen inspected during December 2006 and April 2007 covering blood samples of a total of 1,109 wild and migratory birds and 6,900 droppings.

Under such a situation, some experts point out the possibility that wild birds could be playing a part in the spread of HPAI virus. It is hoped that the infection route will be clarified as soon as possible.

(Specific Measures and Policies)

- With taking into consideration the experts' suggestion that wild birds including migratory birds could be playing a part in the spread of HPAI virus, the government will strengthen monitoring of wild birds, through which migratory birds will be caught at their stop-over points and examined for the status of their possession of HPAI virus. The monitoring results will be utilized for domestic measures for wildlife protection and clarification of infection route of HPAI virus. (MOE)
- In the event of any outbreak of HPAI, the government will send public workers and experts to the affected site immediately to conduct an inspection on the status of virus possession to see whether the virus is spread among wild birds including migratory birds. (MOE)

- The government will promote the efforts to clarify migration routes of migratory birds. (MOE)
- The government will create a manual on the management of those infectious diseases which could infect both humans and animals, such as West Nile fever and Q fever as well as avian influenza, and also strengthen surveillance efforts including information collection from prefectural governments. (MOE)

3 Coping with factors causing disturbance to ecosystems

(Outline of Measures and Policies)

In 2005, the Invasive Alien Species Act came into force, as part of the measures to control invasive alien species' disturbance to ecosystems. Under the Act, import restrictions and control on designated species have been promoted. We will continue to make efforts to ensure appropriate enforcement of this Act, and also seek for solutions to the issue of adverse effects of invasive alien species on those areas having indigenous ecosystems such as island areas, as well as to the issue of an accidental entry of invasive alien species to the country through an unintentional consequence such as undetected adherence to imported materials, animals or plants.

In 2004, when the Cartagena Protocol on Biosafety to the Convention on Biological Diversity entered into force, the domestic law for the implementation of the Protocol, titled the "Law Concerning the Conservation and Sustainable Use of Biological Diversity through Regulations on the Use of Living Modified Organisms (Cartagena Law)," was enforced in Japan. In accordance with this Law, efforts to secure biodiversity have been promoted, and for example, we conduct preliminary impacts assessment of living modified organisms (LMOs) to avoid their adverse effects on biodiversity. We will continue to make efforts for the appropriate enforcement of the Law through the utilization of up-to-date knowledge.

We also need to pay attention to the potential impacts of non-biological factors, such as chemical substances or artificial light, on ecosystems. Regarding the measures for the handling of chemical substances from the standpoint of conservation of ecosystems, a significant progress has been made through the introduction of new rules following the establishment of the "New National Biodiversity Strategy of Japan." For example, the Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture, etc has been revised, and it is now required that each specified chemical substance should be evaluated as to its toxicity to flora and fauna. Also, water environmental quality standards have introduced criteria concerning the conservation of aquatic organisms. It is necessary to continue to promote those measures.

3.1 Invasive alien species and living modified organisms (LMOs)

Through the enforcement of the Invasive Alien Species Act, a total of 84 species are designated as Invasive Alien Species (IAS) as of November 2007. As a result, certain progress is observed as to the status of restricted import or breeding of IAS that has adverse effects on ecosystems.

We have been promoting the projects of controlling IAS in priority areas which play an important role in nature conservation, such as the control of small Indian mongooses in Amami-oshima Island and the Yanbaru region of the Okinawa main island where native, rare species such as amami rabbits and Okinawa rail are living. It is important to implement such impact mitigation measures continually. Regarding countermeasures against raccoons and largemouth basses, control methods are being established for use by local governments. Besides, development of a new control method is also underway to improve effectiveness in control of largemouth basses. Efforts to raise the public's awareness concerning appropriate handling of invasive alien species are

also made through the utilization of websites, etc.

It is necessary to establish effective measures to prevent adverse effects of invasive alien species on island areas and other areas having indigenous ecosystems, with taking into consideration other legal schemes such as the Natural Parks Law.

Regarding imported plants for greening, relevant ministries and agencies are making joint efforts to clarify their problems so that they can be used appropriately in a way that would not damage biodiversity in the area concerned. It is necessary to continue to collect information on their potential impacts, to determine the future direction.

Diverse environments of rivers provide habitats for a variety of living creatures. Rivers are the important place for conservation of biodiversity, as there are quite a few indigenous species having special characteristics unique to organisms in rivers. Therefore it is important to address the issue of invasive alien species in rivers, and in this light, we have established the “Plan for the Implementation of Alien Species Control Measures in Rivers (Draft)” (2001) and the “Basic Idea and Examples of Alien Species Control Measures in Rivers” (2003), which summarizes basic information on invasive alien species and examples of measures introduced nationwide. Those documents are used as reference materials by local authorities directly responsible for the implementation of the measures.

In addition, it is necessary to pay attention to invasive alien species that will enter the country accidentally through an unintentional consequence such as undetected adherence to imported materials, animals or plants, to avoid their impacts on ecosystems. For example, the entry of *Batrachochytrium dendrobatidis* was detected in an imported foreign frog, and it is necessary to clarify the impact of this species on amphibia in Japan.

With increased trade activities and exchanges with foreign countries, there are increased opportunities for invasive alien species to enter the country through an unintentional consequence such as a collateral entry together with imported materials, and therefore it is necessary to establish measures to prevent such entry of invasive alien species from adversely affecting domestic ecosystems. For example, ballast water discharged from ships is a possible pathway for the entry of aquatic invasive alien species, which could proliferate and destroy ecosystems in oceanic or coastal areas or damage fishery activities. In this light, the International Convention for the Control and Management of Ships’ Ballast Water and Sediments (Ballast Water Convention) was adopted by the International Maritime Organization (IMO) in February 2004. It is necessary for Japan to assist efforts for the effectuation of this Convention.

Through the appropriate enforcement of the Cartagena Law, efforts to prevent the adverse effects of LMOs on biodiversity have been promoted, including the introduction of preliminary impacts assessment of LMOs. Since various gene recombination technologies have been developed and are in the process of commercialization, it is necessary to deliberate on reliable methods of preliminary impacts assessment for biodiversity based on up-to-date knowledge.

Also, it seems that people’s awareness of the Cartagena Law and understanding of LMOs are not yet sufficient, as unapproved genetically-modified aquarium fish are observed in the domestic market, for instance. Therefore, it is necessary to promote education and publicity activities through the utilization of websites and provision of information to relevant organizations.

(Specific Measures and Policies)

[IAS Invasive alien species]

- Through the appropriate enforcement of the Invasive Alien Species Act, which provides for restrictions on import or breeding of specific invasive alien species, the government will ensure prevention of their adverse effects on agricultural, forestry and fishery activities and on ecosystems, and also promote raising public awareness concerning the handling of invasive alien species. (MOE, MAFF, MEXT)
- Mainly in priority areas which play an important role in nature conservation, such as habitats of endangered species, national parks and protected forest, the government will promote invasive alien species control projects, including the one on the small Indian mongooses which are the threat to rare species in Amami-oshima Island. Here, the government aims to eliminate them by fiscal year 2014. The government will also study control methods for respective invasive alien species, including raccoons, largemouth basses, etc. so that effective methods can be used in the control projects carried out by local governments. (MOE, MAFF)
- The government will develop effective control methods on invasive alien fish with the aim to prevent fishery damage. (MAFF)
- The government will establish the measures for preventing invasive alien species from adversely affecting island areas having indigenous ecosystems, such as the Ogasawara Islands and Nansei Islands. (MOE)
- The government will promote deliberation on the desirable management of invasive alien plants for greening, by establishing a basic policy for the management of invasive alien plants for greening in national parks and urban parks as well as in slopes of the road. (MOE, MAFF, MLIT)
- The government will promote the collection of data on the impacts on ecosystems of invasive alien plants for greening such as alien grass. Also, with the aim to promote the use of native species for greening, the government will promote fact-finding surveys on genetic diversity of native plants for greening. (MOE)
- The recent rapid expansion of the habitat range of invasive alien species such as bur cucumber in rivers causes a serious problem in some rivers. The government will further promote countermeasures against invasive alien species in rivers as well as research on invasive alien plants and fish, to establish effective measures. (MLIT)
- The government will establish the measures for preventing the impacts of invasive alien species including insects which enter the country accidentally through an unintentional consequence such as undetected adherence to an imported material, animal or plant. Also, the government will study the impact of *Batrachochytrium dendrobatidis* on amphibia in Japan, to establish effective measures. (MOE)
- Japan will continue to actively participate in the discussions of the International Maritime Organization (IMO) toward the effectuation of the Ballast Water Convention. (MLIT, MOE, MOFA)

[LMOs]

- Through the appropriate enforcement of the Cartagena Law, the government will promote the efforts to secure biodiversity and prevent LMOs from adversely affecting biodiversity. (MOF, MEXT, MHLW, MAFF, METI, MOE)
- The government will promote the accumulation of scientific knowledge contributive to the effective enforcement of the Cartagena Law, and develop an effective impact assessment method on biodiversity based on up-to-date knowledge. (MOF, MEXT, MHLW, MAFF, METI, MOE)

- The government will promote education and publicity on the Cartagena Law and public understanding of LMOs, by utilizing websites, etc. to release information on the contents and the status of enforcement of the Law and relevant scientific knowledge. (MOF, MEXT, MHLW, MAFF, METI, MOE)

3.2 Non-biological factors including chemical substances

(Current Situation and Challenges)

Through the revision of the Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture, etc (2003), it is now required that each specified chemical substance should be evaluated as to its toxicity to flora and fauna where the aspect of impacts on ecosystems is taken into consideration, in addition to the conventional viewpoint of health protection for humans. It is necessary to ensure effective enforcement of the said Act, and also promote chemical substances countermeasures in a way that covers a wide range of substances through ecosystems impacts assessment and appropriate management.

In the meanwhile, it is pointed out that it has come to the public eye that the abnormal reproductive function of wild living creatures observed in various places in the world could be associated with their exposure to chemical substances, and endocrine disrupting effects of chemical substances, as the mechanism causing their abnormality. It is important to be aware of any occurrence of an extraordinary event associated with wildlife, including endocrine disruption, in course of promoting chemical substances countermeasures.

As part of the Environmental Quality Standards for Water Pollution pursuant to the Basic Environment Law, water quality standards for the conservation of aquatic organisms are established under the scheme of the water category which is determined according to inhabiting statuses of aquatic organisms in each water area (Water areas are classified into “Organism A,” “Organism B,” etc. based on the criteria such as inhibiting conditions for aquatic organisms (water quality, water temperature, etc.) and the status of their egg-laying sites. Standard values are established per category.), and the classification work of each water area is underway. In November 2003, the standard for total zinc (zinc and its compounds) was established. As of November 2007, classification is done with a total of four water areas. Also, the stricter emission standard for zinc has been introduced under the Water Pollution Prevention Law (since December 2006). Classification of the remaining water areas (33 rivers and lakes and 10 sea areas) needs to be made one by one.

In accordance with the established water quality standards for the conservation of aquatic organisms, environmental management measures should be also established to maintain or reach standard values. It is also necessary to monitor public waters regularly to see the status of their satisfaction of the environmental quality standards.

We conduct environmental assessment of rivers constantly to confirm the status of the dioxins designated under the Law Concerning Special Measures against Dioxins as the substance suspected of causing endocrine disruption.

Regarding agricultural chemicals, from the standpoint of the conservation of ecosystems, the Registration Withholding Standards on Damage to Aquatic Animals and Plants was revised and entered into force in April 2005 for agricultural chemicals under the Agricultural Chemicals Regulation Law. The revised standards have been enhanced, so that risk assessment has to be conducted for algae, crustaceans and fish, compared with the former standard, in which only toxicity to fish was assessed. It is necessary to make sure that the revised standards will be set for each agricultural chemical and also expand the scope of ecological risk assessment and management to cover terrestrial ecosystems.

Also, in order to raise public awareness of light pollution and promote control measures, the “Guidelines for Light Pollution” have been established to promote education for local governments, businesses and citizens. The Guidelines explain the impacts of artificial light on diverse living organisms including photopositive species such as moths, photonegative species such as fireflies and nocturnal species including nocturnal mammals, and also show the basic policy of control measures.

(Specific Measures and Policies)

From the standpoint of protecting ecosystems from chemical substances, the government will ensure that evaluations of chemical substances to be conducted under the Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture, etc. will confirm non-toxicity to flora and fauna. Regarding those persistent chemical substances which are confirmed to be toxic to flora and fauna, they will be designated as “Type III Monitoring Chemical Substances,” and manufacturers and importers of those designated substances will be required to report the quantity of their manufacture and import, so that sufficient surveillance can be made. As of November 2007, a total of 61 substances, including nonyl phenol, are designated as “Type III Monitoring Chemical Substances.” Also, the government is going to develop a preliminary testing method for birds in order to identify any danger of long-term toxicity in high-level predators, and also develop the Quantitative Structure-Activity Relationships (QSAR), which are used to predict ecotoxicity based on the chemical structural formula and physical and chemical characteristics. (MOE)

The government conducts surveys to understand the persistency of chemical substances in diverse media including surface water, bottom sediment, aquatic wildlife (bivalves, fish and birds) and air, and will continue to conduct initial environmental risk assessments to screen chemical substances which may have relatively high environmental risks, including from the standpoint of ecological impact. As of November 2007, a total of 116 chemical substances have been through the initial environmental risk assessment. (MOE, MAFF)

As part of the efforts to address the issue of endocrine disrupting effects of chemical substances, the government will conduct observational studies on wildlife and impacts assessment on fish and shellfish. Also, the government will promote networking of existing activities, coordinated implementation of nature observation activities at schools, and intensive information collection through standardization of observation targets and items to a certain degree. Through those efforts, not only regional continuous wildlife observation but also field surveys by specialists will be promoted. (MOE, MAFF)

Concerning the water areas for which the government has not yet designated the type, the government will collect and organize the information on the water areas, submit it to the deliberation of the Special Committee for the Type Designation of Environmental Standards for the Conservation of Aquatic Life, and examine one after another for type designation. (MOE) [Cited in Chapter 1, Section 8, 2.1.1]

By notifying “Prefectural Standards for Water Category Designation” (June 2006), the government will disseminate the matters related to prefectural standards for water category designation. (MOE) [Cited in Chapter 1, Section 8, 2.1.1]

The government will review the necessary scientific knowledge on the substances considered to be highly toxic and promote toxicity assessment. (MOE) [Cited in Chapter 1, Section 8, 2.1.1]

In accordance with the setting by the environmental water quality standard for conserving aquatic life, the government will appropriately take necessary environmental management measures and policies to maintain and achieve the settings such as effluent control, and will always monitor the achievement of the environmental

water quality standard in public waters. (MOE) [Cited in Chapter 1, Section 8, 2.1.1]

Targeting the dioxins designated as the substance suspected of causing endocrine disrupting effects under the Law Concerning Special Measures against Dioxins, the government will continue to conduct monitoring surveys on each of them in accordance with the “Monitoring Results of Endocrine Disruptors in a Water Environment” (December 2002) and the “Manual for Monitoring of Dioxins in Rivers and Lakes (Draft).” The government will also promote the measures for bottom sediment in polluted rivers, in accordance with the “Basic Policy on Control of Dioxins in Bottom Sediment” (July 2007) and the “Technical Report on Control of Dioxins in Bottom Sediment (Draft)” (April 2007).

In accordance with the Agricultural Chemicals Regulation Law, the government will establish Registration Withholding Standards on Damage to Aquatic Animals and Plants for each agricultural chemical. (MOE) [Cited in Chapter 1, Section 6, 1.1]

The government will establish the method of risk assessment and management of agricultural chemicals to control their impacts on terrestrial ecosystems. (MOE) [Cited in Chapter 1, Section 6, 1.1]

The government will promote the efforts to raise public awareness of the Guidelines for Light Pollution so that appropriate measures pursuant to the Guidelines will be implemented. (MOE)

Since the contents of the Guidelines for Light Pollution are supposed to be reviewed and revised as necessary to reflect any progress of lighting technologies, the government will review the Guidelines from time to time for further improvement. (MOE)

4 Welfare and proper management of animals

(Outline of Measures and Policies)

From the standpoint of the influence of pets on biodiversity, it is important to ensure appropriate management of pets to avoid their adverse effects on native ecosystems in course of their contacting a natural environment. Also, breeding of those wild animals that are not domesticated should be restricted, because it is generally difficult to keep them in a way that respects their instinct, behavior and physiology. Besides, the attitude regarding protecting animals, which basically means that we should not kill, hurt or torture animals and should take appropriate care of them while respecting their behavior, contributes to the development of feelings such as respect of life and friendship in people, toward a harmonious society between animals and humans and also to the conservation of biodiversity.

In 2005, Act on Welfare and Management of Animals was revised, to introduce the responsibility of the Minister of the Environment to establish the basic guidelines for comprehensive promotion of measures for welfare and management of animals, as well as other new rules, including the registration system of animal handling business such as pet shops, nationwide unification of restrictions on breeding of specified (dangerous) animals, and special consideration to be taken for the use of animals for scientific projects.

In accordance with the said revised Act and the basic guidelines established in 2006, we will ensure comprehensive implementation of the measures for appropriate welfare and proper management of animals.

4.1 Promoting appropriate care of pets

(Current Situation and Challenges)

Recently, the public interest in pets, such as dogs and cats, has been increasing in Japan, and about one third of the entire population is keeping a pet (as of 2003). Under this situation, some problems have been

emerging such as inappropriate management of pets by immoral pet shops or irresponsible pet owners, as well as adverse impacts on natural ecosystems of those animals which were abandoned or escaped to go wild and prey upon native species.

Although the number of dogs and cats seized and taken into custody at prefectural facilities or municipal facilities of designated or core cities has declined significantly, it is still around 420,000 in a year (as of fiscal 2004), about 94% of which are eventually destroyed. It is hoped that such status will be improved.

(Specific Measures and Policies)

- The government will prevent abandonment or cruelty of animals through the efforts of raising people's understanding of proper care of animals and awareness of prohibited acts taking into consideration respect for life. The government will also request animal handling businesses to install a signboard and give customers sufficient information on characteristics and status of animals for sale, with the aim to further ensure their appropriate business operation. (MOE)
- The government seeks to reduce by half, by fiscal year 2017, the number of dogs and cats taken into custody at prefectural facilities, etc. through the efforts to promote spaying and neutering to prevent an excessive increase of their population or encourage people to take a lifelong care of their pet and not to make an easygoing decision to keep a pet. The government also seeks to reduce the ratio that seized animals will be destroyed, through encouraging efforts to find new owners for them. (MOE)

4.2 Promoting ownership identification

(Current Situation and Challenges)

To implement the measures to identify ownership of pets would contribute to the prevention of stolen or stray pets and also to the prevention of abandonment or lost of escaped pets, since such measures would clarify owner responsibilities and raise the quality of owners' attitude. However, as of fiscal year 2003, only about 25% of the entire population of pet owners of dog or cat is identified. Also, stray pets are seized one after another, and many of them are assumed to be abandoned or to have escaped from unknown owners.

(Specific Measures and policies)

- The government seeks to double the number of identified owners of dog or cat by fiscal year 2017 through the efforts of raising public understanding of the necessity of ownership identification. Also, through cooperation with local governments and relevant organizations, the central government will improve the infrastructure for ownership identification, through unified data management of pet owners and the spread of ownership identification technologies, especially Microchips and deployment of Microchip readers. (MOE)

4.3 Comprehensive educational measures

(Current Situation and Challenges)

In order to promote appropriate welfare and management of animals, it is important to secure extensive public understanding and knowledge about the significance of preventing cruelty and ensuring appropriate care, but such understanding is still insufficient today. It is pointed out that contact with animals and experiences of taking good care of a pet would contribute to the development of feelings such as respect of life and friendship

in people. In this light, it is necessary to take advantage of various opportunities to promote education and publicity through the cooperation among the national and local governments, veterinarians' associations, industrial organizations and groups dedicated to animal welfare.

(Specific Measures and Policies)

- The national and local governments will cooperate with relevant organizations to carry out various educational and publicity activities concerning appropriate welfare and proper management of animals, including the “Be-kind-to-animals Week” program, seminars for appropriate care of pets, distribution of various informative or publicity materials, etc. The government will also promote the development of regional human resources such as animal protection promoters. (MOE)

Section 2 Sustainable Use of Genetic Resources

(Basic Concepts)

In everyday living, we depend on various bioresources in diverse ways, including the use of crops and marine resources for food, wood for building or furniture materials, cotton and wool for clothing fibers, as well as crude drugs in the medical field, natural pigments in the industrial field and coal in the energy field. Also, as a result of the recent progress of biotechnology, usefulness and value of bioresources have been enhanced, where we benefit from mass production of pharmaceutical products such as human insulin and development of pest-resistant corns, for instance.

Also, the use of alternative resources to replace petroleum, such as bioethanol and biomass plastics, has been promoted. In addition, it is known that bioresources are useful for environmental conservation. For example, microorganisms and plants are effectively used to restore the environment (bioremediation and phytoremediation), and the living creatures surviving under an extreme condition such as a deep seafloor have been found to have a novel function of purifying the environment. Thus, attention is paid to the importance of exploring, cultivating and preserving bioresources.

Due to the global trend of climate change, deteriorated environmental conditions through human development activities, the rapid decrease of tropical rain forests and accelerating desertification, we see diverse genetic resources decreasing or facing the crisis of extinction. Under such circumstance, it is getting more and more important to collect and conserve genetic resources as the source of useful bioresources, hand them over to the next generation and ensure their sustainable use. Thanks to the progress of science and technology including biotechnology, the potential of biodiversity has grown, where it could make it possible to develop new pharmaceutical products or foods essential to the survival of mankind or solve environmental problems on the planet Earth. In order to maximize such potential of bioresources and maintain it for a long time in the future, ecological diversity, biological diversity and genetic diversity should be respectively maintained, and sustainable utilization of bioresources should be promoted with taking into consideration potential impacts of biotechnology on biological diversity as well as risk factors affecting the aspect of safety.

Also, regarding the aspect of diversity of genetic resources, not only its usefulness for the economy but also its significant role to form a local unique climate as our cultural assets should be well understood. For example, in Japan, there are various kinds of locally produced miso that uses *koji* (mold used as a starter for the fermentation in sake and soy-sauce production) indigenous to a specific region. In other words, the efforts to conserve diverse genetic resources, without the limitation to the resources useful for our economy today, can be interpreted as the effort to hand over to future generations a variety of possibilities in utilization of genetic resources.

1 Use and conservation of genetic resources

(Outline of Measures and Policies)

Through various efforts, we already utilize genetic resources in the fields of medical care, food manufacturing, etc. to commercialize diverse products. Such efforts include the genome project of deciphering a base sequence of a genome of diverse living creatures, as well as the projects of isolating useful genes to clarify their functions and technology development for utilizing them. Genetic resources of animals and plants adaptable to diverse environments are essential to the development of novel varieties resistant to pests or environmental stress. With the utilization of science and technology including biotechnology, genetic resources

are all the more contributive to the solution of various problems in the fields of food, environment and energy. In order to promote research for such solution, it is important to collect and accumulate knowledge about genetic information and functions.

On the other hand, it is possible that the release of genetically modified organisms (GMOs) to a natural environment will adversely affect biodiversity, and it is necessary to make preliminary impacts assessment, etc. in accordance with the Cartagena Law (Law Concerning the Conservation and Sustainable Use of Biological Diversity through Regulations on the Use of Living Modified Organisms).

It is important to raise public understanding of usefulness of biotechnology as well as the necessity to secure safety, in order to promote the sustainable use of bioresources. As the attention of general consumers to the safety of food and environmental protection has been growing, it is all the more important to ensure the said public understanding. Therefore, it is essential to promote active educational and publicity activities including information release of scientific knowledge on the impact of biotechnology on biodiversity and risk factors affecting safety.

1.1 Use of genetic resources

1.1.1 Use of genetic resources in the medical field

(Current Situation and Challenges)

Today, quite a few pharmaceutical products in the market are based on a gene recombination technology. It is necessary to secure good quality, efficacy and safety of those products, like other general pharmaceutical products. The Ministry of Health, Labour and Welfare has been promoting the projects of analyzing functions of human genes to identify disease-associated genes and creating database of such genes, and also promoting therapeutic research with the utilization of results of the said projects.

In addition, we make sure that any pharmaceutical product to be produced based on a gene recombination technology is subject to safety testing on a recombinant organism and quality testing on final products and also take measures to prevent their dissemination. At the same time, we promote the measures to secure efficacy, safety and good quality of those pharmaceutical products.

(Specific Measures and Policies)

- Through the analytical studies on the difference in genes between persons of good health and patients of any major disease (dementia, cancer, diabetes, hypertension and asthma), the government will promote identification of the genes associated with those diseases to analyze their functions. (MHLW)
- The government will continue to make efforts to prevent the release of GMOs to a natural environment and secure quality, efficacy and safety of the pharmaceutical products derived from a gene recombination technology. (MHLW)
- The Research Center for Medicinal Plant Resources, National Institute of Biomedical Innovation, which is a MHLW-affiliated organization, actively collects and conserve medicinal plants, etc. and also implements various research projects, including research of technologies needed for cultivation or breeding of medicinal plants, research on chemical and biological evaluation of effective ingredients in medicinal plants, research of foreign-born phytogetic resources to materialize their utilization in Japan and research on tissue culture of medicinal plants. (MHLW)

1.1.2 Use of genetic resources in the fields of agriculture, forestry and fishery

(Current Situation and Challenges)

In Japan, various genome sequencing projects have been carried out targeting plants, animals and insects, together with the projects to isolate useful genes and clarify their functions and technology development to utilize them. In particular, Japan takes the initiative in promoting genome research on rice, which plays an important role of establishing the groundwork to support other research activities for crops including major gains. The genome sequencing project was conducted by an international consortium, and successfully completed, in 2004, full sequencing of the rice genome (about 370-megabase genome sequence). Japan contributed about 55% to the entire sequencing work. Regarding the projects to isolate useful genes and clarify their functions, about 100 genes have been successfully isolated (as of March 31, 2007) and identified to have a useful function for agricultural solutions, such as resistance to rice blast disease.

It is necessary to further promote the projects to isolate useful genes and clarify their functions, and also utilize project achievements effectively to promote breeding of completely new crop varieties that could contribute to problem solution in the fields of food, environment and energy and also create new businesses. For example, it is expectable that such varieties would have a super high yield, which helps us reduce production cost, or would have high resistance to pests, which allows us to stop using agricultural chemicals, or would be usable as energy resources. It is also necessary to ensure the sustainable use of genetic resources that are important constituents of biodiversity.

(Specific Measures and Policies)

- The government will promote the projects of isolating the genes that could be used to solve existing problems in the fields of food, environment and energy, as well as the projects of identifying genetic map locations of those genes and analyzing functions of those genes. (MAFF)
- The government will promote technology development to materialize the maximum utilization of isolated useful genes, through control of their functions, etc. For example, the government seeks novel technologies that would make it possible to inject a gene to a desired location on a chromosome, control the expression of injected genes or transform crops such as sorghum usable as biomass. (MAFF)
- The government will promote the projects to identify and analyze agriculturally useful genetic characters, to use such characters to develop novel crops that have a super high yield or environmental resistance, for instance, which would contribute to the solution of existing problems in the fields of food, environment and energy. The government also seeks the establishment of technologies to produce useful substances through the utilization of genomic information of animals or insects, and the creation of new businesses. (MAFF)
- Regarding those genetic resources which are useful for agricultural, forestry and fishery activities, the government will promote the utilization of those resources for research or technology development through industry-academy-government collaborations. (MAFF)

1.1.3 Use of genetic resources for foods

(Current Situation and Challenges)

Those foods and food additives derived from recombinant DNA technology (hereinafter referred to as “genetically modified foods” or “GMF”) are required to meet the standards specified by the Food Sanitation Law, and since April 2001, safety examinations on GMFs have been implemented as the legal requirement.

According to this rule, any GMF or any foods using GMF as an ingredient may not be imported or marketed in Japan unless they are officially certified through the safety examination without problems. As of June 2007, a total of 77 items of foods including soybeans and corns and 14 items of additives have completed the safety examination in Japan and have been confirmed to have no adverse impacts on the health of human beings.

During the session of the Joint FAO/WHO Food Standards Programme (Codex Alimentarius Commission) held in 1999, the Codex Ad Hoc Intergovernmental Task Force on Foods Derived from Biotechnology was established, for the purpose of setting the international guideline for safety assessment of biotechnology-derived foods, and Japan was elected as the chair of this Task Force. During the 2003 session, the international guideline was finalized and adopted. At the same time, the Task Force was wound up, but it was determined during the 2004 session that the Task Force should be re-established in order to address many pending issues in the field of biotechnology-derived foods. As a result, Japan was elected again as the chair country of the Task Force.

(Specific Measures and Policies)

- The government will continue to have relevant organizations conduct safety assessment of GMFs from time to time, and also revise assessment methods as necessary to respond to the progress of gene recombination technologies. (MHLW)
- In order to secure the safety of GMFs, the government will continue to make efforts to establish reliable testing methods to detect GMFs and also promote surveys and studies on the safety assessment results of the foreign-developed GMOs. (MHLW)
- The Codex Ad Hoc Intergovernmental Task Force on Foods Derived from Biotechnology is currently deliberating on the safety assessment policy for those foods which are derived from genetically modified animals or nutrition/health-conscious genetically modified plants and for those imported foods which contain a minute quantity of the genetically modified plant that is approved by the authority of the exporting country but is not approved by the authority of the importing country. It is planned that the final report on this deliberation will be submitted by the time of the 2009 Codex session. (MHLW)

1.1.4 Use of genetic resources in industrial fields

(Current Situation and Challenges)

With the growing concern over environmental impacts of soaring oil prices and emissions such as carbon dioxide, we seek environmentally sound manufacturing and waste treatment practices that could be achieved through technology development using bioresources of low environmental load. That's why we are working on the establishment of environment-friendly recycle-oriented industrial system through the development of fundamental technologies using biological functions of genetic resources.

(Specific Measures and Policies)

- The government will promote the development of phyto-genic industrial materials and fundamental technologies to produce useful substances such as high protein substances, and will establish the infrastructure for manufacturing based on phyto-genic functions. (METI)
- The government will develop a high-efficiency manufacturing process of useful substances through the use of microorganisms and fundamental technologies for biological reactions. At the same time, the government

will promote improvement of the environmentally-sound technique for biological treatment of effluents and wastes with the utilization of microorganisms. (METI)

1.1.5 Use of genetic resources for research

(Current Situation and Challenges)

Genetic resources are utilized for research and development projects in the life science field. Those genetic resources include mice and genetic samples used in animal experiments as well as human or animal genes and standardized test samples of cells used to analyze genetic or biological functions. Appropriate collection and conservation of genetic resources to make them available for research activities is essential to the promotion of research and development in the life science field.

Especially after the successful completion of the project of sequencing the human genome in April 2003 and with the recent rapid progress of other sequencing projects on diverse organisms, international competitions of post-genome research have been intensifying, and the importance of genetic resources is getting more significant.

(Specific Measures and Policies)

- The government will improve the information systems at the Center for Genetic Resource Information, National Institute of Genetics, Research Organization of Information and Systems, and at the RIKEN BioResource Center, both of which are engaged in comprehensive collection, accumulation and release of information on genetic resources. Starting fiscal year 2002, based on the Intellectual Infrastructure Improvement Plan (issued in August 2001 by the Council for Science and Technology) which aim to raise the level of our country's intellectual fundamentals to the world top class in ten years as the national strategy, the government has been making efforts to enhance its role as the national information center of genetic resources through networking of groups of specialists and core organizations. The government will further improve the domestic systems of collecting, accumulating or providing information on genetic resources. (MEXT)

1.2 Conservation of genetic resources

1.2.1 Conservation of genetic resources in the medical field

(Current Situation and Challenges)

Medicinal plants are precious assets handed over to us by our ancestors who found them from the natural world. Since there are such a wide variety of plants in the world, it is believed that there are still many species whose potential medicinal value is yet to be known. It is necessary to collect and conserve medicinal plants and knowledge thereof, so that we can use them effectively when necessary and also transfer them to future generations.

Also, for therapeutic research, genetic information and genetic resources of mankind, animals and pathogenic microbes are important.

(Specific Measures and Policies)

- The National Institute of Biomedical Innovation (NIBIO) has the Gene Bank, Cell Bank, Small Experimental Animals Bank, the Research Center for Medicinal Plant Resources and the Tsukuba Primate Research

Center. NIBIO will continue to provide bioresources to researchers, in cooperation with Japan Health Sciences Foundation (HS Foundation). (MHLW)

- As a master bank, NIBIO collects and standardizes bioresources, prepares stocks and deliver samples to the HS Foundation, who then cultures and delivers samples to research institutes by taking necessary procedures. NIBIO's Gene Bank develops and collects research resources including non-human primate DNA in particular, and provides them to researchers. NIBIO's Cell Bank collects human cell cultures, standardizes them (verify their purity and quality by testing for microbial contaminations and cross culture contamination), and provides them to researchers. NIBIO's Small Experimental Animals Bank actively collects and keeps experimental animals including novel disease-model animals, while ensuring the maintenance of their strains, and also ensures stable supply of them and releases relevant information. NIBIO will continue to supply those bioresources to researchers. (MHLW)
- From the perspective of the sustainable use of medicinal plants, NIBIO's Research Center for Medicinal Plant Resources is dedicated to the conservation of genetic resources by means of low-temperature preservation of their seeds. Also, in order to collect and secure genetic resources of medicinal plants, the Research Center will continue to promote seed exchange of medicinal plants with foreign botanical gardens and research institutes (415 organizations in 63 countries worldwide as of fiscal year 2004). (MHLW)
- National Institute of Infectious Diseases (NIID) will continue to promote collection and conservation of pathogenic microbes required for surveillance and research into infectious diseases and information exchanges with relevant research institutes inside and outside the country. (MHLW)

1.2.2 Conservation of genetic resources in the fields of agriculture, forestry and fishery (Current Situation and Challenges)

Today, through human development activities such as reckless tropical deforestation or agricultural modernization, biological genetic resources are facing increased danger of extinction. Also, the Convention on Biological Diversity reaffirms that States have sovereign rights over their own genetic resources, and as a result, it becomes difficult for us to collect genetic resources abroad, including in developing countries. Under such circumstances, from the perspective of biodiversity conservation, it is important to collect and conserve rare genetic resources and hand them over to the next generation while promoting their effective utilization.

In this light, the Ministry of Agriculture, Forestry and Fisheries launched the Genebank Project in 1985. At present, the National Institute of Agrobiological Sciences (NIAS) is positioned as the center bank (in the fields of plant, animal and microorganism), under which sub banks, consisting of five independent administrative institutions, are engaged in the operations of search, collection, classification, identification, character assessment, multiplication and conservation of genetic resources inside and outside the country. In the forestry and fishery fields, operations are managed by the Forestry and Forest Products Research Institute (FFPRI) and the Fisheries Research Agency (FRA) respectively. Thus, Genebanks' operations in the fields of plant, animal, microorganism, DNA, forest tree and fishery are underway. Through the Projects, the banks have grown to have a huge collection of genetic resources, including 240,000 phylogenetic accessions in the field of food and agriculture, and the entire collection under this project is now one of the largest in the world. Those genetic resources are distributed to researchers as research samples, and information on collected and conserved resources is made available, and the project contributes greatly to the development of new crop varieties. We are planning to further promote this Genebank Project, by collecting and receiving more genetic resources to

improve our intellectual infrastructure to support research and development activities of biotechnology, etc.

(Specific Measures and Policies)

- The Government will enhance the efforts of collection, conservation and characterization of genetic resources to be provided to breeders and for the development of new varieties, seek improvement of efficiency in conservation through the use of cryopreservation technology, and promote assistance for research activities through distribution of research materials. (MAFF)
- In response to the increasing demand for the protection of forests for landscape, etc., the government will promote the collection and conservation of forest genetic resources and development of new tree varieties in order to secure good and necessary seeds and seedlings. (MAFF)
- The Government aims to increase the collection of phytogenic resources, from the current 240,000 (as of the end of fiscal year 2006) to 250,000 (by fiscal year 2010). (MAFF)
- As part of the Genebank Project, the government will conduct international collaborative research projects for conserving diversity and ensuring appropriate utilization of genetic resources in developing countries where the risk of genetic erosion is high. Also the Government will financially support FAO and participate in international projects such as those sponsored by JICA, to contribute to the conservation of biodiversity. (MAFF, MOFA)

1.2.3 Efforts in the field of science and technology

(Current Situation and Challenges)

Appropriate conservation and utilization of biological genetic resources is essential to the promotion and development of life science research. This is clearly explained in the report “Strategic Promotion of Science and Technology Policy - Life Science Field” (issued in March 2006 by the Council for Science and Technology Policy). We will promote strategic improvement of the collection of biological genetic resources with aiming to make the collection the world’s best by 2010 and promote its effective utilization.

(Specific Measures and Policies)

- The Center for Genetic Resource Information, National Institute of Genetics, Research Organization of Information and Systems, will continue to make efforts to improve the database on whereabouts of wide-ranging, diverse genetic resources. Also, RIKEN BioResource Center, which was established in January 2001, will continue to make efforts to improve the systems of collecting, conserving and making available bioresources, including experimental models such as mouse and thale cress, microorganisms, genetic materials and cultured cells. (MEXT)

1.2.4 Conservation of genetic resources in the environmental field (Environmental Samples Time Capsule Program) [Cited in Chapter 2, Section 4, 3.5]

(Current Situation and Challenges)

In preparation for any future surfacing of environmental problems, it is extremely important to conserve the current global environmental status in an appropriate manner and promote systematic collection and accumulation of environmental samples such as soils and biological specimen, since such preparation would allow us to analyze or evaluate them better in the future when the progress of technologies makes it possible. It

is particularly important to pay attention to endangered wildlife since the list of endangered species is expanding due to increasing contamination of the environment or climate change, and we will conserve their cells and genetic information while hoping that we will be able to restore extinct species in the future when the progress of technologies makes it possible.

Regarding endangered birds in Japan, they include Japanese crane living in Hokkaido and other raptorial species which are considered as the same species or subspecies of those birds living in the eastern part of Eurasia whose population is relatively large. Establishing cooperative relationships with the countries having habitats of those species would contribute to the conservation and breeding of those endangered birds in Japan. Many endangered birds living in Japan have a wide habitat range reaching Eastern Asia and Eurasia, and therefore it is necessary to establish international networks for long-term conservation of their cells and genes.

(Specific Measures and Policies)

- The government will promote the collection of reproductive cells, archaeocytes and somatic cells of the endangered species listed on the Red List managed by the Ministry of the Environment, with the aim to conserve 500 types of cells of the endangered species and analyze DNA of important species in five years starting from fiscal year 2008. The government also aims to conserve 50 types of endangered algae in five years by conserving ten each year. (MOE)
- Regarding the super low temperature preservation technology which is almost established in Japan, the government will promote examination of whether this technology can be used in Siberia where many birds nest during summer, with the aim to materialize international standardization of this technology. (MOE)

2 Use and conservation of microbial resources

(Outline of Measures and Policies)

We have a long history of using microorganisms, although they are invisible to the naked eye. Usage is wide, ranging from the use of lactic acid bacteria or yeast for the production of fermented foods such as cheese, alcohol beverage, *miso*, soy sauce, etc. to the use as an ingredient of pharmaceutical products or an agent to dissolve pollutants. Thus, microbial resources are essential to the materialization of safe and secured living of mankind.

In order to facilitate the promotion of research activities to ensure such utilization of useful genetic resources, it is getting more important to collect and accumulate knowledge about biological genetic information and functions. As part of these efforts, we are working on the systematic collection, conservation, distribution and management of genetic resources including microorganisms.

On the other hand, since the effectuation of the Convention on Biological Diversity (1993), countries who possess genetic resources have introduced measures and laws to restrict the use of the resources by foreign companies or research institutes. For example, some countries employ a permission system and some others have introduced a legal scheme to secure a large share of profits arising out of the use of resources. As a result, the utilization of genetic resources has slowed down.

To address this situation, the Conference of the Parties to the Convention has been discussing for a long time the issue of how to ensure the “sustainable use” and “fair and equitable sharing of benefits,” in view of the significance of the “sustainable use” of genetic resources.

Under those circumstances, we aim to introduce measures to build good relationship with

resource-possessing countries, facilitate smooth acquisition of genetic resources including microorganisms in accordance with the Convention on Biological Diversity, and promote their “sustainable use.”

2.1 Use of microbial resources

(Current Situation and Challenges)

Japanese companies who develop the products derived from genetic resources such as microorganisms (pharmaceutical products, cosmetics, etc.) are facing difficulties in pursuing R&D projects efficiently, due to unclear procedures for acquiring genetic resources in foreign countries as well as regulations imposed by some resource-possessing countries.

Product development projects usually begin with a search of unknown things, followed by surveys and research works, and it is seldom that a project successfully reaches the final stage of actual utilization of a desired value. Also, it takes a long time and considerable cost to pursue a development project, and it generally involves great risks. Therefore, strict regulations on resources acquisition activities imposed by resource-possessing countries tend to diminish companies’ aggressive attitude toward acquisition and utilization of genetic resources.

It is anticipated that some of the largest scientific achievements in the 21st century might come from the bio fields. The bio industry has the potential to bring about some desirable changes to our living and industrial structure, and it is an important and attractive industry. Genetic resources constitute the basis of the bio industry, and Japanese companies desire to use them appropriately and actively in expanding their business, but the said circumstances hamper this desire. Such a situation is actually not beneficial to resource-possessing countries either, because they would lose the opportunity to obtain profits otherwise expectable from genetic resources. Thus, we are afraid that the current situation is a disadvantage to both resource-possessing countries and user countries.

In this light, the Japanese government needs to promote measures to create a desirable environment for securing benefits for both resource-possessing countries and user countries, by encouraging Japanese companies and researchers to make efforts to obtain the trust of resource-possessing countries and build good relationships with them through the sufficient understanding of the objective of “fair and equitable sharing of benefits” under the Convention on Biological Diversity so that Japan can acquire and use genetic resources smoothly and consistently. Regarding the Convention’s objective of “fair and equitable sharing of the benefits arising out of the utilization of genetic resources,” it is expected that a policy decision will be reached by the time of the 10th meeting of the Conference of the Parties to the Convention. Japan believes it is important to build cooperative relationships in real terms through an international framework based on its past achievements and experiences of cooperation with Asian countries.

(Specific Measures and Policies)

- The National Institute of Technology and Evaluation will, through the implementation of joint international programs with resource-possessing countries, promote transfer of technology to those countries and provide Japanese companies with opportunities to utilize overseas microbial resources, for the purpose of promoting “sustainable use” of the resources. (METI)
- The National Institute of Technology and Evaluation has been promoting bilateral programs for conservation and sustainable use of microbial resources in six countries, including Indonesia (2002), Vietnam (2004),

Myanmar (2004), Thailand (2005), China (2005) and Mongolia (2006). The programs aim to build a relationship of trust with not only the government but also the national research institutes of respective countries and promote the documentation for the conservation and use of microbial resources. Through those programs, Japan will continue to transfer to resource-possessing countries the technologies for conservation, collection and utilization of genetic resources, and provide Japanese companies the opportunities to utilize genetic resources. (METI)

- As part of the multilateral cooperation programs pursued by the National Institute of Technology and Evaluation, the Asian consortium consisting of 12 countries, including Japan, South Korea, China, Indonesia, etc. was established (2004) for the purpose of promoting the conservation and utilization of microbial resources. Through the network of genetic resource centers in respective countries, the government will further promote human resources development and shared management of conserved genetic resources. (METI)

2.2 Conservation of microbial resources (Current Situation and Challenges)

Microbial resources are considered to be one of the important biological resources because of their diversity and wide usage. While European countries and the U.S. have been working on the improvement of microbial resources library from early on, Japan was, despite its long history of use of microorganisms for food products, lagging behind in establishment of a shared system for wide use of microbial resources, since the efforts of collecting the resources had been made separately by individual organizations who focus on their own interest. To address this situation, we are working on the improvement of the microbial resources library, mainly at public organizations, through the efforts to gather and centralize scattered collections to promote industrial use of microorganisms.

In the field of agriculture, forestry and fishery, the Ministry of Agriculture, Forestry and Fisheries has been pursuing the Genebank project since 1985, in which the National Institute of Agrobiological Sciences (NIAS) superintends collaborative operations pursued by individual laboratories. Later, NIAS became an independent administrative institution and has been continuing this work under the name of “NIAS Genebank Project.” Also, the Forestry and Forest Products Research Institute (FFPRI) and the Fisheries Research Agency (FRA) are separately engaged in the management of operations specialized in forestry and fishery respectively, to promote systematic collection, conservation and distribution of genetic resources.

In the case where it is physically difficult to integrate collections into one library at a single organization, it is still necessary to establish a network and shared database to make it possible for individual organizations to easily obtain necessary resources from libraries inside and outside the country. For example, we have created the database of the microorganisms of special significance to agriculture, forestry or fishery, and the database contains the information on collected, conserved and character-assessed microorganisms consisting of harmful-to-crops microbes (plant pathogenic microbes) as well as microbes for foods such as fungus, yeast, lactic acid bacteria and *Bacillus natto*. This information is made available through our website, allowing for users' full time access, and we also distribute the information to users. Especially, the library of plant pathogenic microbes contains rare, valuable species, and is widely used in many research activities, including basic research for classification, identification, genetic analysis, etc. as well as applied research for diagnosis of crop disease, development of pest control methods, development of agricultural chemicals, etc. and the library

helps sophisticate agricultural production technologies in Japan. We also conduct collection, character assessment, conservation and distribution of microbial resources of special significance to fishery, including food-poisoning bacteria, marine microorganisms, pathogenic bacteria and virus of aquatic organisms, etc.

In the industrial field, the Biological Resource Center was established inside the National Institute of Technology and Evaluation in 2002, as the core institution engaged in the collection and conservation of biological genetic resources such as microorganisms. The Center conducts information collection and improvement (information on classification, base sequence, genetic functions, etc.) and provides the information together with samples to users. The Center is also working on the project of establishing a library of unknown genetic and microbial resources, for the purpose of promoting industrial use of those resources.

(Specific Measures and Policies)

- The Government will develop effective methods of conserving microbial resources useful for agriculture, forestry, fishery or industrial activities, and promote scientific analysis of them for the purpose of classification and identification. The Government will also promote infrastructural improvement contributive to R&D activities or industrial use of resources, through enhanced efforts for collection, conservation and character assessment of genetic resources, distribution of research materials and information improvement. (METI, MEXT, MAFF)
- For the purpose of promoting collaboration among bioresources centers (BRC) within Japan, 24 domestic BRC organizations (as of the end of fiscal year 2006) have jointly created an online catalogue, and have been promoting networking. (METI, MEXT, MAFF)
- As of fiscal year 2006, the National Institute of Technology and Evaluation has a total of about 40,000 strains of microorganisms and 42,000 DNA clones derived from microorganism, which are made available to researchers and industries. (METI)
- National Institute of Agrobiological Sciences will improve its library of microbial resources by increasing the collection from 24,000 items (as of the end of fiscal year 2006) to 25,000 items (by fiscal year 2010). (MAFF)

3 Use of biomass

(Outline of Measures and Policies)

Biomass is derived from organic matter converted from water (inorganic matter) and carbon dioxide through photosynthesis in plant. Biomass refers to not only phytogenic matter but also excreta of plant-eating animals and food dregs as well. Use of biomass is a part of the carbon cycle in the atmosphere, and therefore does not release any extra carbon dioxide into the atmosphere, unlike petroleum and coal. Since biomass won't be exhausted if used wisely, it can be a sustainable, recyclable resource.

Utilization of biomass would contribute to (1) prevention of global warming, (2) creation of a material-cycle society, (3) development of new strategic industries having competitive strengths through the technology development for biomass utilization, and (4) vitalization of agriculture, forestry and fishery as well as the areas engaged in those industries, through maintenance or improvement of natural recycling functions of those industries and cultivation of new business opportunities for those industries such as energy business, supply of industrial products, etc.

When focusing on the relation to biodiversity, the utilization of biomass through the proper management

of ecosystems (such as thinning of artificial forests, management of community-based forests and grass control in waterside areas and secondary grasslands) would contribute to the conservation of rich biological diversity. Also, biofuels derived from cellulose biomass, such as rice straw or fuel crops, would not cannibalize food supply, and such use of biomass would help preserve farmlands and ultimately contribute to the conservation of biodiversity. In addition, using biomass in a way that takes advantage of untapped resources or wastes would contribute to the promotion of effective use of biological resources.

Japanese government established, during the Cabinet meeting in December 2002, the “Biomass Japan Comprehensive Strategy.” Later in March 2006, this Strategy was revised in response to changing circumstances concerning the utilization of biomass, such as revelation of the pressing need of introducing effective global warming countermeasures.

3.1 Promoting regional utilization of biomass, in the form of Biomass Town, etc.

(Current Situation and Challenges)

Regarding availability and usage rate of biomass in Japan (based on the existing data to our knowledge as of December 2006), waste-derived biomass (including excreta of animals, sludge, black liquor generated from pulp production process, waste paper, food waste, waste wood generated from construction works or sawmills) amounts to 298 million tons, 72% of which are being utilized (we aim to increase it to 80% by 2010), and untapped biomass amounts to 17.4 million tons, 22% of which are being utilized (we aim to increase it to 25% by 2010).

Since biomass is based on organisms, its existence can be observed “widely” but “thinly.” In order to promote the utilization of biomass, it is important to understand such characteristics and establish a regional system allowing for efficient, dispersed utilization of biomass in the form of products or energy. In this light, we have been promoting the “Biomass Town” project, in which municipal governments play the central role in establishing regional comprehensive systems for biomass utilization in wide cooperation with relevant local parties. (“Biomass Town” refers to the area committed to planned promotion of biomass utilization with the goal to reach the usage rate of 90% and 40%, in terms of carbon equivalent value, for waste-derived biomass and untapped biomass respectively.) We aim to increase the number of the “Biomass Town” areas to around 300 by 2010. (As of the end of October 2007, there are a total of 102 Biomass Town areas.)

We will also promote utilization of waste-derived biomass for municipal waster treatment process.

(Specific Measures and Policies)

- Through the joint effort of relevant ministries and agencies, the government will promote the publicity of the Biomass Town Concept, to increase Biomass Towns steadily. (CO, MIC, MEXT, MAFF, METI, MLIT, MOE)
- The government will promote the integrated improvement of the Biomass Town Concept and facility development such as biomass conversion facilities and biomass user facilities. The government will also create model plans, for the purpose of assisting regional voluntary efforts and original ideas. (MAFF)
- With the utilization of the Subsidy for Promoting the Creation of a Sound Material-Cycle Society, the government will assist municipal programs of composting waste-derived biomass and promote facility development to increase facilities to convert biomass into livestock feed or methane. (MOE)

3.2 Promoting domestic production of biofuels

(Current Situation and Challenges)

The Minister of Agriculture, Forestry and Fisheries has clarified existing problems necessary to be solved to extensively increase domestic production of biofuels derived from biomass, and in February 2007, the Minister submitted to the Prime Minister a work schedule of technology development programs to be implemented for materializing such expansion of biofuel production. This work schedule shows a tentative policy for biofuels production, including the use of inexpensive raw materials such as saccharine materials (sugar cane, sugar syrup, etc.) and starchy materials (out-of-standard wheat, etc.) as well as wastes with the utilization of collected waste treatment charges, and the necessity of paying attention to possible cannibalization of food/feed supply. The work schedule also shows a mid-term and long-term plan of promoting the utilization of untapped resources such as rice straw, cellulose materials such as waste timber generated from forest-thinning work and fuel crops.

In order to materialize those plans, it is essential to reduce costs significantly, including costs of producing, collecting and transporting raw materials and production costs of biofuels as well. Also, we need to improve systems and infrastructure to facilitate the use of biofuels, improve energy output-input ratio from the perspective of lifecycle, introduce the CO₂ output-input strategies into various policy measures and promote public understanding of biofuels.

(Specific Measures and Policies)

- Starting from fiscal year 2007, a large-scale biofuel demonstration project has been introduced, covering the entire process from material procurement, production to utilization. The government aims to increase biofuel production to reach annual production of 50,000 kiloliters by fiscal year 2011. (MAFF)
- Starting from fiscal year 2007, the government has been working on technology development for low-cost, high-efficiency production of biofuels. Specifically, the government aims to develop technologies for high-efficiency production of ethanol through breeding and low-cost cultivation of fuel crops and use of non-food materials such as rice straw or wood biomass. (MAFF)
- The government will establish plans on technology development for biofuels and also organize councils to discuss this issue, with the aim to develop technologies to produce cellulose-derived ethanol, which would not cannibalize food supply. The government will also promote institutional development to facilitate smooth utilization of biofuels, aiming to secure good quality of biofuels and fair taxation, based on the principle of “safe, secured and fair.” In addition, with taking into consideration R&D possibilities in Asian countries, the government seeks comprehensive utilization of biomass resources, even beyond the scope of biofuel production, by promoting technology development for the production of general-purpose chemical products from cellulose-derived biomass, and the production of propanol, butanol, etc. (METI)
- Starting fiscal year 2007, in Miyako Island and Tokyo metropolitan areas, the government has been steadily promoting, through intragovernmental joint efforts, the large-scale demonstration project on the gasoline that contains 3 percent bioethanol (E3). The government is also promoting assistance of projects to build the domestic biofuel production facilities that use waste wood generated from construction work. Furthermore, the government will promote technology development necessary for facilitating the practical utilization of the gasoline containing 10 percent ethanol (E10). (MOE)
- Through the utilization of the Subsidy for Promoting the Creation of Sound Material-Cycle Society, the

government will increase or improve the municipal facilities to convert waste-derived biomass to biodiesel.
(MOE)

Section 3 Communication and Implementation

(Basic Concepts)

The materially affluent living we enjoy today stands on mass production and mass consumption, and this lifestyle is one of the major elements that threaten biological diversity. Another major threat to biodiversity is the lack of people's awareness and knowledge, as few are conscious of the significant role of biodiversity to support our living and the opportunities for people to obtain basic knowledge about the biological world has been decreasing.

It is necessary for each of us to understand the importance to hand over rich biodiversity to future generations, by not sticking to the pursuit of convenience and material affluence we could obtain today. It is also important that each one of us will act on our own initiative and review our own lifestyle.

In order to promote people's voluntary efforts, it is necessary to raise and expand public awareness of the significance of the conservation and sustainable use of biodiversity. To this end, communication, environmental education and learning should be promoted aggressively. At the same time, it is important to provide people with not only basic knowledge but also opportunities to have direct contact with nature. In Japan, people have less and less opportunities to have interaction with nature due to the progress of urbanization and industrialization. Increasing opportunities for people to have contact with nature would allow them to recognize the position of human beings as a constituent of natural ecosystems as well as the blessings of biodiversity, and would deepen their understanding of the harmony with nature.

Conservation of biodiversity cannot be achieved through the efforts of the government only. It is essential to attain common understanding among the national and local governments, companies, NGOs and citizens, and all of the parties should make a voluntary commitment in diverse ways through collaboration and cooperation. Actually, the movement toward the promotion of voluntary participation of diverse stakeholders has been growing internationally, as the 8th meeting of the Conference of the Parties (COP8) to the Convention on Biological Diversity held in 2006 adopted the decision on private sector engagement. Also, there is a tendency that more and more private companies are promoting their voluntary efforts, as part of corporate social responsibilities, to contribute to the conservation of biodiversity. In order to make such movement further advance drastically, it is necessary to actively promote economic measures, such as financial support, and human resources development.

It is believed that interaction with nature will assist people in recovering humanity, contribute to children's sound growth, and also help us find correct decisions or behavior in addressing environmental issues. At the same time, people's contact with nature should be made within the scope of sustainable use of natural environment.

1 Communication and public involvement

(Outline of Measures and Policies)

It is necessary to promote communication about conservation and sustainable use of biodiversity, in order to deepen public understanding of the significance of biodiversity and the national strategy on biodiversity and encourage people to take specific actions. Also, in order to promote participation of diverse parties including local governments, companies, NGOs and citizens, it is necessary to clarify contents of participation expectable from each party, and establish the mechanism to promote information sharing and collaboration among diverse

parties including local educational organizations and encourage relevant stakeholders to implement effective measures.

At the same time, many suggest that it is difficult for the general public to understand the significance and positioning of “biodiversity” in our living due to abstractness of the term. As for the definition of “biodiversity” in terms of its relation with our lives, it means not only a wide variety of diverse living creatures but also “flourishing living” thanks to biological diversity and “lively regionality” where both local citizens and indigenous creatures have a lively life.

In order to expand public awareness of such significance of biodiversity in a way that covers all generations including children, it is necessary to clarify the “vision of the future society where people live in harmony with nature” so that people can have positive, joyful impression about the future and learn specifically about their positioning in nature including some new ways of involvement, and we would like to take advantage of the opportunity of COP10 (the 10th meeting of the Conference of the Parties to the Convention on Biological Diversity) to be expected to be held in 2010 in Japan. To this end, we will promote the “Our Life on Biodiversity Project,” which intends to assist diverse parties in making voluntary efforts to promote biodiversity-related measures, by attaining the participation of many citizens and organizations.

1.1 Promoting communication and public involvement

(Current Situation and Challenges)

We have been promoting communication and publicity through various activities including commemorative events on the International Day for Biological Diversity (May 22), exhibition at the Biodiversity Center of Japan, campaigns, distribution of brochures and the utilization of internet. According to the results of the questionnaire survey conducted by the Ministry of the Environment in 2004, about 30% of Japanese people have heard of the term “biodiversity,” and about 10% know the meaning of the term. Thus, the level of public awareness of “biodiversity” is still low. It is necessary to create opportunities for people to consider or recognize biodiversity in their living so that we can hand over our nature-rich lands to future generations.

To this end, we will make efforts to raise public understanding of the significance of biodiversity by using easy-to-understand words and also promote various measures in all social strata through establishing partnership between public and private sectors. It is important to encourage diverse parties, including not only the national government but also local governments, private businesses including companies, NGOs and citizens, to introduce voluntary efforts for conservation and sustainable use of biodiversity as part of their duties or daily activities. It is also necessary to establish the mechanism that promotes collaboration of those parties and create opportunities for the general public to learn biodiversity through experience and participation.

With those objectives in mind, we will promote the following measures aggressively under the name of the “Our Life on Biodiversity Project” as part of preparations for the COP10 to be held in Japan in 2010.

(Specific Measures and Policies)

- In promoting the measures for conservation of biodiversity, the government will call for the wide participation of various parties in all social strata, make specific proposals for drastic promotion of those measures, organize a group of experts who promote partnership between public and private sectors, and

make efforts to raise public understanding of the significance of biodiversity by using easy-to-understand words, so that the measures will be penetrated into the society and respective stakeholders can promote their own initiatives. (MOE)

- In order to widely expand public awareness of the significance of biodiversity and penetrate such attitude in daily living or corporate activities, the government will promote publicity activities through a tie-up with various programs. Also, the government will hold events to increase interest of the general public in biodiversity. (MOE)
- Through making specific proposals, the government will encourage local citizens to take voluntary actions to conserve biodiversity in their areas. (MOE)
- According to the results of the questionnaire survey conducted by the Ministry of the Environment in April 2004, 30.2% of Japanese people “know” or “have heard of the term “biodiversity.” The government seeks to raise this level of awareness to reach or exceed 50% by the end of fiscal year 2011. (MOE)
- According to the results of the questionnaire survey conducted by the Ministry of the Environment in April 2004, only 6.5% of Japanese people “know” or “have heard of the term “National Biodiversity Strategy.” The government seeks to raise this low level of awareness to reach or exceed 15% by the end of fiscal year 2011. (MOE)
- As for the frequency that the term “biodiversity” appears in newspapers, major newspapers (Asahi, Mainichi and Yomiuri) used this term 207 times in total during fiscal year 2006. The government aims to increase this to 300 times by the end of fiscal year 2011. (MOE)
- In order for local governments to autonomously establish or implement appropriate original measures, including the initiatives suitable for natural and social environments in their areas, programs pursuant to national strategies, regional guidelines applied to activities of local companies and citizens, the central government will establish manuals for local governments to follow when establishing their regional biodiversity strategies or introducing the policy of biodiversity conservation to their existing programs or systems. Also, the central government will give publicity to actual local efforts and examples. (MOE)
- Through acquiring wide participation of diverse private sectors, the government will establish guidelines for voluntary corporate activities to autonomously promote efforts toward the conservation and sustainable use of biodiversity, including the biodiversity-conscious way of securing raw materials or procuring/manufacturing and selling products, efforts to conserve biodiversity in their premises (open spaces, plants, offices, etc.), investments or financing activities contributive to the conservation of biodiversity, disclosure of information on how they work on the conservation of biodiversity and status of promoting social contributions. The government will also give publicity to actual efforts and examples of corporate activities. (MOE) [Cited in Chapter 2, Section 3, 2.1]
- The government will deliberate on effective mechanisms that would promote voluntary actions of diverse parties such as the effort to promote agriculture, forestry and fishery designed to help conserve biodiversity. (MOE, MAFF)
- For the purpose of assisting diverse parties in establishing partnerships with other parties, the government will collect and provide necessary information and create opportunities of exchanges, and those activities will be managed by the Environmental Partnership Plaza for Global Environment and the Environmental Partnership Office for Local Environment. (MOE) [Cited in Chapter 1, Section 3, 4.2]
- For the purpose of deepening public interest in and recognition of the significance of biodiversity, the

government will conduct a survey to collect extensive information on the local natural phenomena attributable to global warming, the state of distribution of wildlife, etc. in cooperation with various relevant organizations and experts and through participation of citizens. The survey results will be released to the public. The government will also deliberate on the introduction of a system of monitoring local wildlife. (MOE) [Cited in Chapter 2, Section 5, 2.1 and Chapter 2, Section 6, 1.1]

- In order to enhance performance of rivers as habitats for diverse living creatures, the government will hear opinions of local citizens to have them reflected in river improvement plans. The government will also promote cooperation and collaboration with civic groups in diverse activities such as those for improving biotope, restoring riverside vegetation and embodying attractiveness of rivers in town development plans. (MLIT)
- Through the implementation of the measures mentioned below in “2. Economic measures,” “3. Interaction with nature,” “4. Education and learning” and “5. Development of human resources,” the government will promote voluntary actions of and cooperation among diverse parties including local governments, private businesses including companies, NGOs and citizens. (MOE, MEXT, MAFF, MLIT)

2 Economic measures

(Outline of Measures and Policies)

Economic measures aim to make it possible to achieve policy goals by giving certain economic incentives to respective stakeholders to encourage them to take certain actions that are beneficial to them in terms of economic reasonableness. Those economic measures help achieve the integration of the environmental factors and financial factors that are essential to the materialization of a sustainable society. Administrative measures in this field include subsidies, grants-in-aid and tax incentives.

2.1 Economic measures

(Current Situation and Challenges)

Economic measures to promote voluntary efforts of diverse parties in the field of biodiversity include subsidies and grants-in-aid to be provided by the national government, tax incentives, use of foundations, goodwill fund-raising or financial contributions by civic groups or businesses and forest environment tax to be collected by local governments. In addition, certification systems for environment-friendly products or economic activities also stand on an economy-oriented mechanism.

There are also direct incentives, such as preferential treatment of corporate investments, which intend to encourage companies to introduce biodiversity-conscious projects.

(Specific Measures and Policies)

- In the cases that frictions are observed between wildlife and local citizens, that certain alien species adversely and remarkably affects local ecosystems or people’s living or that it is necessary to introduce measures for conservation or restoration of certain key areas for ecosystem networking, the government will introduce measures to assist municipalities in promoting autonomous activities to conserve biodiversity in their lands. (MOE)
- The government seeks to promote voluntary efforts of private sectors, such as the introduction of certification systems for environment-friendly products or economic activities, hoping that such voluntary

efforts will become widespread in the field of biodiversity. To this end, the government will collect various information including examples of foreign countries. (MOE)

- Through acquiring wide participation of diverse private sectors, the government will establish guidelines for voluntary corporate activities to autonomously promote efforts toward the conservation and sustainable use of biodiversity, including the biodiversity-conscious way of securing raw materials or procuring/manufacturing and selling products, efforts to conserve biodiversity in their premises (open spaces, plants, offices, etc.), investments or financing activities contributive to the conservation of biodiversity, disclosure of information on how they work on the conservation of biodiversity and status of promoting social contributions. The government will also give publicity to actual efforts and examples of corporate activities. (MOE) [Cited in Chapter 2, Section 3, 1.1]

[Subsidy and grant-in-aid]

- The government will promote regional development programs by utilizing financial supports applicable to urban park development programs, comprehensive assistance programs for green zone improvement and greening projects as well as subsidies for improvement of natural environment. (MLIT, MAFF, MOE)

[Assistance through the use of foundations]

- The government will assist civic groups in implementing activities for environmental conservation through the use of the “Japan Fund for Global Environment,” “Children’s waterfront rediscovery project” and “Forest Fund for Green and Water.” (MOE, MLIT, MAFF)

[Tax incentives]

- There are tax incentives such as preferential treatment of financial contributions to designated public interest corporations who are engaged in activities to conserve natural environment including biodiversity, and special tax exemptions applied to income tax, corporate tax or local tax imposed on specific zones of designated areas such as natural parks and protection forests. (MOE, MAFF)

[Compensation]

- We have the Natural Parks Law, the Urban Green Space Conservation Law, etc. that prescribe the protection of those areas contributive to the conservation of biodiversity, and those laws provide for compensations applicable to those land owners who suffer a loss caused by regulations. Also, as far as designated green conservation areas, such as natural parks, are concerned, the government may purchase private lands. (MOE, MLIT)

[Financial contributions by citizens]

- The government will promote publicity, education and other measures to promote the effective utilization of goodwill financial contributions made by private citizens or companies for conservation of biodiversity. Those measures include the National Trust Movement that intends to use financial contributions made by citizens to purchase nature-rich private lands to manage the lands for the purpose of nature conservation, and greening projects carried out by the Greenery by Golfers Group. (MOE)
- The National Land Afforestation Promotion Organization and prefectural Afforestation Promotion

Committees have been promoting the “green feather fund movement” in accordance with the Law concerning the Promotion of Forest Development through the Green Fund, to utilize funds to protect forests and promote greening. (MAFF)

3 Interaction with nature

(Outline of Measures and Policies)

The government promotes the efforts to increase the opportunities for people to have interaction with nature through various events such as nature observation programs. Also, special focus is placed on children, as it is believed that such opportunity of “hands-on” nature experience in the early stage of growth would increase their love of nature and help develop their intellectual interest in biodiversity as well as the attitude for nature conservation and ultimately lead to their sound growth as a human being. The government also promotes information provision through the utilization of internet.

In order to ensure the conservation of natural environment, which is one of the principles of the Ecotourism Promotion Law, the government will make sure of appropriate operation of ecotourism by paying attention to biodiversity, introducing monitoring practices of natural environment, securing the conservation of natural tourism resources and establishing rules to be observed by tourists. The government will also promote publicity and education through the efforts to accumulate know-how, promote information sharing and increase the areas dedicated to nature conservation.

3.1 Promoting people’s interaction with nature

(Current Situation and Challenges)

Although nature observation events and other “be-friendly-to-nature” programs are held nationwide from time to time, the opportunities of interaction with nature have not been widespread among the general public yet. People seem to be seeking such opportunity, but in reality, it seems difficult for people to realize it, partly because parents have less and less contact with nature and therefore tend to be unsuccessful in providing substantial nature experiences for their children or teaching the way of interacting with nature. Also, accessible places for hands-on nature experience as well as information on such places are insufficient. In order to correct such state of things, it is necessary to develop programs to provide children with the opportunity to play in nature and deepen interest in and understanding of nature. It is also necessary to develop human resources to support such programs, and comprehensively promote, through joint efforts of diverse parties, provision of information on where such programs are available. The government has been already promoting those efforts in cooperation with NGOs, but needs to further enhance the efforts, jointly with various organizations, in diverse fields covering not only primitive nature but also urban nature close to citizens.

In the meanwhile, there are problems such as adverse impacts on a natural environment of tourism, despite its aim to promote interaction between people and nature. Thus, the idea of sustainable use of a natural environment is not yet fully penetrated among the general public. Under such circumstances, the Ecotourism Promotion Law was established in June 2007. It is necessary to promote wide and substantial acknowledgement of ecotourism in accordance with the principle of the Law and promote appropriate implementation of ecotourism by achieving a consensus with local citizens.

(Specific Measures and Policies)

[Measures for natural parks, etc.]

- The government will implement nature observation programs and promote public awareness campaigns on natural environment conservation at natural parks that have exceptional natural environments. The government will utilize brochures and Internet websites to publicize Japan's wonderful natural environment at home and abroad and will develop and provide information to deepen citizens' understanding about the natural environment and their interaction with nature. (MOE) [Cited in Chapter 1, Section 2, 2.3]
- The government will promote learning and education about the environment, ecotourism and other programs for the consideration and implementation of qualitative improvements to the use of natural parks. The government also aims to increase the number of accesses to the website, "Ecotourism Map," – which introduces its efforts for ecotourism and provides tour programs and accommodation information – from 831,208 in FY2006 to 1,250,000 in FY2010. [Cited in Chapter 1, Section 2, 2.3]
- The government will consider and implement designation of access control districts and guidance of use under the Natural Parks Law and other measures, to disperse and level out use of natural parks. (MOE) [Cited in Chapter 1, Section 2, 2.3]
- Targeting children, the government will promote programs to provide hands-on experiences to appreciate nature with five senses, by utilizing after-school hours or operating learn-through-experience programs such as a long-term rural stay at an agricultural, fishing or mountain village or a trial experience as a park ranger engaged in nature protection at a national park. Such experiences of having contact with nature, ranging from primitive nature to accessible nature, would allow children to learn blessings of nature and obtain a variety of knowledge concerning the relationship between nature and mankind, and would lead to their sound growth as a human being. The government aims to increase the number of youth participants in the park ranger program from 840 in fiscal year 2005 to 1,300 by fiscal year 2010. (MEXT, MAFF, MLIT, MOE) [Cited in Chapter 2, Section 3, 4.2]
- By promoting people's participation in volunteering activities at parks as a natural park guide, etc. the government seeks to ensure appropriate use of natural parks and improve nature conservation activities. (MOE)
- Through diverse events including "Greenery Month," "Get-to-know Nature Movement" and "National Nature Trails Walking Month," the government will carry out a variety of activities nationwide to provide people with the opportunity to observe and appreciate nature. The government will also provide information, through the internet, on facilities and events for having interaction with nature. Through those measures, the government will further increase opportunities for people to have contact with nature. (MOE, MLIT)
- On the website, "Internet Nature Institute," which provides extensive information on nature including national parks, the government will improve, review and update contents, to contribute to the promotion of people's interaction with nature. (MOE)

[Measures for forests]

- The government will promote the "Forest Kids Club Activities" which intends to provide children with an introductory learning opportunity through hands-on experience in a forest. At the same time, the government will promote the improvement of forests and relevant facilities that can be used for

educational programs for children, develop human resources necessary for those programs, and also promote improvement and utilization of school forests. Thus, the government will accept more educational programs to take place in a forest and also promote publicity for forest education. (MAFF, MEXT) [Cited in Chapter 2, Section 3, 3.2]

- The government will promote the activities of the “All Japan Junior Green Friends Federation” which has been organized for the purpose of developing children’s love of nature, attitude for nature conservation and sound and cheerful mentality. (MAFF)
- By utilizing the “Yuyu-no-mori” program and other educational programs to take place in national forests, the government will promote education on forest environment. (MAFF)

[Measures for rural areas and Satochi-Satoyama areas]

- The government will improve or enhance the implementation of the “Research of Organisms Living in Paddy Fields” which intends to obtain information on the environment and wildlife in rural areas. Here, rural water environments including paddy fields and water channels are regarded as people’s learning place and playgrounds. (MAFF, MOE) [Cited in Chapter 1, Section 6, 1.6]
- Targeting the national government parks having the Satochi-Satoyama environment with rich biodiversity, the government will continue to promote the efforts to improve and conserve the environment by inviting citizens to participate in the efforts. The government will also provide firsthand learning programs for the study of a precious natural environment of those parks and history and culture of surrounding areas. Thus, the government seeks to promote the effective utilization of such environment as the center for promoting regional efforts to ensure local citizens’ environment-friendly behaviors toward the creation of a sustainable material-cycle society of low environmental load. (MLIT)

[Measures for urban cities]

- Using urban parks, the government carries out a variety of educational programs on the environment based on hands-on experience to learn the ecology of living creatures and nature mechanism there, in cooperation with local NPOs and schools. The government will continue to promote training of volunteers engaged in those educational programs and the creation of new programs. (MLIT)
- In order to give extensive publicity to the important role of sewerage, including its function of managing water cycle in urban cities and controlling pollution load of effluents discharged into public waters, the government will promote information sharing between sewage treatment service managers and local citizens. The government will also ensure that, through environmental education, the role of sewerage and its contribution to the conservation of diverse ecosystems will be clearly known to the public so that children will understand accurately the sewage system and the role of sewerage in river basins. The government will also create opportunities for children to visit sewage treatment facilities. Those facilities will be effectively utilized as the place of learning for children. (MLIT)
- Vast green areas in the national gardens located in midtown areas (such as the Outer Gardens of the Imperial Palace, Shinjuku Gyoen and Kyoto Gyoen) could be conveniently used for environmental education. All of those national gardens have some historical remnants or cultural assets, and are therefore suitable for history studies. The government will take advantage of those existing natural environments and cultural backgrounds to promote environmental education. Especially in Shinjuku

Gyoen National Garden, which celebrated its 100th anniversary during fiscal year 2006, the “Mother and Child Forest” was renewed and opened in February 2007, and the government will utilize natural resources there to offer new environment education programs. (MOE)

[Measures for rivers]

- With the aim of promoting children’s hands-on experience at rivers, MLIT, MEXT and MOE, in cooperation with local teachers, municipalities and private organizations, will promote the “Children’s Waterfront Rediscovery Project,” which encourages registration of suitable waterside areas and children’s usage of such areas. [Cited in Chapter 1, Section 8, 4.1 and Chapter 2, Section 3, 4.2]
- In order to promote environmental education for children, the government will actively offer assistance to the educational programs utilizing rivers, and will give publicity to those programs through the internet. (MLIT)
- The government believes that river water survey using its inhabitants as index will give people an opportunity to discover their immediate natural environment, which accordingly will raise their awareness on environmental issues. For this reason, the government will continue participatory aquatic-life surveys. [Cited in Chapter 1, Section 8, 5.4]

[Measures for fishing villages]

- In addition to promoting creation of fishing villages that use charming regional resources including rich biodiversity, the government will deepen people’s understanding and interest in the fishing industry and fishing villages by promoting the exchanges between cities and fishing villages through hands-on experiences and contact with nature and promoting settlement of residents, and thereby activate fishing villages. (MAFF) [Cited in Chapter 1, Section 9, 2.3]

[Measures for ports]

- In cooperation with local governments and NPOs, the national government will carry out the “Coastal Nature School” program nationwide which intends to provide hands-on nature experience and environmental education with the utilization of a coastal natural environment. (MLIT)

[Cross-regional measures]

- In accordance with the policy for intragovernmental collaborative actions established by the “Project Team on Complementarities and Interrelationships between Urban and Rural Areas,” the government will carry out the “Project for Promoting Children’s Hands-on Activities in the Rural, Mountainous or Fishing Villages,” which intends to provide elementary school children with the opportunity to experience firsthand rural life through a one-week stay at an agricultural, mountain or fishing village. For the next five years, the government will carry forward preparations for accepting participants in the Project, where the government seeks to obtain the participation of 23,000 schools nationwide (1.2 million students per grade). (MIC, MEXT, MAFF, MOE) [Cited in Chapter 2, Section 3, 4.2]
- For assisting children’s sound growth and humanity development, the government will establish, in cooperation with relevant ministries and agencies, the regional networks connecting local organizations

and groups to ensure continuous, collaborative promotion of diverse education programs based on hands-on experience. (MEXT, MAFF, MLIT, MOE, METI)

- For assisting young people's development of ambition and sociability and increasing the opportunities for the youth to have hands-on nature experience as the foundation of environment studies, the government will promote youth programs in a way that targets each and all development stages of children and young people. Such opportunities include hands-on nature experience for small children, summer camp during summer holidays, and training course for youth leaders through long-term hands-on nature study. (MEXT)
- By using national youth education facilities of the National Institution for Youth Education, the government will provide young people with learning opportunities on the environment through hands-on experience, such as observation of plankton, etc. in lake water, monitoring of water quality of rivers, observation of animals and plants, etc. (MEXT)

[Promoting ecotourism]

- The government will give an award to excellent ecotourism programs and also hold ecotourism seminars nationwide, to accumulate and share know-how about utilization and conservation of regional natural resources. (MOE)
- For the purpose of acquiring public awareness of the policy and aims of the Ecotourism Promotion Law to be entered into force in April 2008, the government will promote publicity and education activities nationwide for the first five years. The government will also provide assistance to the municipalities dedicated to the promotion of ecotourism, and implement measures to assist regional efforts in establishing a "comprehensive plan" pursuant to the Law. (MOE)
- By operating the website that provides information on eco tours for diverse tourists, the government will make domestic tour information available and also newly establish English pages to publicize the appeal of Japan's beautiful nature to the world. (MOE)
- As part of the efforts to increase people's interaction with nature and raise public understanding of nature mechanism, the government will improve waterside footpaths and promote environment-conscious tourism. (MLIT)

[Promoting green tourism]

- With the aim to increase opportunities for people to experience firsthand rural life through "green tourism" which intends to provide people with relaxing vacation at a nature-rich agricultural, mountain or fishing village, the government will continue to promote human resources development for instructors, escort staff (regional guide) and coordinators to be engaged in planning and arrangement. (MAFF)
- Through the use of websites, the government will provide urban citizens with information on green tourism, rural villages, tour programs for hands-on agriculture, forestry or fishery experience and rural private houses. The government will also offer the opportunities for people to learn agricultural, mountain or fishing villages through the use of diverse media or "green tourism fairs" to be held in urban cities. (MAFF)

3.2 Providing the opportunities of interaction with nature

(Current Situation and Challenges)

The government will promote the utilization of a natural environment for increasing people's interaction with nature. Such natural environment include "natural parks" in which people can interact with indigenous nature and learn nature mechanisms, "forests" which can be used for environmental education contributive to people's enhanced understanding of and interest in the multifaceted functions of forests as well as the significance of forestry or use of wood, "rural areas," "Satochi-Satoyama areas" and "fishing villages" where people can learn the relationship between business and nature, "urban parks" which offer accessible natural environment allowing for safe utilization and "water areas such as rivers, ports and coastlines" which are close to people and support people's living. It is necessary to ensure that use of a natural environment is made in a way that secures safety and comfort and satisfies needs of citizens. It is also important to ensure appropriate use of a natural environment so that vegetation or habitats won't be exhausted or destroyed.

Taking a walk along a long-distance nature trail that connect diverse natural environments such as forest, river, coastal area, rural scenery and townscape as well as historical and cultural resources would provide you the opportunity to appreciate diverse ecosystems and natural/cultural landscape. The nationwide network of long-distance nature trails we have today can be converted to the total length of 26,000 kilometers, and it is hoped that those nature trails will be utilized more effectively as a tool to increase opportunities for people to learn firsthand and deepen understanding about multiple facets of biodiversity.

(Specific Measures and Policies)

[Measures for natural parks, etc.]

- For national parks, the government will develop mountain climbing trails (through such measures as installation of signs, scour repair and vegetation restoration), information facilities at major park entrances and long nature trails that organically link natural parks with exceptional natural environments and cultural properties together. The government will also promote human interaction with nature and expand facilities for providing information on nature. (MOE) [Cited in Chapter 1, Section 2, 2.4]
- An area where ecosystems have disappeared or changed in National Park, the government will rejuvenate or restore forests, wetlands, tidal flats, seaweed beds or the like. (MOE) [Cited in Chapter 1, Section 2, 2.4]
- For quasi-national parks, the government will provide natural environment development subsidies to support local governments' programs to take advantage of regional characteristics to develop places for human interaction with nature and to conserve and restore natural environments. (MOE) [Cited in Chapter 1, Section 2, 2.4]
- In order to prevent the destruction of vegetation and disturbance of wildlife habitats through concentration of visitors and other forms of overuse at natural parks, the government will implement appropriate facility provision, including the construction of boardwalks at wetlands and installation of off-limits fences at alpine plant communities. (MOE) [Cited in Chapter 1, Section 2, 2.3]

[Measures for forests]

- The government will promote the improvement of forests and relevant facilities that can be used for educational programs for children, develop human resources necessary for those programs, and also promote improvement and utilization of school forests. Thus, the government will accept more

educational programs to take place in a forest and also promote publicity for forest education. [Cited in Chapter 2, Section 3, 3.1]

[Measures for rural areas and Satochi-Satoyama areas]

- The government will promote the environmental improvement of countryside and Satochi-Satoyama areas, by creating spaces for people to have contact with nature, etc, while establishing a consensus on the conservation of biodiversity and promoting infrastructural improvement for the conservation of biodiversity. (MAFF) [Cited in Chapter 1, Section 6, 1.6]
- The government will promote urban agriculture and the creation of spaces for people's contact with wildlife. (MAFF) [Cited in Chapter 1, Section 6, 1.6]

[Measures for urban areas]

- The government will promote facility improvements, targeting learning centers where people can obtain hands-on nature experience or study natural ecosystems, facilities for protection and breeding of animals or plants within zoos and botanical gardens, urban greening botanical gardens equipped with an activity center for environmental education and urban parks including environment contact parks. (MLIT)
- The government will promote the utilization of green areas other than those inside parks. Those areas include open green zones including spaces made available to citizens pursuant to a municipal ordinance. The aim here is to create opportunities for environmental education. (MLIT)

[Measures for fishing villages]

- The government will promote conservation and formation of good fishing village landscape that is approachable for people and inheritance of historical and cultural heritage. (MAFF) [Cited in Chapter 1, Section 9, 2.3]

[Measures for rivers]

- The government will avoid alteration of rivers as much as possible to conserve and create a desirable habitat environment and diverse river views while securing safety of rivers in terms of flood control. Even when identifying any necessity to make an alteration to a river, the government ensures that such alteration will be made to a minimum and that natural characteristics and mechanisms will be maintained to the maximum degree so as to secure the "multiple nature-type river creation" that makes it possible to restore a desirable natural environment. (MLIT)
- The government will organize a council consisting of a river management authority, local government, educational organizations and civic groups to promote regional joint efforts to utilize rivers for creating opportunities of recreation and education for children. This council will be engaged in the improvement of riverside facilities and river structures ("Waterfront School Project"), including waterfront facilities, riverside promenades, rapids, deep pools and little streams. (MLIT)
- Through joint efforts with municipalities, the government will establish regional networks dedicated to the formation of an attractive, lively riverside area based on the effective utilization of river and local characteristics. In order to promote exchanges of those networks, a waterfront plaza will be established and also utilized as the regional activity center. As part of the activities of the waterfront plaza, the government

will ensure a gentle, safe inclination of levees, construct protective river walls having accessibility to riparian areas and improve waterfront open spaces. (MLIT)

- In the riverside areas where a hospital, retirement home or welfare facility is located or where the population of the elderly is dense, the government will promote barrier-free structures such as a slope having accessibility to riparian areas, stairs equipped with handrails and a gentle inclination of levees. The government aims to create attractive riverfront spaces which anyone including elderly citizens, physically handicapped people and children can use safely for relaxation or recreation. (MLIT)
- Any necessary improvement of a river will be made integrally with regional development in a way that ensures conservation of the natural environment of the river and harmony with the natural, historical and social environment of surrounding areas, with the aim to create a desirable “landmark” waterfront zones (“Hometown River Development Project”). (MLIT)
- Targeting the rivers located in central urban districts such as metropolitan areas and their surrounding areas, the government would implement a river improvement project in a way that ensures integral improvement of waterfront environment (“My Town, My River Development Project”) only when the government finds immediate necessity of such project as well as the strong necessity of riverfront improvement and merits which may be expected from such integral improvement of river and surrounding urban districts judging from the status quo of those districts . (MLIT)
- Targeting mountain streams located in the areas having excellent natural and social environments, the government will promote a soil erosion control project with the focus on conservation of water and green. The aim here is to improve a living environment by securing green zones and waterfront spaces, or restore a desirable environment for streams by ensuring harmony with the regional environment, through the efforts to improve landscape or accessibility to riparian areas and recover ecosystems. (MLIT)
- Targeting forest areas contributive to maintenance or enforcement of the flood control function of levees, the government will promote improvement measures in a way that ensures conservation and creation of natural ecosystems and effective utilization of forests for recreation activities such as walking, nature appreciation and hands-on nature experience. (MLIT)

[Measures for ports]

- For the purpose of promoting people’s effective utilization of a natural environment of ports which would deepen their understanding of the significance of such a natural environment, the government is working on the improvement of bay areas which can be used by local governments, NPOs, etc. to provide educational programs on nature and society. (MLIT)

[Measures for coastlines]

- In an effort to improve coastline facilities for seashore conservation, the government will promote area protection, including the facility development of gently inclined walker-friendly coastline dikes as well as improvement of sandy beaches. The government also seeks to promote accessibility to beaches and user-friendliness, and the measures include planting, installation of promenades as well as improvement of a surrounding environment through the introduction of barrier-free structure. Specifically, the government will implement coastline improvement projects and forest conservation projects integrally. Through such integral implementation of sandy beach conservation and soil erosion prevention together with afforestation

as a countermeasure against drifting sand or salt air damage, managed by the Forestry Agency, the government aims to promote the creation of beautiful, nature-rich and user-friendly beaches as typified by white sands and green pines (Project to recover sea and forest with bountiful nature “Recovery of White Beaches and Green Pines”). (MAFF, MLIT)

- Through the utilization of a beautiful natural environment at beaches and cooperation between MLIT, MAFF and MEXT, the government will promote safety and accessibility of beaches with a hope that seaside intergenerational exchanges will be increased (“Project for Recreation and Hands-on Experience”). (MAFF, MLIT)

[Long-distance nature trails]

- Regarding the project of long-distance nature trails, a long period of time has passed since the project plan was initially established for each trail, and the initial plan is no longer suitable for the present state of things, as some trails have been divided into sections by a disaster or city development and the advent of a new public transport or other attractive resources have changed people’s needs. Therefore, the government will review the plan to make it suited to the actual regional conditions, and will also steadily promote the improvement of each trail to raise the level of appeal for users through the utilization of the subsidy for improvement of natural environment. (MOE)

4 Education and learning

(Outline of Measures and Policies)

In December 2006, the Fundamental Law of Education was revised to newly express, as one of the five objectives of education, the aim of “fostering an attitude toward respect for life, nature protection and dedication to environmental conservation.”

The basic principles of environmental education and the responsibilities of the respective stakeholders are specified in the “Law concerning the Enhancement of Willingness for Environmental Conservation and Promotion of Environmental Education” (hereinafter referred to as the “Law for Environmental Conservation Activities and Promotion of Environmental Education”). In September 2004, the basic guidelines for the promotion of environmental education were established under the Law.

In 2005, the United Nations Decade of Education for Sustainable Development (ESD) commenced as proposed by Japan. Since then, respective countries in the whole world have been promoting measures to meet their regional needs. Japan, as one of the advanced countries responsible for taking the initiative in promoting environmental conservation, needs to further promote measures such as education contributive to comprehensive environmental, economic and social development, and also carry forward personnel strategies to secure human resources to participate in the efforts of establishing a sustainable society. In Japan, one of our challenges is that we do not have sufficient specialists who could lead environmental education and human resources development. In pursuing such measures, it is important to establish intragovernmental cooperation as well as cooperation among the government and other relevant parties such as NGOs, universities and research institutes.

In the report titled “Becoming a Leading Environmental Nation in the 21st Century” established by the Cabinet members in June 2007, the government explains its strategy of human resources development to contribute to the creation of “a society in harmony with nature,” “low carbon society,” and “sound

material-cycle society,” and clarifies its plan titled “21st Century Environmental Education Initiatives—to provide Environmental Education for Anyone, Anywhere, and at Any Time,” which says that diverse high-quality environmental education programs should be prepared and provided throughout a lifetime to families, schools, communities and companies.

4.1 School education

(Current Situation and Challenges)

At schools, it is quite important to deepen children’s understanding of the environment including biodiversity and nurture their attitude of taking voluntary actions to protect the environment.

Schools have been providing environmental education through the entire curriculum in a way that integrates with social studies, science or moral education. According to the current official guidelines for school teaching, it is suggested that teaching about environmental issues should be promoted in each subject including science and that “classes of integrated study” should be utilized to enhance environmental education by giving students hands-on experiences or opportunities to make problem-solving efforts. The government continues to ensure that environmental education will be promoted at schools in accordance with the aims of the revised Fundamental Law of Education.

(Specific Measures and Policies)

[Improving contents of education]

- Japan will participate in the “Global Learning and Observations to Benefit the Environment Program (GLOBE Program)” initiated by the United States, and designate GLOBE participating schools. (MEXT)
- The government will hold events for promoting environmental learning to publicize excellent examples of environmental education practices nationwide and provide opportunities of information exchanges. (MEXT)
- The government will conduct research on the effective utilization of independent specialists such as NPO personnel for environmental education and methods thereof, and will publicize research results. (MEXT)
- The government seeks up-to-date methods of environmental education in response to the changing social needs including those demanded by the “United Nations Decade of Education for Sustainable Development (ESD),” and will conduct surveys and research necessary for facilitating such efforts. (MEXT)
- The government will promote a variety of programs to provide hands-on nature experiences including rural long-stay programs.
- The government will improve school facilities in a way that ensures low environmental load and harmony with nature, and utilize such improved facilities for environmental education. (MEXT, MAFF, METI, MOE)

[Improving the ability of teachers]

- Targeting community members and teachers dedicated to environmental conservation activities, the government will hold seminars for environmental education and basic training courses for environmental educators. (MEXT, MOE) [Cited in Chapter 2, Section 3, 5.1]
- Targeting supervisors of prefectural boards of education and teachers, the government will provide training with the aim to improve their ability as an environmental educator at school. (MEXT) [Cited in Chapter 2, Section 3, 5.1]

- The government is working on the creation of a teachers' guidebook that explains the meaning and role of environmental education at schools and also shows practical examples of teaching. (MEXT, MOE)

4.2 Measures to be implemented outside schools and life-long education

(Current Situation and Challenges)

Although the attitude toward environmental conservation of every citizen seems to be improving, such an attitude is not necessarily connected with specific actions. Therefore, the government needs to have high-quality, action-inspiring environmental education programs available “anytime, anywhere and to anyone.” Through the implementation of the “21st Century Environmental Education Initiatives—to provide Environmental Education for Anyone, Anywhere, and at Any Time” and other programs, the government is planning to provide better environmental education not only at schools but also at museums and other social education facilities. The government also aims to create opportunities for people to have hands-on nature experiences at agricultural villages, forests, waterfront areas, beaches, etc. or to experience the wisdom of employing an environment-friendly style of living through cultural studies. Through those measures, the government seeks diversification of environmental education programs involving learning of biodiversity so that all societal members including families, schools, communities and companies can receive high-quality environmental education throughout a lifetime.

(Specific Measures and Policies)

- As part of social education measures, the government will promote volunteering activities to be performed by local residents, and will provide assistance for regional efforts to promote learning on environmental issues and other regional problems. (MEXT)
- Targeting zoos, botanical gardens, aquariums and natural museums, the government continues to promote facility improvement to assist diverse learning activities, with the aim to improve the functions of museums as the place to stir people's intellectual interest and spirit of quest. (MEXT)
- The government will promote the utilization of natural monuments for environmental education, and improve facilities for such utilization, while providing continuous assistance to local governments in promoting learning activities through the use of natural monuments. (MEXT)
- Targeting children, the government will promote programs to provide hands-on experiences to appreciate nature with five senses, by utilizing after-school hours or operating learn-through-experience programs such as a long-term rural stay at an agricultural, fishing or mountain village or a trial experience as a park ranger engaged in nature protection at a national park. Such experiences of having contact with nature, ranging from primitive nature to accessible nature, would allow children to learn blessings of nature and obtain a variety of knowledge concerning the relationship between nature and mankind, and would lead to their sound growth as a human being. (MEXT, MAFF, MLIT, MOE) [Cited in Chapter 2, Section 3, 3.1]
- In accordance with the policy for intragovernmental collaborative actions established by the “Project Team on Complementarities and Interrelationships between Urban and Rural Areas,” the government will carry out the “Project for Promoting Children's Hands-on Activities in the Rural, Mountainous or Fishing Villages,” which intends to provide elementary school children with the opportunity to experience firsthand rural life through a one-week stay at an agricultural, mountain or fishing village. For the next five years, the government will carry forward preparations for accepting participants in the Project, where the government

seeks to obtain the participation of 23,000 schools nationwide (1.2 million students per grade). (MIC, MEXT, MAFF, MOE) [Cited in Chapter 2, Section 3, 3.1]

- The government will implement the project of “Junior Eco-Club” which aims to assist children’s voluntary learning and activities for environmental conservation. (MOE)
- The government will improve the database on environmental education and learning programs, collect relevant information on knowledge, places, tools and examples concerning environmental education and learning, and will make such information available to diverse parties. (MOE)
- By establishing collaboration among diverse parties including schools, companies and the mass media, the government will promote environmental education in a way that ensures wide publicity oriented to local communities. (MOE)
- Targeting those districts that are successful in employing ESD practices rooted in local communities, the government will promote the creation of original learning tools and programs to meet regional needs. Through the publicity of those successful examples, the government seeks expansion of ESD oriented to local communities. (MOE)
- The government will promote the development of environmental education programs for small children applicable to diverse fieldwork, with the aim to expand the use of such programs in kindergartens and nursery schools. (MOE)
- The government will promote the creation of environmental education tools designed for after-school learning activities, and implement after-school environmental education in cooperation with diverse local organizations. (MOE)
- For the purpose of assisting diverse parties in establishing partnerships with other parties, the government will collect and provide necessary information and create opportunities of exchanges, and those activities will be managed by the Environmental Partnership Plaza for Global Environment and the Environmental Partnership Office for Local Environment. (MOE) [Cited in Chapter 2, Section 3, 1.1]
- With the aim of promoting children’s hands-on experience at rivers, MLIT, MEXT and MOE, in cooperation with local teachers, municipalities and private organizations, will promote the “Children’s Waterfront Rediscovery Project,” which encourages registration of suitable waterside areas and children’s usage of such areas. (MLIT) [Cited in Chapter 1, Section 8, 4.1 and Chapter 2, Section 3, 3.1]

5 Development of human resources

(Outline of Measures and Policies)

For realizing the conservation and sustainable use of biodiversity, we are highly in need of those specialists who have expertise in this field or have the ability of teaching the significance of biodiversity to the public. Also, in all fields, it is important to develop the human resources dedicated to the promotion of environment-friendliness of socioeconomic systems including corporate activities. Furthermore, it is important to secure and develop the manpower that could publicize Japan’s environmental efforts to the world, or facilitate the employment of Japan’s achievements in international initiatives such as the Convention on Biological Diversity, or collect and convey up-to-date knowledge. It is believed that development of such human resources could be achieved quite effectively when promoted through collaboration of diverse parties including universities and NPOs, and such collaborative efforts have been actually increasing. In this light, the

government seeks promotion of training and collaboration of diverse parties as part of strategies for human resources development, and also aims at utilization of registration systems for personnel strategies.

5.1 Development of human resources

(Current Situation and Challenges)

In order to develop the human resources contributive to the conservation and sustainable use of biodiversity, it is necessary, needless to say, to provide each citizen opportunities to accumulate experiences or good results through participation in environmental protection activities, but additionally, it is also necessary to promote professional education at institutions of higher education, on-site training or practical learning, participation in international meetings, practical experiences at international organizations and cooperation with private sectors such as NGOs, which are already in progress. More than 90% of Japanese universities run a class on a subject relevant to the environment, such as “the environment and mankind” and “socioecology.”

(Specific Measures and Policies)

- The government will promote training of park volunteers, education for instructors and other personnel responsible for supporting nature studies at nature contact facilities such as visitors’ centers or other public facilities to improve their planning ability or instruction skills, and will also promote development of professional instructors at nature schools and professional guides for ecotours. (MOE)
- The government will assist the operation of “Coastal expert training course (coastal area ecotourism instructor training seminar)” which aims to develop instructors for seaside activities or environmental education and is designed for men and women 18 years old or older. It is planned that this seminar will be held in major cities nationwide in cooperation with local governments, educational organizations and NPOs. (MLIT)
- Targeting community members and teachers dedicated to environmental conservation activities, the government will hold seminars for environmental education and basic training courses for environmental educators. (MEXT, MOE) [Cited in Chapter 2, Section 3, 4.1]
- Targeting supervisors of prefectural boards of education and teachers, the government will provide training with the aim to improve their ability as an environmental educator at school. (MEXT) [Cited in Chapter 2, Section 3, 4.1]
- Through the official registration of “environmental counselors” who have expertise and experiences in the field of environmental conservation, the government will promote wide utilization of those human resources. (MOE)
- The government will register those privately operated manpower management programs that aim to foster or accredit specialists in the field of environmental conservation or environmental education, in which those programs are suppose to satisfy certain criteria for the official registration. The government will promote wide utilization of registered programs. (MOE)
- The government will promote human resources development at institutions of higher education. To this end, the government will assist, through public-private collaborative consortiums, universities and graduate schools in Asian countries in developing the programs to foster environmental specialists, while clarifying the vision for human resources development in the field of the environment in Asia. (MOE)

- With the aim to realize the creation of a low-carbon society by 2050, the government will deliberate on environmental education and long-term ESD practices. (MOE)
- In order to take the leadership in the field of biodiversity, the government will send delegates to international meetings relevant to the Convention on Biological Diversity, with the aim of finding, support and fostering Japanese experts in the field of biodiversity. (MOE, MOFA)[Chapter 2, Section 4, 1.1]
- The government will foster and provide assistance to the instructors engaged in forest improvement activities and the specialists dedicated to the promotion of forest environmental education. (MAFF)

Section 4 International Cooperation

(Basic Concepts)

Conservation and sustainable use of biodiversity is not an issue for just one country but a common issue for human beings. Therefore, it is necessary to use our country's ability to actively promote measures suitable for its status in international society.

Many developing countries have natural environments that are important for the global conservation of biodiversity. Many of them, however, have difficulty in conserving biodiversity appropriately due to their social, economic and technical problems such as increases in population, expansion of economic activities and poverty. Since many local communities depend on biodiversity (biological resources) as the basis of their livelihoods, loss of biodiversity in developing countries leads to poverty as well as environmental deterioration. To promote conservation and sustainable use of biodiversity in developing countries is important for the whole international society.

In encouraging international efforts, it is necessary not only to be actively involved in various treaties and international programs related to biodiversity and to support developing countries, but also to develop the domestic basis for smooth implementation of these international efforts and to promote the activities of local governments or the private sector. At the same time, appropriate environmental consideration is required for cooperation including ODA and the overseas activities of private enterprises.

Japan presents Nagoya City of Aichi Prefecture as its candidate to host the 10th meeting of the Conference of the Parties to the Convention on Biological Diversity (COP10 of CBD) scheduled in 2010, which is the target year for "The 2010 Biodiversity Target" (achieving by 2010 a significant reduction of the current rate of biodiversity loss at the global, regional and national level as a contribution to alleviating poverty and to the benefit of all life on Earth) of the CBD, and also the United Nation's "International Year of Biodiversity." Taking the opportunity of COP10, Japan is required to further promote its active efforts at home and abroad from a global perspective and to demonstrate international leadership in the field of biodiversity.

1 Coordination with Asian and other neighboring countries and Japan's international leadership

(Outline of Measures and Policies)

Under the "Convention on Biological Diversity" (adopted in 1992), various decisions and recommendations are made in the Conference of the Parties to the Convention on Biological Diversity (COP) and the Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA). For example, in COP8, held in 2006, decisions on the inclusion of individual targets to grasp the achievement of "The 2010 Biodiversity Target" and on the participation of private sectors in the Convention were adopted. As a contracting Party to the Convention (concluded in 1993), Japan also needs to implement the measures based on these decisions and recommendations.

Utilizing its standing as a candidate for the host country of COP10 in 2010, Japan will contribute to the discussion for setting next world target to be adopted in COP10, in addition to making positive efforts inside and outside Japan including the implementation of comprehensive assessment of biodiversity.

1.1 Candidate for the host of the 10th meeting of the Conference of the Parties to the Convention on Biological Diversity (COP10) and setting next world target

(Current Situation and Challenges)

2010 is the target year of “2010 Biodiversity Target” of the Convention on Biological Diversity. Actions to be taken to achieve the 2010 Biodiversity Target were shown in the Potsdam Initiative announced in the G8 Environment Ministers Meeting held in 2007.

However, the level of recognition in Japan is low on the status of discussions, decisions, and recommendations of CBD, the Conference of the Parties (COP), and the Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA), including the “2010 Biodiversity Target,” and further outreach and communication are necessary.

In addition to the efforts toward hosting COP10 in 2010, Japan will promote more positively the efforts of international society in the field of biodiversity.

(Specific Measures and Policies)

- In addition to making efforts in the future to enhance the domestic measures based on the decisions and recommendations of the Convention and other meetings, through participation in the meetings related to the Convention (such as COP, SBSTTA, various working groups), the government will contribute to the global conservation and sustainable use of biodiversity by promoting the establishment of an effective international framework and recommending other Parties to implement the decisions of the Convention. (MOFA, MOE, METI, MAFF)
- The government will widely communicate the status of the discussions and the content of main decisions and recommendations of COP and SBSTTA via the internet and other media, and thereby disseminate biodiversity and the Convention on Biological Diversity to the public to encourage their cooperation for the implementation of the Convention. (MOE)
- To take leadership in the field of biodiversity, the government will support domestic experts in the field of biodiversity, by dispatching them to the meetings related to the Convention, for example. (MOE, MOFA) [Cited in Chapter 2, Section 3, 5.1]
- The government will enhance the collaboration with local governments (NGOs, enterprises, neighboring municipalities, the COP10 Committee, etc.) with an eye toward COP10. (MOE, MOFA, MAFF)
- To more effectively promote the measures for biodiversity conservation in the Asia-Pacific region, the government will exchange information on the biodiversity of each country to enhance regional collaboration. (MOE, MOFA)
- The government will hold the expert’s meeting on the major topics for the Convention to discuss the major topics including “Post-2010 Targets.” (MOE, MOFA, relevant government ministries and agencies)
- The government will realize COP10 in Japan and send out to the world messages to show the essence of Japan and of Asia. In addition, the government will contribute to setting the next world target, and, based on the result of COP10, will make efforts in cooperation with the Asia-Pacific region beyond COP10. (MOE, MOFA)

1.2 Implementation of comprehensive assessment on biodiversity by each country

(Current Situation and Challenges)

In the COP8 in 2006, measures to achieve the 2010 Biodiversity Target were discussed, and it was decided to urge the parties to develop their targets for country and regional levels and the relative indicators and to incorporate those targets and indicators into National Biodiversity Strategies.

As for the methods for comprehensive assessment of biodiversity, there are global-scale assessments such as Millennium Ecosystem Assessment (MA) and Global Biodiversity Outlook (GBO), but there is no method that comprehensively analyzes and assesses the status and trends of biodiversity in Japan. It is also considered to be one of the reasons why it is difficult for Japanese people to consider the status of biodiversity and its influence on life familiar and real. For this reason, there is an issue to solve to assess the status and trends of biodiversity in Japan and to inform it to the public in an understandable way.

Japan needs to establish the method of comprehensive assessment concerning Japan's biodiversity and grasp the achievement of its target, to fulfill the responsibility as a party to the Convention on Biological Diversity with an eye toward the so-called "2010 Biodiversity Target"—"a significant reduction of the current rate of biodiversity loss by 2010"—adopted in the 6th meeting of the Conference of the Parties to the Convention on Biological Diversity (COP6) in 2002. Also, Japan needs to demonstrate its international leadership through urging the implementation of comprehensive assessment on biodiversity to various foreign countries as a host country of COP10 in 2010.

(Specific Measures and Policies)

- The government will implement comprehensive assessment on biodiversity with the participation of many experts, summarize it in a way easy to understand, and publish it. (MOE) [Cited in Chapter 2, Section 5, 1.1]
- The government will publish the result of the comprehensive assessment of biodiversity in COP10, and call for the implementation of comprehensive assessment on biodiversity on the country level to other countries. Especially for the Asia-Pacific region, the government will give technical support and will transfer experiences. (MOE)

1.3 Proposal and announcement of SATOYAMA Initiative

(Current Situation and Challenges)

There are some regions in the world where a variety of ecosystem that is specific to the region is either progressively deteriorated or lost due to damaging agricultural activities, too much logging and abandonment of logging areas, and too much grazing of livestock, etc., that do not consider weather, soil, and hydraulic conditions of the place or that exceeds the recuperative strength of nature, due to putting too much importance on short-term productivity in socioeconomic activities. The resulting loss in biodiversity on the earth not only leads to the loss of biodiversity in Japan such as decrease in migratory birds but also exerts big impact on the people's lives in Japan, which depends on overseas biodiversity for the major proportion of its resources such as foods and lumber.

Therefore, in building a sustainable society, it is essential for Japan and for the entire international society to promote building of Society in Harmony with Nature through sustainable and cyclical use of natural resources that matches to the potential of regional environment, in addition to building a Low-Carbon Society

and Sound Material-Cycle Society.

Japan has the wisdom and tradition of not just using nature but using it wisely, collaborating with it, protecting and fostering it, as seen in Satochi-Satoyama (rural landscapes formed by sustainable use of natural resources) areas. In various regions in the world including Asia, there are traditional methods and social systems to use natural resources to coexist with nature. By restoring such wisdom and tradition in our time and further developing and using them, Society in Harmony with Nature appropriate for natural and social conditions in various regions of the world needs to be realized.

In international deliberations related to biodiversity including the Conference of the Parties to the Convention on Biological Diversity, establishment of sustainable use of biodiversity has become an important issue common for developed and developing countries, and it is considered to contribute to its solution.

The Institute of Advanced Studies of the United Nations University advocates the implementation of “Sub-global Assessment of Satoyama and Satoumi in Japan (SGA)” under the framework of Millennium Ecosystem Assessment (MA) and is examining it aiming at the announcement of the result at COP10. For the Assessment, in addition to the cooperation such as the provision of necessary advice and data, Japan will promote the measures for the SATOYAMA Initiative while cooperating with other related international activities.

(Specific Measures and Policies)

- Focusing on Satochi-Satoyama, the government will rebuild the system to harmonize with nature that integrates wisdom and technology of the present age, by using wisdom and tradition to live in harmony with nature as seen in our country’s view of nature and the socioeconomic system. In addition to such methods established in Japan, the government will collect and analyze the sustainable approaches to using natural resources and the social system that exist in various countries, especially in Asia, and establish a common principle to realize a society in harmony with nature realized by using natural resources in a sustainable way in accordance with the potential of the regional environment. (MOE)
- The government named this activity the “SATOYAMA Initiative”—using this common principle of realizing the society in harmony with nature in various regions in the world—and widely called for the participation in the international framework based on this principle, by proposing it and announcing it in international venues such as COP10, in cooperation with international organizations and each country. (MOE)

1.4 Proposal and announcement of Asian National Park Initiative

(Current Situation and Challenges)

Human beings, especially in Asia, often live in a close relationship with nature, and collaboration with and consensus building with regional residents are the common issues. In some of the national parks in Southeast Asia, however, there is friction between local residents and park managers. In some cases, parks are not prepared to receive visitors and do not have many users, and not much benefit is passed onto the region.

Japan has adopted a zoning system and has built up the mechanism to coexist with regional society while leaving beautiful nature for the future, and this can also be an effective method for other regions in Asia.

There is no framework for the management authorities of national parks or other protected areas in Asia to exchange information on each country’s managing method or to build a system to accept users from foreign

countries. It is necessary to build such a system to improve the management level and to decrease the loss of biodiversity by getting the consent of the local residents.

To accomplish the above, the Japanese type of national park system will be announced to the world as a part of a campaign concerning the beautiful nature of Japan.

(Specific Measures and Policies)

- Concerning national parks and other reserves in each Asian country, especially those in East Asia and Southeast Asia, the government names the framework to collect management methods of Japanese-type national parks and advanced examples of each Asian country, to mutually share and transmit information, to make technical cooperation on conservation and management, to improve the level of conservation and management of each country's national parks, and to build the system to receive users as the "Asian National Park Initiative," and will propose and transmit it to Asian countries in international conferences and workshops. At the time, existing frameworks such as the IUCN World Commission on Protected Areas, East Asia Meeting, will be used. By this, the government will contribute to the conservation of biodiversity and sustainable development of regional societies. (MOE)

1.5 Cooperation related to the information on biodiversity protection in the Asia-Pacific region

(Current Situation and Challenges)

The Potsdam Initiative adopted in G8 Environment Ministers Meeting held this year has proposed a mechanism for global integration and sharing of biodiversity information, and thus enhancement of the measures to cooperate on the information on biodiversity conservation has become a worldwide issue.

In the Asia-Pacific region, which has a close relationship with Japan socioeconomically and in environmental conservation and in which decrease in biodiversity is a worry given the expected future rapid economic growth, international effort related to biodiversity conservation information made in cooperation with each country and with related organizations is necessary.

(Specific Measures and Policies)

- While collaborating with existing international programs such as GTI and BGIF, the government will promote cooperation with each country and related organizations by holding expert workshops and trainings within the Asia-Pacific region, regarding the collection, accumulation, integration, and sharing of various information on biodiversity including the Checklist of Species of Wildlife (inventory) that is the basis of the conservation of biodiversity and ecosystem monitoring data. (MOE)

2 Implementation of other conventions related to the Convention on Biological Diversity

(Outline of Measures and Policies)

By strengthening the cooperation with various conventions related to biodiversity such as the following, efforts for biodiversity conservation needs to be made from a global perspective.

2.1 Cartagena Protocol

(Current Situation and Challenges)

"Cartagena Protocol on Biosafety to the Convention on Biological Diversity (Cartagena Protocol, adopted

in 2000)” prescribes, based on the Convention on Biological Diversity, the international framework for import and export of genetically modified organisms, etc. to prevent the impact genetically modified organisms, etc. would exert on the conservation and sustainable use of biodiversity. Japan concluded it in 2003. In February 2004, its domestic law—“Act on the Conservation and Sustainable Use of Biological Diversity through Regulations on the Use of Living Modified Organisms (Cartagena Act)” —was enforced. Appropriate and smooth implementation of the Cartagena Act needs to be secured by taking measures to control the use of genetically modified organisms based on the Protocol.

(Specific Measures and Policies)

- Through appropriate enforcement of the Cartagena Act, the government will promote appropriate and smooth implementation of Cartagena Protocol. (MOF, MEXT, MHLW, MAFF, METI, MOE)
- Through the Conference of the Parties serving as the Meeting of the Parties to the Cartagena Protocol, the government will participate in the examinations on the measures necessary to promote effective implementation of the Protocol. (MOFA, MOF, MEXT, MHLW, MAFF, METI, MOE)

2.2 Ramsar Convention

(Current Situation and Challenges)

The “Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention, adopted in 1971)” aims to promote the conservation and wise use of wetlands that are internationally important as habitats for wild fauna and flora including waterfowl and the animals and plants that are living there. Japan became a contracting party in 1980. After formulating the “New National Biodiversity Strategy,” Japan designated two wetlands in 2002 as Ramsar sites based on the Convention and added 20 sites in 2005. As of 2007, Ramsar sites in Japan cover 130,293 ha at 33 sites. In the future, conservation and wise use of wetlands in Japan need to be further promoted based on the decisions by the Conference of the Contracting Parties to the Convention. In addition, measures need to be implemented to conserve wetlands in Asian regions where the destruction of wetland ecosystems has been progressing in recent years.

(Specific Measures and Policies)

- Among the wetlands considered for registration on the occasion of COP9 in 2005 but not yet registered, and those that have been found through new surveys to meet the criteria for identifying wetlands of international importance, the government will try to register 10 more Ramsar sites in Japan by COP11 (planned for 2011). MOE [Cited in Chapter 1, Section 2, 8.1]
- Following the decisions by the COP, the government will promote comprehensive conservation and wise use of wetlands by implementing monitoring surveys and information development for Ramsar sites, restoration of wetlands, environmental education, relevant public awareness campaigns and other measures, in cooperation with relevant local governments, NGOs, experts and local residents. (MOE, MLIT) [Cited in Chapter 1, Section 2, 8.1]
- Internationally, especially in the Asian region, which is located on the migratory routes of waterbirds flying to Japan, the government will cooperate in promoting the implementation of the Convention and wetland

conservation, by conducting surveys on the status of wetlands, supporting the selection of the candidate sites for Ramsar designation, and raising awareness. (MOE, MOFA)

2.3 CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora) (Current Situation and Challenges)

The “Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES, adopted in 1973)” targets the protection of endangered species by regulating international trade in wild fauna and flora, and Japan became a party to the Convention in 1980. Based on the Convention, Japan controls import and export of the species listed in Appendices I, II and III, in accordance with “Export Trade Control Ordinance” and “Import Trade Control Ordinance” of the “Foreign Exchange and Foreign Trade Control Law” and with the “Customs Law.”

Furthermore, the species listed in Appendix I of the CITES are subject to the regulation of internal trade, i.e. regulation on the transfer of the ownership and/or the right of possession under the “Law for the Conservation of Endangered Species of Wild Fauna and Flora.” Thus, the implementation of the Convention is promoted by appropriate applications of related domestic legislation. However, illegal trade of the species listed in the CITES Appendices is detected even today and further enhancement of effective controls is required.

(Specific Measures and Policies)

- The ministries and the organizations concerned will continue to collaborate and cooperate to prevent and disclose illegal acts. In addition, they will cooperate with the CITES to reduce illegal trade, including that which is done via the Internet, under the CITES. (MOF, METI, MOE, National Police Agency, MOFA)

2.4 World Heritage Convention

(Current Situation and Challenges)

The “Convention Concerning the Protection of the World Cultural and Natural Heritage (World Heritage Convention, adopted in 1972)” targets the protection of the world heritages that are important for all of mankind, and Japan became a party to the Convention in 1992. Based on the Convention, three regions in Japan—Shiretoko, Shirakami-Sanchi, Yakushima—have been listed in the World Heritage List as natural heritage sites.

In addition, cultural heritages such as “Sacred Sites and Pilgrimage Routes in the Kii Mountain Range” and “Iwami Ginzan Silver Mine and its Cultural Landscape” are also listed in the World Heritage List, since their values were recognized as Cultural Landscapes defined in the “The Operational Guidelines for the Implementation of the World Heritage Convention” as “combined works of nature and of man.”

Appropriate conservation of these heritages will be promoted, in addition to the preparation of conditions for recommending and describing new natural heritages. Support for developing countries is also expected.

(Specific Measures and Policies)

- Concerning Shiretoko, Shirakami-Sanchi, and Yakushima that are listed in the World Heritage List, the government will promote appropriate conservation. (MOE, MAFF, MEXT) [Cited in Chapter 1, Section 2, 9.1]

- With regard to “Ogasawara Islands” listed in January 2007 in the Tentative World Heritage List , which indicates the government’s intention to recommend in the future, the government will enhance the measures to secure conservation in cooperation with the organizations concerned. It also promotes the measures for foreign species and the efforts to conserve rare species for about three years after 2007, and aims at recommending it after getting some visible achievement. (MOE, MAFF, MEXT) [Cited in Chapter 1, Section 2, 9.1 and Chapter 1, Section 9, 1.5]
- Regarding “Ryukyu islands (target area is a part of Nansei Islands, from Tokara Islands down to south),” since enhancement of the measures to secure conservation is necessary for important areas such as habitats of threatened species, the government will analyze and evaluate its value as world natural heritage and make efforts for enhancement of reserve setting in cooperation with the region. (MOE, MAFF, MEXT) [Cited in Chapter 1, Section 2, 9.1 and Chapter 1, Section 9, 1.5]
- The government will support Asian developing countries for the recommendations to the world heritage and for the conservation and management of world heritage sites. (MOE)

2.5 International Convention on Oil Pollution Preparedness, Response and Co-operation, 1990 (OPRC Convention)

(Current Situation and Challenges)

The “International Convention on Oil Pollution Preparedness, Response and Co-operation, 1990 (OPRC Convention, adopted in 1990)” targets to establish an international cooperation system to cope with large-scale oil spill incidents, and Japan became a party to the Convention in 1995. Japan also signed in 2007 the “Protocol on Preparedness, Response and Co-operation to Pollution Incidents by Hazardous and Noxious Substances, 2000 (OPRC-HNS Protocol),” which expanded the scope of pollutant to hazardous and noxious substances other than oil. To deal with the OPRC Convention and the OPRC-HNS Protocol, Japan has formulated the Japanese National Contingency Plan for Oil Pollution Preparedness and Response (National Contingency Plan). The National Contingency Plan prescribes that the information map regarding natural and social conditions influenced by oil spill incidents at coastal areas should be developed and appropriate measures should be implemented so that wildlife relief, wildlife impact assessment, and information provision are appropriately performed.

In regard to the vulnerable costal area map, although the system to prepare for oil spill incidents has been established, the vulnerable costal environment map needs to be enhanced and appropriately managed in the future, since hazardous liquid substances have become the object of a National Contingency Plan by the OPRC-HNS Protocol and the coastal terrain of various regions is changing due to the projects such as reclamation. Furthermore, based on the National Contingency Plan, the system to appropriately perform wildlife relief and impact assessment needs to be established.

(Specific Measures and Policies)

- The government will enhance the vulnerable costal area map to cope with the spill incidents of hazardous liquid substances other than oil, and will update the vulnerable area map by including target groups of living organisms (fish, benthic life) and ecological classifications (tidelands, seaweed beds, etc.) based on the change in use of coastal land. (MOE)

- The government will implement trainings for local government staff to cope with incidents, aiming at providing knowledge and skills necessary for wildlife relief. (MOE)

2.6 Antarctic Treaty

(Current Situation and Challenges)

“The Antarctic Treaty (adopted in 1959)” prescribes the matters such as the renunciation of claims to territorial sovereignty of the area south of 60° South Latitude in Antarctica, and Japan became a party to the Treaty in 1960. Antarctica has quite a rare and unique ecosystem including Ross’s seal, and is “world’s national park,” that is, a common property of mankind. Each party to the Treaty obeys the prescriptions in the Treaty and in the “Protocol on Environmental Protection to the Antarctic Treaty (adopted in 1991, entered into force in 1998, hereinafter referred to as “the Protocol”),” and the people involved in research expeditions and tours are given guidance, thereby its environment and rare ecosystem are protected. Japan has formulated the Protocol’s domestic law—Law Relating to Protection of the Environment in Antarctica—and is positively practicing the protection of the environment in Antarctica.

The rules such as the Protocol are examined as necessary and the system for the Antarctic Treaty is closely examined in the annual Antarctic Treaty Consultative Meeting so that the unique value of Antarctica is protected.

Japan not only obeys the international agreements decided in the Antarctic Treaty Consultative Meetings and others but also actively gives information and makes proposals to keep the unique value of Antarctica and further promote the protection of the Antarctic environment in cooperation with other countries and international organizations.

Survey and research are also necessary in the future, since diversity, ecology, physiology, and genetic property of the living organisms on the Antarctic ice sheet and its surrounding area are primarily unexplained.

(Specific Measures and Policies)

- In the Antarctica Environmental Monitoring Technology Guideline Project, the government will make the guidelines for monitoring method at Showa Base and will implement periodical environmental monitoring by the Japan Antarctica Research Expedition. (MOE, MEXT)
- The inspection to another country’s base—the first time for Japan—will be made, to review the mutual check function of the status of observation of the Treaty by the parties to the treaty. The result will be reported in the Antarctic Treaty Consultative Meeting and, when necessary, proposals will be made on a better system for the Antarctic Treaty including inspections. (MOFA, MOE, MEXT)
- Japan’s Antarctic Observation Project, which has been implemented since 1956, has been implementing research and surveys for the ecosystem and biota of Antarctic marine and land. The government will clarify the polar environment and genetic characteristics by using various methods focusing on genetic analysis. (MEXT)

2.7 United Nations Convention to Combat Desertification in Those Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa

(Current Situation and Challenges)

The “United Nations Convention to Combat Desertification in Countries Experiencing Serious Drought

and/or Desertification, Particularly in Africa (UNCCD, adopted in 1994)” is the convention prescribing that the countries and regions influenced by desertification formulate and implement action plans to combat desertification and that developed countries support such measures. Japan became a party to the Convention in 1998.

According to a report (1991) of the United Nations Environment Programme (UNEP), the total area influenced by desertification covers about 25% of total land area on earth (about 3.6 billion ha) and is giving effect on about one sixth of the total world population. The issue of desertification not only gives big impact on biodiversity but also relates closely with global environmental problems such as global warming, and measures are necessary also from these viewpoints.

As the factors of desertification, there are climatic causes and human causes. As climatic causes, drought and acidification of which occurrence is becoming more frequent due to the global warming can be pointed out. As human causes, deforestation due to grazing, cultivation, and extraction of fuelwood can be pointed out. In addition, as the background of human causes, socioeconomical and political factors such as poverty, population increase, and development of market economy exist.

Based on the Convention, Japan is also making efforts to prevent desertification, focusing on the support for developing countries as one of developed countries.

(Specific Measures and Policies)

- As a developed country party of UNCCD, the government will support combating desertification for the developing countries experiencing serious drought and/or desertification through measures including ODA . (MOFA, MOE, MAFF) [Cited in Chapter 2, Section 6, 1.1]
- The government will examine the methods to comprehensively conserve and manage natural resources and implement research and surveys. In addition, the government will provide the scientific knowledge gained by those methods in the Conference of the parties to the Convention and the meetings of subsidiary bodies, and positively tackle the desertification problem in the world. (MOFA, MOE, MAFF) [Cited in Chapter 2, Section 6, 1.1]

2.8 Bilateral Conventions and Agreements for the Protection of Migratory Birds

(Current Situation and Challenges)

Based on “the Convention between the Government of Japan and the Government of the United States of America for the Protection of Migratory Birds and Birds in Danger of Extinction, and Their Environment (entered into force in 1974),” “the Convention between the Government of Japan and the Government of Russian Federation for the Protection of Migratory Birds and Birds in Danger of Extinction and Their Environment (entered into force in 1988),” “the Agreement between the Government of Japan and the Government of Australia for the Protection of Migratory Birds and Birds in Danger of Extinction and Their Environment (JAMBA, entered into force in 1981),” and “the Agreement between the Government of Japan and the Government of the People’s Republic of China for the Protection of Migratory Birds and Their Environment (JCMBA, entered into force in 1981),” Japan is implementing measures to protect migratory birds and their habitat environments, including research on the migratory birds between two countries, information exchange, restrictions on capture, and establishment of protected areas. Furthermore, the trade of species of

birds that are in danger of extinction is controlled in Japan based on the “Law for the Conservation of Endangered Species of Wild Fauna and Flora (enforced in April 1993).”

(Specific Measures and Policies)

- The government will implement bilateral joint studies on the species, prioritizing the rare species such as short-tailed albatross, Steller’s sea eagle and Saunders’ gull, for which there is a substantial necessity for ecological clarification and conservation. (MOE)
- While cooperation with Korea to protect migratory birds is progressing in accordance with “the Agreement between the Government of Japan and the Government of the Republic of Korea on Cooperation in the Field of Environmental Protection (entered into force in 1993),” the government will pursue preparations for the negotiation on bilateral convention/agreement with the Republic of Korea for migratory birds. (MOE, MOFA)
- For migratory waterbirds and their habitats in the Asia-Pacific region, the government will examine the necessity of a framework for bilateral cooperation with other Asian countries and the necessity of multilateral agreement, which would provide a framework for long-term conservation. (MOE, MOFA)

2.9 International Convention for the Control and Management of Ships’ Ballast Water and Sediments, 2004 (BWM)

(Current Situation and Challenges)

The “International Convention for the Control and Management of Ships’ Ballast Water and Sediments, 2004 (BWM)” aims at coping with negative influence on ecosystem caused by aquatic organisms entering into in ship’s ballast water, carried to distant places, and discharged at a place different from its primary habitat. The Convention makes it mandatory to install a Ballast Water Management System to kill or eliminate aquatic organisms in ballast water or, as a provisional step, to change ballast water in broad ocean areas. At present, the formulation of the guidelines prescribing technical matters to implement the Convention and the development of the system are underway.

As one of the world’s major maritime and shipbuilding nations, Japan has hitherto contributed positively to the adoption of the Convention. It is also necessary in the future to promote the works needed for the effectuation of the Convention and the appropriate redemption of the duties in the Convention, including the development of the technology to effectively treat the aquatic organism in ballast water and the examination of necessary domestic system.

(Specific Measures and Policies)

- For ratification of the Convention, the government will promote the examination on the preparation to ratify the Convention in an early stage, by collecting information on environmental influence caused by ballast water, collecting and analyzing basic information on the technology to treat ballast water. (MOE, MLIT) [Cited in Chapter 1, Section 9, 5.1]
- The government will continue to actively participate in the discussion of IMO, including formulation of the guidelines to implement the Convention. (MLIT, MOE, MOFA) [Cited in Chapter 1, Section 9, 5.1]
- The government will contribute to the early entry into force of the Convention by promoting the development of the Ballast Water Management System. (MLIT)

2.10 CMS

(Current Situation and Challenges)

Under the “Convention on the Conservation of Migratory Species of Wild Animals (CMS, adopted in 1979),” it is prohibited to capture the migratory species of wild animals that are threatened with extinction and listed in Appendix I of the Convention. In addition, for the conservation of the species listed in Appendix II, Multilateral Agreements and Memoranda of Understanding (MoU) have been concluded for migratory waterbirds, seals, bats, sea turtles, etc. Under these agreements, development of a conservation and management plan, conservation and restoration of habitats, survey and research, and awareness-raising have been conducted. Japan has not ratified the Convention, since we have different views on the animals for which capture is prohibited by the Convention.

(Specific Measures and Policies)

- In addition to the steady implementation of the bilateral treaties and agreements for migratory birds, the Ramsar Convention and the CITES, which Japan has already ratified, the government seeks to conserve migratory species of wild animals by examining the necessity of dealing with the Convention, including Agreements and MoUs, based on the trend in international engagements concerning this Convention. (MOE, MOFA)

2.11 International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGR)

(Current Situation and Challenges)

The “International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGR, adopted in 2001)” aims to achieve conservation and sustainable use of plant genetic resources for food and agriculture by creating a “multilateral system” to facilitate the provision of plant genetic resources to other countries effectively and to share, in a fair and equitable way, the benefits arising from the utilization of these resources. This Treaty has the significance of promoting the conservation and sustainable use of plant genetic resources for food and agriculture, although there still exist several issues to be solved, such as the undecided details of its implementation and its unclear relation with intellectual property rights.

(Specific Measures and Policies)

- The Government will continue to examine how to handle this Treaty, in light of international trends on this Treaty, the relationship with existing international treaties, and the measures necessary to implement it within Japan. (MOFA, MAFF, METI)

2.12 United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol

(Current Situation and Challenges)

The ultimate objective of the “United Nations Framework Convention on Climate Change (UNFCCC, adopted in 1992)” is “to achieve stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent anthropogenic interference with the climate system.” The Convention also prescribes that “such a level should be achieved within a time frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a

sustainable manner.” Furthermore, the Intergovernmental Panel on Climate Change (IPCC) has pointed out that ongoing global warming might influence biodiversity.

In the 3rd Conference of the Parties to the UNFCCC in 1997 (COP 3 in Kyoto), the Kyoto Protocol (entered into force in 2005) was adopted, which prescribes the legally binding commitment of each developed country to reduce greenhouse gas emissions. Japan is required to reduce its greenhouse gas emissions by 6% below its levels in the standard year (basically 1990) during the period from 2008 to 2012. On the other hand, current emissions (FY2005) are 7.8% above the levels of the standard year and addition and enforcement of measures and policies are required to achieve 6% reduction.

Furthermore, “Beautiful Star 50” proposed in 2007 suggested to “reduce the emissions in the entire world to half of the current level by 2050” as a long-term strategy, and suggested “3 principles” for building an international framework in 2013 and later as a mid-term strategy.

(Specific Measures and Policies)

- To fulfill the 6% reduction target in the first commitment period (2008 - 2012) of the Kyoto Protocol, the government will promote the measures based on the Kyoto Protocol Target Achievement Plan (cabinet decision in April 2005), which will be revised within FY2007. (All government ministries and agencies) [Cited in Chapter 2, Section 6, 1.1]
- Internationally, the government will exercise international leadership to make the next framework after 2013 to be as effective as that being participated in by major emitting countries. (MOE, MOFA, METI) [Cited in Chapter 2, Section 6, 1.1]

3 Implementation of international programs

(Outline of Measures and Policies)

To effectively promote conservation and sustainable use of biodiversity, various types of international cooperation are necessary such as bilateral and multilateral cooperation and the cooperation among developed countries and among developing countries. It is also important for Japan to positively participate in these international programs either directly or through various international organizations.

Especially in the Asia-Pacific region, Japan should play important roles in various programs. Japan will positively participate and cooperate in activities including the international monitoring to grasp the present conditions related to the important components of biodiversity, such as tropical forests, coral reefs, wetlands, habitat of migratory birds, research and surveys, conservation efforts, and the collaboration to share the information on the conservation of biodiversity obtained from those activities.

3.1 Conservation of migratory waterbirds in the Asia-Pacific region

(Current Situation and Challenges)

The “Asia-Pacific Migratory Waterbird Conservation Strategy” was adopted in 1996 under the leadership of Japan and Australia as an international framework to conserve migratory waterbirds and their habitats in the Asia-Pacific region. Its implementation has been promoted in collaboration with the governments of the related countries, international organizations, NGOs and experts, and Flyway Site Networks have been established for shorebirds, cranes and Anatidae. International cooperation among Flyway Site Networks has been implemented, including information exchange and research and surveys carried out on the conservation of migratory birds

and their habitats .

In 2006, with the expiration of the Strategy, “Partnership for the Conservation of Migratory Waterbirds and the Sustainable Use of their Habitats in the East Asian - Australasian Flyway (Partnership for the East Asian - Australasian Flyway)” was established to further promote international cooperation on the conservation of migratory waterbirds and their habitats. Japan has 27 sites that participate in the Flyway Networks partnership. Flyway Site Networks address all migratory waterbirds in the regions. In the future, it is necessary to expand Flyway Site Networks and improve this internationally to promote activities for raising awareness and conservation at sites of Flyway Networks.

(Specific Measures and Policies)

- The government will promote activities such as raising awareness, research and surveys, training and information exchange at sites participating in Flyway Networks. (MOE)
- The government will take measures to expand the Partnership and Flyway Site Networks. (MOE)

3.2 International Coral Reef Initiative (ICRI)

(Current Situation and Challenges)

As one of a few developed countries that have coral reefs, Japan has been promoting, in cooperation with other related countries, the International Coral Reef Initiative (ICRI)—an international framework built in 1994 for the purpose of conserving coral reefs and related ecosystems (such as mangroves and seaweed beds). Coral reefs are facing various threats caused by human activities including extraction as a resource, reclamation, pollution, loss of topsoil, tourism, and increased sea water temperature accompanied with climate change. Global-scale conservation, therefore, needs to be continued in the future.

In practice, the future issues are to designate important coral reef ecosystems to be preserved as marine protection areas and to form a network, to urgently examine the measures to cope with the impact of climate change and marine acidification, and to promote international discussion to conserve mangroves that have close relationship with the conservation of coral reefs by the methods such as reducing inflow of earth and sand from land.

(Specific Measures and Policies)

- Especially in the Asia-Pacific region, the government will contribute to the formation of the marine protected area network by improving the marine protected area database. The government also tries to strengthen and improve the coral reef reserve network by holding in Japan an international conference on the coral reef reserve in 2008, which is the international coral reef year. (MOE)
- Through the “International Coral Reef Research and Monitoring Center (Ishigaki City, Okinawa),” the government will transmit the information on Japan’s research and conservation related to coral reefs. The government also cooperates in the promotion of the research and educational function of the “Palau International Coral Reef Center,” which is a base in the Micronesia region and the establishment of which Japan had supported. (MOE)

3.3 Man and Biosphere (MAB) Program

(Current Situation and Challenges)

Man and Biosphere (MAB) Program was inaugurated in 1970 as one of the international cooperation programs of the United Nations Educational, Scientific and Cultural Organization (UNESCO). Its target is to develop the scientific basis to solve environmental problems, and one of its important pillars is the “Biosphere Reserve” that has three functions, namely conservation of biodiversity, support for logistics, and sustainable development. As of October 2007, 529 locations in 105 countries have been designated as Biosphere Reserves. In Japan, four areas—Yakushima Island, Mount Odaigahara & Mount Omine, Mount Hakusan, and Shiga Highland—have been designated as Reserves by UNESCO.

(Specific Measures and Policies)

- From 2002, Japan has been donating for the Japanese Funds-in-Trust for the Promotion of Science for Sustainable Development (renamed as the Japanese Funds-in-Trust for Solution of Global Issues, in FY2007), and has been positively supporting the network activities in the Biosphere Reserves in the Asia-Pacific region through dispatch and cooperation of university researchers. By the Japanese Funds-in-Trust for the Capacity-building of Human Resources, Japan has been supporting human resource development in this field in the Asia-Pacific region, and is also supporting the establishment of biosphere reserves in East Europe at present. (MEXT, MOFA)
- Based on the worldwide trend, the government will examine the development of new policies to use the mechanism of biosphere reserves such as selection of new candidates for the reserves. (MEXT, MOE)
[Cited in Chapter 1, Section 2, 10]

3.4 Sustainable forest management and the measures to prevent illegal logging

(Current Situation and Challenges)

Forest ecosystem is very important for the conservation of biodiversity, but deforestation and forest degradation have been continuing in the world. For preventing deforestation, it is important to ensure implementation of sustainable forest management. For this reason, international conferences such as the United Nations Forum on Forests (UNFF), and multilateral efforts such as the International Tropical Timber Organizations (ITTO) and the Asia Forest Partnership (AFP), in addition to many bilateral efforts, have been underway. Japan is positively participating in these international efforts, in parallel with its positive effort to promote sustainable forest management through the activities including measures against illegal logging, restoration of wastelands and planting.

In the international trend to promote sustainable forest management, the one that has been promoted worldwide in various regions by the cooperation of each country is the development of “criteria and indicators” to scientifically and objectively grasp and assess sustainability of forest management that is prescribed in the “Agenda 21” (1992) decided by the United Nations Conference on Environment and Development as action plan for sustainable development. Nine major international processes are in progress in parallel in the world. The major processes are the ITTO criteria and indicators for the member tropical timber countries of the “International Tropical Timber Organizations (ITTO),” the “Pan European Process” by temperate forest countries in Europe, and the “Montreal Process” by temperate forest countries other than European countries including Japan. The criteria and indicators of the Montreal Process consist of seven criteria including

“Conservation of biological diversity” and “Maintenance of forest ecosystem health and vitality” and the indicators to practically measure and describe those criteria. Using these methods, whether the handling of a forest is trending towards sustainable direction is judged, by collecting data periodically along with the indicators for each country and region, and by grasping, analyzing, and evaluating their changes.

Furthermore, based on the principle that illegally logged timbers should not be used, in “Japan’s Climate Change Initiative” published for the Gleneagles G8 Summit held in July 2005 in England, the Japanese government announced its intention to introduce measures to ensure that it procures verified legal and sustainable wood and wood products based on the Green Purchasing Law.

To that end, in February 2006, the basic policy for the Green Purchasing Law, which prescribes the items and criteria for judgment of eco-friendly goods to be procured by the government, was revised. What was included as criteria for judgment is that, for the materials (such as timber, laminated lumber, plywood) used for public construction including papers, stationery and office furniture, their raw material timber should be logged in a legal manner according to the law regarding the forests of the country of origin.

Active participation in and contribution to these measures are necessary for further promoting sustainable forest management.

(Specific Measures and Policies)

- Through “Asia Forest Partnership (AFP)” that Japan and Indonesia proposed and was inaugurated in the World Summit on Sustainable Development, the government will practice the activities such as the measures against illegal logging, prevention of forest fire, restoration of degraded land and reforestation, and thereby promote sustainable forest management. (MAFF, MOE, MOFA)
- Through active participation in international policy dialog, the government will play a positive role in international society in cooperation with related countries to promote sustainable forest management including taking measures against illegal logging with a view to conserving biodiversity in the world’s forest resources and mitigating global warming. (MAFF, MOE, MOFA) [Cited in Chapter 2, Section 6, 1.1]
- The government will implement research on the regions facing illegal logging issues and on the impact of illegal logging on forest decrease, global warming and biodiversity, and will propose in international conferences new policies for reducing deforestation and for biodiversity conservation. (MOE) [Cited in Chapter 2, Section 6, 1.1]
- After Canada had served as the secretariat of the Montreal Process since its inauguration, Japan has been the secretariat since January 2007. As the secretariat, Japan will demonstrate its leadership for establishing sustainable forest management in the world and promote international effort for formulating and applying “criteria and indicators” to grasp, analyze, and evaluate sustainability of forest managements. (MAFF) [Cited in Chapter 1, Section 5, 1.13]
- The government will continue sustainable government procurement according to the basic policy related to the Green Purchasing Law. (MOE)
- Japan announced its intention to contribute to the Forest Carbon Partnership Facility (FCPF) launched by the World Bank with the aim of developing the methodology of reducing greenhouse gas emissions through the conservation of forests. The government will actively contribute to reducing deforestation in developing countries and formulating the mechanism for sustainable forest management. (MOF, MOE, MAFF, MOFA) [Cited in Chapter 2, Section 6, 1.1]

3.5 Environmental Samples Time Capsule Program [Cited in Chapter 2, Section 2, 1.2.4]

(Current Situation and Challenges)

To prepare for the time in the future when environmental issues become obvious, it is quite important to appropriately preserve the current global environment to make it possible to analyze and evaluate in the future when the technology advances. For this purpose, this program is to systematically collect and accumulate environmental samples such as soils and samples of living organisms. Especially because wildlife species facing the risk of extinction are increasing due to environmental contamination and environmental changes, information on the cells and genes of threatened species is stored for the time in the future when extinct forms of life can be restored by developed technology.

The threatened birds in Japan include the species that are similar to or are considered to be subspecies of the ones with comparatively large numbers living in East Eurasia such as red-crowned cranes and birds of prey living in Hokkaido. Building cooperative relationships with the countries where these species live will greatly contribute to the protection and breeding of the threatened birds in Japan. Concerned with threatened birds, habitats of many of them spread not only in Japan but also over East Asia and Eurasia, so it is necessary to build an international network concerning long-term storage of cells and genes.

(Specific Measures and Policies)

- The government will collect reproductive cells, initial cells, and somatic cells of the threatened species in the Red List of the Ministry of the Environment, and will target to preserve the cells of 500 kinds of threatened species and to analyze DNAs of important species in five years from FY2008. For aquatic plants, the government will target to preserve 10 kinds of threatened algae per annum, thereby targeting individual conservation of 50 kinds in 5 years. (MOE)
- Especially on the possibility of application of ultralow temperature preservation technology, which is being established in Japan, in Siberia, is the summer nesting site for many kinds of birds, the government will conduct research in Siberia and examine international standardization. (MOE)

3.6 Critical Ecosystem Partnership Fund

(Current Situation and Challenges)

The Critical Ecosystem Partnership Fund (CEPF) is a fund established in 2000 by the Conservation International (CI) and Global Environment Facility (GEF) to support organizations that implement activities to protect the biodiversity hotspots (areas selected as biologically richest yet most endangered) in developing countries. From its establishment to March 2007, the Fund has provided grant of 89.8 million dollars to nearly 1000 projects concerning conservation of biodiversity in 14 hotspots.

Since June 2002, when Japan expressed its participation in the fund in the final preparatory conference of the World Summit on Sustainable Development (WSSD, 2002), Japan has contributed to the Partnership in providing funds and formulating support policies.

The activities under its new strategy framework started in July 2007, and it is expected to further contribute to the conservation of biodiversity.

(Specific Measures and Policies)

- The CEPF Council in July 2007 decided to start cooperation for the conservation of biodiversity in the target areas including newly selected regions, and Japan will also continue positive support for the conservation of hotspots in the developing countries that the CEPF performs. (MOF, MOE)

3.7 Establishment of information system for biodiversity

3.7.1 Global Taxonomy Initiative (GTI)

(Current Situation and Challenges)

Accurate data on the species as components of the ecosystem is necessary for conservation of biodiversity, but COP2 (1995) pointed out that there was overwhelming lack of taxonomists who could conduct research on the matter. COP6 (2002) adopted the Action Plan for “Global Taxonomy Initiative (GTI),” of which the cross-sectoral theme for implementing the Convention on Biological Diversity is advancement of taxonomy, and each country has been making efforts to foster taxonomists and to share taxonomy information.

Japan held GTI workshop in 2002 which was highly evaluated. Further promotion of efforts is necessary.

(Specific Measures and Policies)

- The government will attempt to advance taxonomy research by contributing to regional projects in Asia’s Oceania Region. In addition, it will try to improve access to various kinds of information on taxonomy by developing a taxonomy database and improving management on species samples, and thereby contribute to the clarification of actual conditions of species in the world. In addition, the government will improve organizational capacity for taxonomy researches in the developing countries of the region through research activities. (MOE, MEXT)

3.7.2 Clearing-House Mechanism (CHM) for biodiversity information

(Current Situation and Challenges)

Based on the Clearing-House Mechanism (CHM) Strategy Plan decided in COP5 (2002), measures have been taken to enhance each country’s policies and measures on the conservation and sustainable use of biodiversity by exchanging and sharing various kinds of information on the biodiversity of each country.

The Biodiversity Clearing-House Mechanism is the system to cross-sectionally search and grasp the existence of various kinds of information on biodiversity that many groups and individuals such as governments, universities, museums, and researchers possess, and to enable the promotion of exchanges and circulation of information among each other. Based on Article 17 (Exchange of Information) and Article 18 (Technical and Scientific Cooperation) of the Convention on Biological Diversity, Japan has started operation in July 2004, and is expanding its data steadily as seen in the registration of about 800 metadata (information on information source necessary to search and grasp the location of data) as of June 2006. The present issue for further enhancing the usage is to further increase the number of participation.

(Specific Measures and Policies)

- In regard to the Clearing-House Mechanism (CHM) for Biodiversity Information, the government will strengthen the effort to greatly enrich the registered metadata qualitatively and quantitatively, and almost double the number of registration (about 1600 metadata) by March 2012, and thereby promote enhancement

and information exchange on metadata at home and abroad. (MOE) [Cited in Chapter 2, Section 5, 2.4]

- For making them easy to use for all users, the government will make the access to target information easier and enable the access from abroad to the provided information, and thereby strengthen international transmission of information on natural environment. (MOE) [Cited in Chapter 2, Section 5, 2.4]
- Based on the Strategic Plan of the Clearing-House Mechanism, the government will attempt to accumulate information by promotion of research and surveys in Japan, and will positively promote information exchange with each country from the viewpoint of the support for developing countries. The government also will let researchers know the existence of biodiversity information system, promote usage, and increase data providers. In addition, the government will mutually collaborate various information systems and increase the quantity of information available for users. (MOE)
- In various international conferences held by international organizations including the United Nations Environment Programme (UNEP), Food and Agriculture Organization of the United Nations (FAO), United Nations Educational, Scientific and Cultural Organization (UNESCO), and Organisation for Economic Co-operation and Development (OECD), the government will positively exchange information also in the future, and promote exchange of research and survey information based on bilateral treaties and bilateral science and technology cooperation. (MOE)

3.7.3 Global Biodiversity Information Facility (GBIF)

(Current Situation and Challenges)

The Global Biodiversity Information Facility (GBIF) was inaugurated in March 2001, based on the discussions by the Committee for Scientific and Technological Policy (CSTP) of the Organization for Economic Co-operation and Development (OECD) for the purpose of accumulating data on biodiversity and using it in the world. GBIF is playing the most important role in the operation of taxonomy data information sharing which is one of the measures taken by GTI. In addition, GTI Japan node is transmitting data to GBIF network as one of the data providers for GBIF. As of July 2007, over 110 million data provided by 191 providers are available by GBIF.

Japan's contribution of funds through the Ministry of Education, Culture, Sports, Science and Technology, for its activities is the second highest in the world after the United States. Japan has also established the "Inter-Ministerial/Agency Co-ordination Committee for GBIF" to examine the efforts to be made in the country by the collaboration of each ministry and agency, and serves as Vice Chair of GBIF Governing Board, and thus is positively participating in the activities. Furthermore, the "GBIF Japan Science Committee" has been established, by which domestic experts conduct researches and deliberations from scientific and technical viewpoints.

In regard to the establishment and operation of the base for domestic database, a base was established at the Research Organization of Information and Systems in 2004 to provide sample data in Japan. In addition, the National Museum of Nature and Science has established a base in 2005 in cooperation with domestic natural history museums conducting research and surveys related to the characteristic biodiversity of the region and collecting and storing samples, and has been proving sample data since that time.

(Specific Measures and Policies)

- To positively promote the activities of GBIF in the future based on the discussions of the GBIF Japan Science Committee, the government will build a biodiversity database at the Institute for Bioinformatics Research and Development of which website containing information on the status of GBIF's activities in Japan has been published. Thus collaboration with GBIF will be made in the future. (MOFA, MEXT, Cabinet Office, METI, MAFF, MOE) [Cited in Chapter 2, Section 5, 2.6]

3.8 Acid Deposition Monitoring Network in East Asia (EANET)

(Current Situation and Challenges)

The Acid Deposition Monitoring Network in East Asia (EANET), proposed by Japan as a framework for regional cooperation to prevent the adverse effect of acid deposition on the ecosystem in East Asia, which is rapidly industrializing and urbanizing recently, started its regular operation in January 2001, and 13 countries in East Asia have participated until today. EANET, using a common method, monitors wet deposition and dry deposition of so-called “acid rain,” as well as its impact on ecosystems (soil, vegetation, inland water areas), collects, analyzes and evaluates high-quality data based on quality assurance and quality control, and conducts surveys and research on acid deposition. Thus, EANET promotes international efforts and the formation of common understanding among participating countries regarding the status of acid deposition. Through EANET, Japan provides technical assistance to developing countries participating in EANET, including dispatching technical missions and organizing workshops, and thereby contributes to building capabilities in monitoring technologies and other areas.

In Europe and North America, the adverse impacts of acid deposition on the ecosystems in forests, soil, lakes and reservoirs have been observed. In East Asia, which is rapidly industrializing and urbanizing, there is also concern that acid deposition may cause a serious impact in the near future.

(Specific Measures and Policies)

- The government will continue to grasp the adverse impact of acid rain on the ecosystem at an early stage and promote the study of its mechanism. It also promotes EANET activities to prevent the adverse impact of acid rain in East Asia. (MOE)

3.9 Measures for the Northwest Pacific Region

(Current Situation and Challenges)

For the environmental conservation of international closed water areas, the United Nations Environment Programme (UNEP) has been promoting environmental cooperation called the “Regional Sea Programs” in various regions in the world. In the sea area surrounding Japan, four countries—Japan, China, Korea and Russia—adopted the “Northwest Pacific Action Plan (NOWPAP)” in 1994 to conserve the environment of the Japan Sea and the Yellow Sea. To be responsible for the implementation of each project of NOWPAP and to promote the activities, a Regional Activity Center (RAC) is located in each country. In Japan, the “Special Monitoring & Coastal Environmental Assessment Regional Activity Centre (CEARAC)” has been established.

To effectively use and manage the coastal environment surrounding Japan, the NOWPAP member countries need to make efforts in cooperation with each other.

(Specific Measures and Policies)

- ○ Japan is the host country of the RCU (Regional Coordination Unit, established in Toyama and Busan) that is NOWPAP's secretariat. At the same time, mainly through the support for CEARAC, the government will implement construction of a marine environment monitoring system that uses Remote Sensing Technology and environmental impact research, and attempts to improve the conservation of biodiversity from the viewpoint of environmental contamination in the sea. (MOE)
- ○ With NOWPAP, the conservation of biodiversity will be improved by promoting the measures against the problem of garbage at the sea as one of the pillars for new activities and the measures concerning integrated management of rivers and coastal areas to solve marine pollution caused by land area. (MOE)

3.10 Global Invasive Species Programme (GISP)

(Current Situation and Challenges)

The Global Invasive Species Programme (GISP) is managed jointly by four organizations: the Commonwealth Agricultural Bureaux International (CAB-International), an intergovernmental organization that provides information on agriculture and bioscience; the International Union for Conservation of Nature and Natural Resources (IUCN); the Nature Conservancy, a conservation group in the United States; and the South African National Biodiversity Institute (SANBI). GISP targets to make a list of measures against invasive species by collecting examples of the species and examining the best prevention and management plan. Until now, GISP has made an evaluation of issues on invasive species, a strategy to tackle invasive species, samples for the best prevention and management, and a provisional database.

(Specific Measures and Policies)

- The government will examine the cooperation for GISP. (MOE)

3.11 Group on Earth Observations (GEO)

(Current Situation and Challenges)

In G8 Summit held in Evian in France in June 2003, the importance of earth observation was emphasized from the viewpoint of balancing environmental protection and economic development, in addition to the agreement on holding a ministerial meeting on earth observation. To that end, Earth Observation Summits have been held three times, and the “Global Earth Observation System of Systems (GEOSS) 10-Year Implementation Plan” (hereinafter referred to as the “10-Year Implementation Plan”) was approved in February 2005.

The pillars of the “10-Year Implementation Plan” are (1) to build in 10 years the system to comprehensively observe the earth by the collaboration of various observation systems such as satellite and earth surface observation, (2) to clarify the purposes and concrete approaches and methods of GEOSS for nine societal benefit areas (disasters, health, energy, climate, water, weather, ecosystems, agriculture, biodiversity), and (3) to establish international framework to promote the “10-Year Implementation Plan.”

By the effort of many countries that approved “10-Year Implementation Plan,” Group on Earth Observations (GEO) was established. GEO holds workshops aiming at capacity development in relation with GEOSS. In addition, GEO makes Annual Work Plans to implement the “10-Year Implementation Plan,” and group countries and participating organization of GEO have been practicing the tasks to achieve the targets of

the “10-Year Implementation Plan” along with these work plans and based on voluntary contribution of each country and organization. 74 tasks have been registered in the “Work Plan 2007 - 2009,” and Japan is implementing 44 tasks as a leading organization or contributing organization.

In the G8 Summit held in Heiligendamm in Germany in June 2007, it was confirmed that the G8 should provide leadership in the development of GEOSS. In this way, also from the viewpoint of coping with global environmental issue including biodiversity, the GEOSS construction is increasingly anticipated.

(Specific Measures and Policies)

- The government will positively support GEO in the future with an eye towards the future of international framework on earth observations, and will promote earth observation to contribute to GEOSS construction. (MEXT)

4 Cooperation for developing countries

(Outline of Measures and Policies)

The Official Development Assistance (hereinafter referred to as “ODA”) Charter decided by the cabinet in August 2003 was set up so that “Environmental conservation and development should be pursued in tandem” as one of its four principles of ODA implementation, while positioning “Addressing global issues” as one of its priority issues. In “Environmental Conservation Initiative for Sustainable Development (EcoISD)” announced in 2002, “conservation of natural environment” was positioned as one of its priority areas.

Based on these policies including the Initiative, the government positively contributes towards worldwide conservation of biodiversity through the conservation and sustainable use of biodiversity in developing countries.

In practice, the government makes positive support in various aspects of drafting, formulating, and implementing the plan on the conservation and sustainable use of biodiversity, of fostering human resources and preparing facilities. In addition, to try to conserve and sustainably use biodiversity and to contribute to worldwide conservation of biodiversity in cooperation with developing countries, it gives support for the conservation and management of nature reserves, forest conservation, prevention of desertification, research and prevention of the influence on biodiversity by climate change, and natural resource management.

4.1 Cooperation for capacity building for environmental issues

(Current Situation and Challenges)

Because social, economic, and technical problems including increased population, expanded economic activities, and poverty, together with environmental problems are global issues, many countries have difficulties in appropriately conserving biodiversity alone. The capacity building to handle environmental matters, therefore, needs to be practiced comprehensively.

(Specific Measures and Policies)

- To enhance the comprehensive capacity of organizations and people to deal with problems concerning the environment, the government will promote human resources development in developing countries, including building the capacities of environment-related technologies, as well as provide cooperation for institution-building and equipment provision. (MOFA)

- To help developing countries develop their own capacities, the government will select projects for its cooperation from a long-term perspective, and promote cooperation that attaches particular importance to the participation of stakeholders, both in the decision-making on priority-setting and on target projects as well as in the implementation of projects, joint efforts to enhance their implementing abilities, and the promotion of environmental education for raising peoples' awareness of environmental problems. (MOFA)

4.2 Consideration for environment

(Current Situation and Challenges)

Even though developing countries have a substantial need for assistance in the environmental sector, they tend to put a higher priority on development projects, and therefore local needs in the environmental sector are not reflected in specific project proposals. For this reason, the government will promote giving incentives for environmental conservation.

(Specific Measures and Policies)

- The government will promote giving incentives for environmental conservation and raising environmental awareness, through policy dialog, various forums, and other appropriate cooperation schemes. (MOFA)
- The government will support projects in which appropriate environmental considerations are fully taken into account, in order to promote the integration of economic growth/poverty reduction and environmental conservation by incorporating environmental considerations into all development plans and individual projects, and to address environmental problems in developing countries. (MOFA)

4.3 Promotion of cooperation under a comprehensive framework

(Current Situation and Challenges)

Japan's experience in overcoming environmental problems as well as valuable know-how in coping with biodiversity issues and building an administration system and society in harmony with nature have been accumulated by a broad range of entities, including local governments and private enterprises. Based on this standpoint, the government will effectively promote international cooperation by collaborating with these entities and through using Japan's scientific technology in monitoring, data analysis and counter-approaches.

(Specific Measures and Policies)

- The government will promote cooperation by positively promoting collaboration with ODA and other cooperation in these fields, carried out by international organizations, local governments, private sector, NGOs and others. (MOFA)
- In order to solve regional and global environmental problems, the government will implement its cooperation in this field based on broad and comprehensive frameworks that synthesize various cooperation methods effectively. One example is the combination of cooperation in which support measures are provided intensively in one particular place and that which is provided for wider regions. (MOFA)
- The government will revise EcoISD based on the needs in developing countries, the trend of international society surrounding biodiversity, global issues such as climate change, and thereby more effectively and efficiently promote international cooperation in environmental fields including biodiversity. (MOFA)

4.4 Contribution for global environment conservation in the field of agriculture, forestry, and fisheries (Current Situation and Challenges)

To get higher production and income under increased population and poverty, developing countries were forced to make resource-stripping production activities including excessive cultivation or grazing. As a result, resources such as land and water have degraded and environmental problems including desertification have occurred on a global scale, and deterioration of biodiversity is a concern. These global environmental problems are the threats related to the survival of individual human beings beyond national borders, and international society needs to cope with them in cooperation.

The forests in the world are rapidly decreasing and deteriorating due to the changeover of forest into agricultural land, illegal logging, wildfires, and excessive grazing, especially in tropical forests where many kinds of species on earth are living. In every year from 2000 to 2005, about 12.9 million ha (about 7.3 million ha, which is equivalent to one-fifth of Japan's total land area, if deducted by the increase by afforestation) of forest decreased. Such a large-scale decrease of forests is one of the big factors causing a crisis in global biodiversity, and cooperation needs to be promoted for conservation and creation of forests in developing countries.

Furthermore, marine resources are sustainable, and appropriate conservation and management of marine resources is the responsibility imposed on the coastal states by the UN Convention on the Law of the Sea. Marine resources are important also from the viewpoint of securing a stable supply of fishery products for the nation and of conserving biodiversity.

While there are negative international opinions against bycatches of sharks, sea birds, and sea turtles, and against tuna longline fishing and high-sea trawl fishery because of fishery's influence on biodiversity in the abyssal sea, the move in the Convention on Biological Diversity to establish marine protection areas on the high seas, and the move to manage living marine resources under the control of international trade by the Washington Convention, it is important to continue support for developing countries not only from the viewpoint of biodiversity conservation but also from that of appropriate conservation and sustainable use of living marine resources on a scientific basis.

(Specific Measures and Policies)

- Using Japan's experiences and knowledge at home and abroad, the government will promote international cooperation for sustainable agriculture, forestry, and fisheries, and will positively contribute to global environmental conservation such as prevention of desertification, sustainable use of water resources, and measures to tackle global warming. (MAFF) [Cited in Chapter 2, Section 6, 1.1]
- As bilateral cooperation, the government will implement technical cooperation via JICA and promote sustainable forest management in developing countries. (MOFA, MAFF)
- As multilateral cooperation, the government will promote projects that aim at promoting sustainable forest management, such as measures against illegal logging in developing countries, by funding the Food and Agriculture Organization of the United Nations (FAO) and the International Tropical Timber Organization (ITTO). (MOFA, MAFF)
- The government will conduct basic research and technical development to promote sustainable forest management in developing countries and measures to prevent global warming. (MAFF) [Cited in Chapter 2, Section 6, 1.1]

- As multilateral cooperation in fisheries, the government will promote the projects that aim at promoting international resources management and fishing village development for sustainable fisheries, by funding the Food and Agriculture Organization of the United Nations (FAO) and the Southeast Asian Fisheries Development Center (SEAFDEC). (MAFF)

Section 5 Information Management and Technology Development

(Basic Concepts)

For conservation of biodiversity, it is necessary at first to grasp its current status and to know its deterioration as early as possible, then, based on these factors, to extract various issues, in addition to specifying the objects to conserve and examining various policies including planning of appropriate conservation measures. To accurately know from a nationwide viewpoint the current status of the natural environment and the changes in the temporal sequence and in space, it is necessary to collect scientific and objective natural environment data and to promote their preparation, together with existing theses and reports, to be used by various users for various purposes. In implementing such researches and preparation of information, to make the information collection effective and to share information, it is necessary to build and enhance the network with experts in various areas, appropriately exchange information and cooperate among related ministries and agencies, local prefectural governments, and NGOs, and let local residents and volunteers to participate in the implementations. In addition, collected and prepared information need to be provided to the public in a way that is easy to understand by using IT technology and a system that promote distribution of information. The Convention on Biological Diversity points out the importance of international exchange of information, and from the viewpoint of global conservation of biodiversity, international information exchange is essential as well as information exchange within Japan.

It is also important to implement policies based on scientific knowledge and various researches and technical development necessary to promote the activities to conserve biodiversity in the regions.

1 Comprehensive assessment on biodiversity

(Outline of Measures and Policies)

To grasp the situation of and tendency of the change in biodiversity, scientific and objective information needs to be comprehensively analyzed and assessed. Therefore, to know how much socio-economic effect biodiversity conservation would bring about in living and in business activities, comprehensive evaluation and analysis of our country's biodiversity needs to be conducted, including the evaluation on the ecosystem service that biodiversity brings about. Through such assessment, the status of biodiversity and the necessity of conservation are informed to the public in an easily comprehensible way, and the political issues with high priority are clarified, thereby measures and policies will be developed effectively.

Because various factors relate intricately, the influence on biodiversity gradually appear over a comparatively long time span. Such a time gap is one of the reasons the sense of crisis in people is weakened and makes it difficult to lead to the initiation of conservation activity. In the field of biodiversity, a long-term view beyond generation—what influence the present policy decision would give on biodiversity and human life in the future—is important. Therefore, in a comprehensive assessment of biodiversity, future prediction will be attempted by providing several different scenarios. It is important for each and every citizen to share the present and future status of biodiversity through such a comprehensive evaluation on biodiversity, and to have the consciousness of conserving biodiversity for future generations.

1.1 Implementation of comprehensive assessment of biodiversity

(Current Situation and Challenges)

As a comprehensive assessment of biodiversity, there are worldwide ones such as the Millennium

Ecosystem Assessment (MA) and the Global Biodiversity Outlook (GBO), but there is none that comprehensively analyzes and assesses the current status and trend of biodiversity in Japan. This can be considered one of the factors why it is difficult for the people of Japan to feel familiarity concerning the status of biodiversity and its influence on daily living. Therefore, it is an issue to solve to assess the current status and trend of biodiversity in Japan and to convey it in a way which is easy to understand. In addition, to fulfill the responsibility of Parties to the Convention on Biological Diversity of so-called “2010 Biodiversity Target”—achieving by 2010 a significant reduction of the current rate of biodiversity loss at the global, regional and national level as a contribution to poverty alleviation and to the benefit of all life on Earth—which was adopted in COP6 in 2002, Japan needs to grasp its status of target achievement. Therefore, Japan needs to establish the method for a comprehensive assessment of biodiversity in Japan and to urge the implementation of comprehensive assessment on biodiversity to various foreign countries as a candidate for host country of COP10 in 2010, and thereby demonstrate its international leadership.

(Specific Measures and Policies)

- The government will implement comprehensive assessment on biodiversity with the participation of many experts, summarize it in a way easy to understand, and publish it. (MOE) [Cited in Chapter 2, Section 4, 1.2]

1.2 Development of biodiversity indicators

(Current Situation and Challenges)

As indicators for the promotion of efforts in the biodiversity conservation field in the Third Basic Environment Plan, nine indicators (including trial indicators) such as “degree of human disturbance of vegetation in the nature conservation basic survey” have been presented. Indicators that are easier to understand, to grasp the status of changes in biodiversity and the effect of various policies, need to be developed. For the purpose, examination needs to be promoted on the collaboration with the Stern Review on biodiversity and on the expressions easy to understand other than values, such as mapping of biodiversity crisis status and the selection of biodiversity hotspots, for example.

(Specific Measures and Policies)

- Through a comprehensive assessment of biodiversity, the government will examine in collaboration with the ministries concerned the method to appropriately grasp the status of changes in biodiversity and the effects of various policies. (MOE)

1.3 Development of biodiversity indicators in the field of agriculture, forestry, and fisheries

(Current Situation and Challenges)

In the field of agriculture, forestry, and fisheries, technologies and basic data to appropriately manage the ecosystem that had been formed through agriculture, forestry, and fisheries from the view point of living in harmony with nature, including new Satoyama management technology, the method to assume the area where insects may be living, and technology to maintain habitat environment for fish by channel forming rapids, abysses, and cay, have been obtained hitherto. They have been used for policies and measures related to the consideration on biodiversity such as the activities for conservation and use of Satoyama forests and the

network between water and ecosystem.

However, in the implementation of the policies and measures for agriculture, forestry, and fisheries including sustainable agriculture, although biodiversity is taken into consideration, the indicators based on a scientific basis that can qualitatively grasp the effect have not been developed. The development, therefore, is needed to effectively promote those policies and measures.

(Specific Measures and Policies)

- By researching what kind of living organisms are living in paddy fields, forests, seaweed beds, and tidal flats, and using basic data obtained in the past such as the characteristics of biota unique to the ecosystem formed by agriculture, forestry, and fisheries and the research methods, the government will examine the indicators based on scientific ground to grasp positive and negative impact of agriculture, forestry, and fisheries on biodiversity and the biodiversity indicators to effectively promote relative policies and measures, and will clarify the role that agriculture, forestry, and fisheries play for biodiversity, in addition to promoting deepening national and international understanding. (MAFF)

2 Promotion of survey and information management

(Outline of Measures and Policies)

To grasp the current condition of biodiversity in Japan and to promote its sustainable use, the National Survey on the Natural Environment based on the “Nature Conservation Law” will be implemented on an ongoing basis to advance appropriate understanding of the current situation and changes related to biodiversity in Japan. Furthermore, aiming at continuously monitoring the situation of ecosystem and biodiversity in Japan and enhancing preventive conservation measures in combination with scientific prediction techniques, a comprehensive ecosystem monitoring system that covers the influence of global warming will be established.

Efforts will also be made to make the inventories of wildlife that is the most basic information to grasp the status of biodiversity and to prepare information on samples, in cooperation with related organizations in Japan and foreign countries.

In addition, the establishment of the system will be promoted for the enhancement of the survey and research for biodiversity conservation and of the information on the natural environment, including enhancement of the Biodiversity Center of Japan of the Ministry of the Environment and collaboration among relevant ministries, agencies, and organizations.

The information obtained needs to be widely open to the public and be shared so that they are used for the conservation of biodiversity. Efforts will be made to expand and to improve convenience of the provision and publication of the information by using information and communications technology.

2.1 Promotion of the national survey on the natural environment and others

(Current Situation and Challenges)

To establish and enhance the basic information on Japan’s natural environment, it is necessary to establish a system for the collection and provision of appropriate information corresponding to the needs in policies and measures based on the changes in social and natural conditions, such as the construction of the system to collect a wide range of information and awareness-raising with the participation of various entities including the general public, and priority research on the distribution and change in populations of animals and plants that is

important for the conservation of biodiversity. In addition, it is necessary to improve the promptness of data provision, to grasp the population and population density of medium to large mammals, of which data in the past has been scarce, and to accumulate data on Satochi-Satoyama, coastal, and oceanic areas.

(Specific Measures and Policies)

- The government will continue to implement the National Survey on the Natural Environment that has been implemented from 1973, and promote monitoring on the current conditions of biodiversity on the land area and the status of changes while trying to improve the promptness of data provision. Regarding the one-to-twenty-five thousand vegetation map that is the basic information map of natural environment on the land area, about 35% of the land area has been covered (as of March 2007). The government will promote early formulation to cover all of Japan by targeting about 60% by March 2012. (MOE)
- In addition to continuously collecting information on the distributions of fauna and flora in Japan, the government will enhance, in collaboration with the ministries concerned, the data collection for the natural environment in Japan's sea area of which basic information on biota has not been collected to the same extent as the land area. (MOE)
- The government will implement a citizen-based survey, that calls for the collection of the information observed on familiar natural environment including the change in the distribution of wildlife caused by global warming, by participation of various entities including research institutions, private organizations, and experts, in addition to general public, and thereby enhance public awareness on the conservation of biodiversity in Japan. In addition, it will build the system to collect wide range of natural environment data. (MOE) [Cited in Chapter 2, Section 3, 1.1 and Chapter 2, Section 6, 1.1]
- To promote detailed protection and management policies for birds and mammals that will give big impact on Japan's ecosystem and agriculture, forestry, and fisheries, such as deer and bears, the government will promote the collection of the information on habitat and population focusing on such particular wild animals and the research on population density and population estimate, and will clarify the changes over a long period of time. (MOE) [Cited in Chapter 2, Section 1, 2.4]

2.2 Comprehensive ecosystem monitoring system

(Current Situation and Challenges)

Monitoring Sites 1000, started in FY2003 has been promoting long term ecosystem monitoring on Japan's typical ecosystems (forests, Satochi-Satoyama, inland water areas, coastal areas) by the participation of researchers, experts, and NGOs. About 1000 research sites are scheduled to be established, and 718 sites have been established up till now (as of March 2007). Research results of Monitoring Sites 1000 have been used for various policies and methods for biodiversity conservation. However, to practically grasp the influence on the ecosystem by global warming which is a recent issue of concern, it is necessary to prepare and establish a more comprehensive monitoring system from the global viewpoint, in addition to establishing comprehensive information analysis and a provision system for grasping the status in a wide area and for improving promptness in data provision. The preparation and establishment includes establishment of new sites in the ecosystem where the impact of global warming is remarkable including alpine zones, more detailed monitoring of the relationship between physical/chemical factors including weather conditions and biological factors, and introduction of remote sensing technology using artificial satellites. Furthermore, to connect this project to

concrete conservation policies in each area, close collaboration and cooperation with related local governments are necessary in sharing information on research implementation and research results.

(Specific Measures and Policies)

- As a part of “Comprehensive Ecosystem Monitoring System,” the government will enhance the Monitoring Sites 1000 project. The government will establish about 1000 research sites by the end of FY2007. Furthermore, the government will add and enhance the research sites and research items to grasp more precisely the status of changes in Japan’s typical ecosystems such as alpine zones where the impact of global warming appears obviously. (MOE) [Cited in Chapter 1, Section 2, 1.1; Chapter 2, Section 1, 1.2 and Chapter 2, Section 6, 1.1]
- The government will implement wide-area ecosystem monitoring by using remote sensing technology, including development and operation of satellites such as the Advanced Land Observing Satellite “Daichi” (ALOS) and their image analysis, will strengthen the collaboration among various ministries and agencies for data sharing and mutual usage, improve the promptness of data provision, and thereby promote construction of a comprehensive monitoring system on Japan’s natural environment. (MOE, MEXT)
- For the monitoring, the government will build the system to effectively and continuously implement researches by participation and cooperation of various entities including experts, NGOs, volunteers, and local governments, and will publish the obtained accumulation of natural environment information and the result of analysis as needed, and thereby promote usage of the policies and measures for biodiversity conservation. (MOE)
- The government will collaborate and share information not only in Japan but also with related countries and organizations abroad, and contribute to the promotion of global monitoring such as Global Earth Observation System of Systems (GEOSS) and Asian Waterbird Census (AWC) and of biodiversity conservation. (MOE)

2.3 Preparation on wildlife inventory and information on samples

(Current Situation and Challenges)

A Wildlife inventory that compiles the list of wild fauna and flora living in a certain region and various kinds of information on their distribution and living status is considered to be indispensable for making a plan on conservation of biodiversity. However, with the preparation of an inventory in Japan including the information on wildlife, there is not enough basic information on distribution and living and some taxa are left without being assigned. Therefore, they need to be promptly enhanced, taking cooperation with international projects and information compatibility into consideration, together with systematic preparation and maintenance of information, samples, and documents on wildlife that is the basis of the inventory.

(Specific Measures and Policies)

- With strengthening the cooperation between governments and academia, and in cooperation with international projects such as Global Taxonomy Initiative (GTI), Species 2000, and Global Biodiversity Information Facility (GBIF), the government will promote preparation and publication of inventories of wild fauna and flora. The government will also attempt to collect systematically and to share the

information on the samples and data of wild fauna and flora that would be the basis for the inventories. (MOE, MEXT)

- The government will promote the collection of samples of living organisms and data and the enforcement of the maintenance and management system at the Biodiversity Center of Japan. (MOE)

2.4 Provision and publication of natural environment information

(Current Situation and Challenges)

With the progress of information and communications technology, computerization of information on the natural environment and construction and provision to the public of the data that uses GIS (Geographic Information System) are underway. Based on the conditions, it is required to make a wide variety of information on the natural environment easier to use and to understand for all users.

Concerning the Clearing-House Mechanism (Mechanism to promote and facilitate information exchange on biodiversity) based on Article 17 (Exchange of Information) and Article 18 (Technical and Scientific Cooperation) of the Convention on Biological Diversity, Japan has steadily increased data volume after starting the operation of the system in July 2004, and about 800 metadata (information on information source necessary to search and grasp the location of data) has been registered at present (as of June 2006). For further expanding its usage in the future, increasing the number of data is an issue to be solved.

(Specific Measures and Policies)

- The government will further computerize natural environment information acquired by the implementation of various researches and surveys, improve and strengthen information provision through the Japan Integrated Biodiversity Information System (J-IBIS), and thereby promote information disclosure at home and abroad via the Internet. The government will focus on the establishment and provision of data using WebGIS, which enables compiling and analysis on the net of various natural environment information prepared by various entities, and on the enhancement of the function that enables a variety of analysis on the data including other statistics. (MOE, relevant government ministries and agencies)
- In regard to the Clearing-House Mechanism (CHM) for Biodiversity Information, the government will strengthen the effort to greatly enrich the registered metadata qualitatively and quantitatively, and almost double the number of registration (about 1600 metadata) by March 2012, and thereby promote enhancement and information exchange on metadata at home and abroad. (MOE) [Cited in Chapter 2, Section 4, 3.7.2]
- For making them easy to use for all users, the government will make the access to target information easier and enable the access from abroad to the provided information, and thereby strengthen international transmission of information on natural environment. (MOE) [Cited in Chapter 2, Section 4, 3.7.2]

2.5 Preparation of base and establishment of system for biodiversity information

(Current Situation and Challenges)

The Biodiversity Center of Japan of the Ministry of the Environment, which was established in 1998 as the core base of the information on biodiversity conservation in Japan, has implemented the National Survey on the Natural Environment and has operated the Japan Integrated Biodiversity Information System. In the future, for the evaluation on species and ecosystems and for implementing appropriate measures based on the evaluation result, these efforts to qualitatively and quantitatively enhance information will be further

strengthened. In addition, to promote mutual use and sharing of the biodiversity information possessed by various entities such as the ministries concerned, local governments, research organizations, museums, NGOs, experts, and citizens, an extensive network centered on Biodiversity Center of Japan needs to be built. In addition, to promote an information system necessary for global conservation of biodiversity, collaboration with related organizations in various foreign countries including those in the Asia-Pacific region, together with promoting awareness-raising in the opportunity of the invitation of COP10 to Japan, are necessary.

(Specific Measures and Policies)

- To promote “research,” “information,” “awareness-raising,” and the “collection of samples and data” of Japan’s biodiversity, the government will improve and strengthen the organization and functions of the Biodiversity Center of Japan as a core foothold. Especially to evaluate qualitatively and quantitatively the influence of global warming on biodiversity and the ecosystem in Japan and to take appropriate measures, the government will promote the Comprehensive Ecosystem Monitoring System in addition to the National Survey on the Natural Environment. For the ministries concerned, local governments, research institutions, museums, NGOs, experts, and citizens to become able to use for their policies and activities the information on biodiversity that these entities possess respectively, the Biodiversity Center of Japan will be the core to promote network building for mutual use and sharing of the information. The government will contribute to international projects to promote global conservation of biodiversity, and collaborate and share information with the related countries and organizations abroad, and enhance the necessary system for these measures. (MOE)
- The government will strengthen the measures to promote computerization, mutual usage, and publication of the information on biodiversity that have been acquired by various entities, including ministries concerned, local governments, universities, private organizations, and other research institutions, museums, etc. Especially through the Working Group on Natural Environment Information Collaboration among Ministries and Agencies established in 2004 and various liaison organs such as the liaison conference including nature-related research institutions, the government will strengthen information exchange, collaboration and exchanges, and the network for natural environment information. (MOE, MLIT, MAFF, MEXT)
- The number of registered data of the library database at the Biodiversity Center of Japan is about 22,000 as of October 2007. The government will continue to make efforts to enhance the number and the contents of the registered data. (MOE)

2.6 For Global Biodiversity Information Facility (GBIF)

(Current Situation and Challenges)

The Global Biodiversity Information Facility (GBIF) was inaugurated in March 2001, in collaboration with the Japan Integrated Biodiversity Information System (J-BIS), Species 2000, and the Global Taxonomy Initiative (GTI), for the purpose of accumulating data on biodiversity of each country for the entire world to use. By this, it is expected that existing data will be on the network so that access via the Internet to more than 90% of the scientific names of the entire scientifically known living organisms will be possible in 10 years, for example.

With Japan, the Ministry of Education, Culture, Sports, Science and Technology is promoting Japan’s

participation to the GBIF through the Japan Science and Technology Agency. At the same time, to expedite the deliberation by the ministries concerned and experts in Japan and to examine our country's policy on the GBIF and measures to take within Japan, the "Liaison Committee of GBIF-related Ministries" has been established, in addition to the "GBIF Japan Science Committee" in which domestic experts conduct research and deliberation from the viewpoint of science and technology.

(Specific Measures and Policies)

- To positively promote the activities of GBIF in the future based on the discussions of the GBIF Japan Science Committee, the government will build a biodiversity database at the Institute for Bioinformatics Research and Development of which website containing information on the status of GBIF's activities in Japan has been published. Thus collaboration with GBIF will be made in the future. (MOFA, MEXT, Cabinet Office, METI, MAFF, MOE) (MOFA, MEXT, Cabinet Office, METI, MAFF, MOE) [Cited in Chapter 2, Section 4, 3.7.3]

2.7 Promotion of forest monitoring

(Current Situation and Challenges)

Japan is participating the Montreal Process that objectively grasps and evaluates sustainability of forest management in each country, with 11 Pacific Rim countries in temperate and subarctic zones. Based on the seven criteria of the Process such as "Conservation of biological diversity" and "Maintenance of forest ecosystem health and vitality," for the purpose of continuously grasping status and change of forest including biodiversity, 15,700 permanent observation plots have been set in the forests all over Japan, and the "forest resources monitoring survey," which has a five-years cycle, has been conducted from 1999. In the future, in addition to continuing the forest resources monitoring survey, evaluation and analysis on the research result and its reflection on the establishment of regional forest plans are needed.

Within the national forests, for virgin natural forests and for the forests where precious wild fauna and flora live, 7 types of forests at 833 locations that total about 778,000 ha have been set as forest reserve as of April 1, 2007, and 24 locations of about 0.51 million ha have been set as green corridors, which are the networks formed by connecting several forest reserves, and they are playing important roles for conservation of biodiversity. To grasp their status after the establishment and to use this information for appropriate conservation and management, monitoring research will be made and, depending on the situation, appropriate measures such as restoration of vegetation will be taken.

(Specific Measures and Policies)

- Regarding about 15,700 permanent observation plots in Japan, the government will continuously implement the research about site conditions, vegetations, dead and withered trees, trace of living birds and animals, pests and mammalian pests. (MAFF) [Cited in Chapter 1, Section 5, 1.12]
- Based on the results until the second forest resources monitoring survey, the government will make Japan's "2nd Country Report 2009" according to Montreal Process, and promote sustainable forest management in Japan and in the world. (MAFF) [Cited in Chapter 1, Section 5, 1.12]
- The government will handle forest space data and the result of forest resources monitoring survey on the

forest GIS in an integrated manner, and thereby use forest resource information effectively. (MAFF) [Cited in Chapter 1, Section 5, 1.12]

- Concerning forest reserves, to grasp the status after the setting and to promote conservation and management depending on the status, the government will promote monitoring survey on the current status of the forests and vegetation, habitat of wildlife, and the status of use of the people entering forests. (MAFF)
- Concerning green corridors, to grasp the status of the forests and the actual status of living and breeding of wildlife, the government will promote monitoring surveys such as the research on forest stand structure and inhabitation of wildlife. (MAFF)
- In establishing information system that uses Geographic Information System, the government will examine mutual usage of information with other nationwide researches such as the National Survey on the Natural Environment and Monitoring Sites 1000. (MAFF, MOE) [Cited in Chapter 1, Section 5, 1.12]

2.8 Information development for river environments

(Current Situation and Challenges)

To grasp the basic information on natural environment at rivers and dams, the “Census of Rivers and Riparian Areas,” that periodically and continuously survey the inhabitation and growth of living organisms in rivers and dam reservoir, has been implemented. This Census has been conducted for 109 first-class water systems and 166 second-class water systems nationwide. What are surveyed are the inhabitation of fish, benthic animals, plants, birds, amphibian, reptiles, mammals, land insects, and status of rivers such as rapids, abysses, and river edges.

To use the information on river environments such as inhabitation and growth of living organisms that was gained by the Census of Rivers and Riparian Areas for policies and academic activities, it is necessary to link the information with geographical information and to comprehensively collate it, and the establishment of river environment GIS, therefore, is underway. Furthermore, it is planned to disclose the information to many researchers and the general public and to enable the usage for environmental learning.

(Specific Measures and Policies)

- The government will implement the census on the river environment to make a round of the research on fish and benthic animals in about five years and the research on others in about 10 years, and collect information on the nationwide river environment, together with grasping nationwide trends and the regional characteristics of inhabitation and growth of living organisms. (MLIT)
- The government will continue to prepare and disclose river environment GIS. The government also promotes mutual usage with other nationwide research data such as the National Survey on the Natural Environment. (MLIT, MOE) [Cited in Chapter 1, Section 8, 5.1]

2.9 Marine environmental database construction

(Current Situation and Challenges)

To systematically and effectively implement the conservation, restoration, and creation of the natural environment that takes water quality improvement and ecological network into consideration, steady collection, accumulation, analysis, and publication of environmental data are indispensable. Therefore, the databases to synthetically collect, accumulate, analyze, and publish the environmental data, which the government and port

authorities possess for each closed water area, is under construction.

Concerning six marine areas including three major bays, Ariake Sea, and Yatsushiro Sea, various entities such as administrative organizations, research institutions, and private sectors have registered environmental data, and sharable marine environmental database has been built until today. The issue to be solved in the future is data accumulation of each database.

(Specific Measures and Policies)

- The government will accumulate data and enhance the content of the marine environmental database. (MLIT)

2.10 Operation of the Japan Oceanographic Data Center

(Current Situation and Challenges)

To effectively use marine data of various domestic and foreign organizations such as the comprehensive marine data bank of Japan, the Japan Oceanographic Data Center (JODC) has been collecting, managing and providing various marine data and information in an integrated manner. In 1985, JODC established the “marine organisms data management system,” intended to manage marine organisms (mainly plankton) data. The “marine organisms data management system” is composed of two databases. One is the “JODC Taxonomic Code of Marine Organisms,” which contains a coded set of marine organisms based on the taxonomic system. The other is the “Marine Organisms Observation Data,” which contains observation data provided by marine research institutions.

(Specific Measures and Policies)

- The government will promote the accumulation of the data on the marine environment and marine organisms at the Japan Oceanographic Data Center, and further strengthen collaboration within the government. (MLIT)

2.11 Information development for natural environment at national parks

(Current Situation and Challenges)

Information on the natural environment to manage national parks is not well prepared. It is necessary to collect and put in order scientific information that will be the basis for management and to appropriately reflect it in the management of national parks.

(Specific Measures and Policies)

- The government will collect scientific information necessary for management of national parks with the cooperation of related administrative organizations, researchers, and regional experts, and will promote appropriate management of national parks based on such information. (MOE)

3 Promotion of research and technology development

(Outline of Measures and Policies)

In the “Field-specific Promotional Strategy” (decided by the Council for Science and Technology Policy in March 2006) that was formulated based on the “Third Science and Technology Basic Plan” (decided by the

cabined in March 2006), which the government is supposed to promote intensively in the five year period from FY 2006 to FY2010, “To realize sustainable conservation and use of ecosystem” and “To realize effective use of biological resources by the technology to use biomass originated in Japan” are described as individual policy targets to be realized. In the field of technical research on ecological management for the conservation and use of the ecosystem, four programs—“Clarification and evaluation of structure and function of the ecosystem,” “Clarification of factors preventing sustainability in the use of biological resources and assessment of impact,” “Adaptive management technology for conservation and restoration of ecosystem,” and “Social technology for sustainable use of biological resources”—have been set up, to strengthen the cooperation in domestic researches on biodiversity and the ecosystem. In regard to the latter use of biomass, the necessity of sustainable system technology to use regional biomass is described.

Based on these points, the following policies will be implemented.

3.1 Studies in the field of environment

(Current Situation and Challenges)

[Global Environment Conservation Research Fund]

With the Global Environment Conservation Research Fund, that is the sum of the experiment and research expenses for environmental conservation implemented by research institutions of related ministries and is budgeted as a lump by the Ministry of the Environment, “Research and technology development in the fields of building society in harmony with nature” is one of the items research need to be focused on in FY2008. Researches are needed for the clarification of the existence of biodiversity and maintenance mechanism, for the conservation method inside and outside the habitats necessary for preventing extinction of rare species, and for the technology of artificial breeding.

[Global Environmental Research Fund]

The Global Environmental Research Fund is a competitive research fund system to promote researches that contribute to the solution of global environmental issues. “Ecosystem conservation and restoration in wide area” is one of its four targeted research fields, and targets the research on the decrease in biodiversity (including disturbance of the ecosystem) on the global level and over a wide area (such as East Asia) level, in addition to the issues of decrease in tropical forests and desertification.

With biodiversity, the status of disturbance on the ecosystem by alien species has been grasped, the method to assess the risks of invasive species has been proposed, and concrete methods as the measures to prevent invasive species have been developed. At present, from the viewpoint of the change in biodiversity caused by environmental change, the researches on the evaluation of vulnerability of subalpine and alpine zones are underway.

As future issues, it is necessary to research the method and technology to alleviate the influence on biodiversity by foreign species that have already distributed in a wide area, on the influence that climate change gives on biodiversity, and on the adaptive measures for the influence.

[Environmental Technology Development Promotion Fund]

Also with “Basic Research and Development” of the Environmental Technology Development Promotion Fund that supports basic and fundamental research to accumulate intellectual assets—the base of

next-generation technology for environmental conservation—by widely using the wisdom of business, academia and government, one of the targets of its research is “the technologies on the maintenance of sound ecosystem and the contact with nature.”

To maintain the ecosystem, it is necessary to concentrate the wisdom of business, academia and government. The Environmental Technology Development Promotion Fund publicly invites excellent researchers from business, academia and government and provides research expenses.

(Specific Measures and Policies)

- By the Global Environment Conservation Research Fund, “Research to be used for genetic guidelines on plants using biodiversity assessment technology for nature restoration projects” will be implemented as biodiversity-related research in FY2007. (MOE)
- By the Global Environmental Research Fund, “Research on the impact of foreign species on biodiversity and its mitigation, taking a vulnerable oceanic island as a model case,” “Research on the assessment system building on vulnerability of alpine and subalpine zone ecosystems focusing on interactions among living organisms,” “Research on natural and social environments to avoid extinction of great apes,” and “Research on sustainable management on tropical wood production forests, combined with carbon storage and economic effect of biodiversity conservation” will be implemented. (MOE)
- By the Environmental Technology Development Promotion Fund, “Development of new lake management method for the conservation of sound lake and pond ecosystems” will be implemented. (MOE)

3.2 Technology development for conservation and maintenance of forests

(Current Situation and Challenges)

To realize sustainable multi-faceted functions of forests, conservation of biodiversity and sustainable use of its components are important. At the same time, conservation of biodiversity in forests needs to be attended to from the genetic aspect, by developing a new variety of forest trees to cope with needs for variety of breeding and by securing forest tree genetic resources necessary for various scientific researches.

(Specific Measures and Policies)

- Forestry and Forest Products Research Institute (MAFF) will take the lead in the development of the technology to alleviate influence caused by foreign species on endemic ecosystem, the technology to conserve endemic species and rare species, and the technology to alleviate damage by plant pests on the forests in a wide area that needs urgent measures.
- The government will conduct research on the situation of DNA analysis and gene disturbance to get basic information necessary for genetic management of broadleaf forests. (MAFF)

3.3 Research for rivers

(Current Situation and Challenges)

The Aqua Restoration Research Center, that has about 800 m long channel—the world’s largest class experimental channel—has been established, which has been practicing basic and applied researches to conserve and restore natural environment in rivers, lakes and reservoirs, thereby using its results in cooperation with the researchers in various fields.

In addition, by the collaboration of researchers in the fields of biology, ecology, and river engineering, the National Institute for Land and Infrastructure Management researches are conducted for the purpose of understanding rivers from an ecological viewpoint and of investigating the ideal status of rivers, by using some rivers as concrete fieldwork sites.

(Specific Measures and Policies)

- The government will promote and use the research at the Aqua Restoration Research Center. (MLIT)
- The government will promote river ecological researches for Chikuma River, Kizu River, Kita River, Shibetsu River, Iwaki River as the fields for research, analyze the past research results, and promote the organization of and analysis on the gained academic results. (MLIT)

3.4 Research for ports and harbors

(Current Situation and Challenges)

While public interest in natural environments with abundant ecosystems has increased, the harmony between mankind and nature aiming at sustainable development, and further, creation of better environment are also required when creating and maintaining ports and harbors.

(Specific Measures and Policies)

- By using the world largest tidal flat tank (Mesocosm), the government will promote researches on the living organisms that are naturally settling and living in the tank and on material circulation of oxygen, nitrogen, and phosphorus. (MLIT)
- The government will promote a wide range of research on living organisms from bacteria to birds also at existing natural tidal flats, artificial tidal flats, and seaweed beds. (MLIT)
- Based on these basic data, the government will promote researches to keep abundant biodiversity of coastal areas while developing an ecosystem model of coastal area. (MLIT)

3.5 Research for coasts

(Current Situation and Challenges)

To realize high-quality coasts which are safe and harmonizing with nature, in addition to collecting and organizing basic information on coasts, research on coastal erosion in a wide area and research on the construction of environment (including ecosystem) friendly coastal conservation facilities will be promoted with related research institutions. Also, the parties concerned need to make efforts to have common awareness on the coastal environment to be conserved.

(Specific Measures and Policies)

- In addition to grasping the influence and effect that coastal conservation facilities would exert on the natural environment such as ecosystems and the environment, the government will research and examine the creation of beaches that takes the ecosystem based on the creation of beaches in harmony with nature into consideration. (MLIT, MAFF)
- The change in weather and oceanic phenomena due to global warming and long-term increased sea level are concerns, and serious impacts are concerns also for beaches, including aggravation of coastal erosion,

increase in Zero-Meter Zones, escalation of damage by high tide, and change in habitats of living organisms. For these reasons, the government will monitor tide level and ocean waves, and promote examination as necessary to cope with those changes. (MAFF, MLIT)

Section 6 Efforts against Global Warming

(Basic Concepts)

Increase in global warming may exert serious impact on vulnerable ecosystems in islands, coasts, subalpine and alpine zones, and arid areas, and the risk of extinction is expected to become higher with many species. On the other hand, seawater acidification with the increase in the concentration of carbon dioxide in the air is also pointed out. Concerning coral reefs, it is predicted that an increase in the sea surface temperature by about 1 to 3°C will cause coral bleaching and extinction in wide areas. There is the possibility of impact on agriculture, forestry, and fisheries and biodiversity in urban areas. Furthermore, global warming is expected to give big impact on social economy, by food, human life, and living organisms that transmit infectious diseases that are affected by the change in biodiversity.

For this reason, it is necessary to grasp the impacts of global warming on biodiversity and pursue adaptive measures for its reduction and influence.

1 Mitigation of global warming and adaptation to its effects from the perspective of biodiversity

(Outline of Measures and Policies)

On the basis of the fact that conserving sound ecosystem of forests, grasslands and wetlands, which fix a large amount of carbon, will inhibit the release of green house gases and contribute to the mitigation of global warming, measures to conserve biodiversity will be promoted. The function of forests as the source of absorbing green house gas is effective in mitigating global warming, besides their function to conserve biodiversity. Maintenance and conservation of forests will be promoted so that their functions can be exerted to the fullest extent. Furthermore, vegetation-derived biomass resulted from the ecosystem management for the conservation of rich biodiversity, including thinning of artificial forest, control of secondary forests, mowing at the waterside and grazing in the secondary grasslands, will be used extensively as the alternative energy of fossil fuel. This will also lead to the vitalization of the local industry.

It is important that adaptation to the impact of global warming should be studied before the impact becomes an issue in many parts of the country. In addition to the upgrading of monitoring including the impact of global warming, adaptation measures will be examined from the viewpoint of conservation of biodiversity—what the ecological network highly adaptive to environmental change including climate change should be and the key points for conserving and restoring a sound ecosystem.

1.1 Mitigation of global warming and adaptation to the impact from the viewpoint of biodiversity

(Current Situation and Challenges)

Regarding global warming, the Kyoto Protocol entered into force (2005) and actions are already under way at home and abroad. In addition, the Fourth Assessment Report (2007) of the Intergovernmental Panel on Climate Change (IPCC) has revealed that biodiversity has been already affected by global warming and that the impact will be more significant by the progression of global warming in the future. Thus, scientific knowledge on the global warming has been accumulated.

Together with implementation of mitigation method on global warming, the impact of warming on biodiversity needs to be grasped to take appropriate adaptation measures.

(Specific Measures and Policies)

[Mitigation measures]

- Internationally, the government will exercise international leadership to make the next framework after 2013 to be as effective as that being participated in by major emitting countries. (MOE, MOFA, METI) [Cited in Chapter 2, Section 4, 2.12]
- To fulfill the 6% reduction target in the first commitment period (2008 - 2012) of the Kyoto Protocol, the government will promote the measures based on the Kyoto Protocol Target Achievement Plan (cabinet decision in April 2005), which will be revised within FY2007. (All government ministries and agencies) [Cited in Chapter 2, Section 4, 2.12]
- Based on the anti-global warming strategy of the Ministry of Agriculture, Forestry and Fisheries (formulated in June 2007), the government will promote measures to prevent global warming in the field of agriculture, forestry, and fisheries, including forest sink measure, biomass usage, energy saving measures for protected horticulture, agricultural machinery, and fishing boats, and decrease in the amount of applied fertilizer by the promotion of sustainable agriculture. (MAFF)
- To secure about 1.3 million t-C (tons of carbon), which is the target of forest absorption in the Kyoto Protocol Target Achievement Plan, the government will further promote comprehensive measures including maintenance of sound forests, promotion of appropriate management and conservation of protection forests, promotion of use of timber and wood biomass, and promotion of forest creation by the participation of citizens, with the cooperation of each entity such as government, local governments, people related to forestry and wood industry, and general public. (MAFF) [Cited in Chapter 1, Section 5, 1.2]
- Biomass, that has the characteristics to emit carbon dioxide absorbed from the air by photosynthesis when burned without increasing carbon dioxide in the air, contributes to the prevention of global warming when used as an alternative of energy and products derived from fossil resource. The government will promote its use. (Cabinet Office, MIC, MEXT, MAFF, METI, MLIT, MOE) [Cited in Chapter 2, Section 2]
- Concerning greening rooftops and greenery on walls, the government will make efforts to grasp their effects by collecting empirical data on the degree of contribution to global warming by measuring alleviation of heat island phenomenon in the cities and on the effect as habitat environment for living organisms. (MLIT) [Cited in Chapter 1, Section 7, 2.11]
- To alleviate the heat island phenomenon, the government will promote measures such as greening rooftops, greenery on walls, and highly reflective painting. (MOE)
- Using Japan's experiences and knowledge at home and abroad, the government will promote international cooperation for sustainable agriculture, forestry, and fisheries, and will positively contribute to global environmental conservation such as prevention of desertification, sustainable use of water resources, and measures to tackle global warming. (MAFF) [Cited in Chapter 2, Section 4, 4.4]
- The government will conduct basic research and technical development to promote sustainable forest management in developing countries and measures to prevent global warming. (MAFF) [Cited in Chapter 2, Section 4, 4.4]
- The government will positively participate in international examinations on the assessment of the role forests and wood usage play in the prevention of global warming. (MAFF) [Cited in Chapter 1, Section 5, 1.2]
- Through active participation in international political talks, the government will play a positive role in international society in cooperation with related countries to conserve biodiversity that world forest

resources protect and to prevent global warming, with an eye towards the promotion of sustainable forest management including the measures against illegal logging. (MAFF, MOE, MOFA) [Cited in Chapter 2, Section 4, 3.4]

- The government will implement the researches on the regions having illegal logging problem and on the impact illegal logging would give on forest decrease, global warming, and biodiversity, and will propose in international conferences new policies for deforestation control and biodiversity conservation. (MOE) [Cited in Chapter 2, Section 4, 3.4]
- It was decided to donate to the Forest Carbon Partnership Facility (FCPF) that the World Bank established to develop the methodology of greenhouse gas emission reduction by the conservation of forests. The government will positively contribute to the deforestation control in developing countries and the formulation of the mechanism for sustainable forest management. (MOF, MOE, MAFF, MOFA) [Cited in Chapter 2, Section 4, 3.4]

[Monitoring and adaptive measures]

- As a part of "Comprehensive Ecosystem Monitoring System," the government will enhance the project of "Monitoring Sites 1000." The government will establish about 1000 research sites by the end of FY2007. Furthermore, the government will add and enhance the research sites and research items to grasp more precisely the status of changes in Japan's typical ecosystems such as alpine zones where the impact of global warming appears notably. The government will also continue to monitor changes in the status of endangered species. Based on the results of these researches including one regarding the effects of global warming, the government will carry out, from the standpoint of biodiversity conservation, its necessary studies on adaptive measures, such as clarifying how an ecosystem network should be in order to be more adaptable to environmental changes such as climate change, as well as reviewing points to keep in mind for ecosystem conservation and restoration. (MOE) [Cited in Chapter 1, Section 2, 1.1; Chapter 2, Section 1, 1.2 and Chapter 2, Section 6, 1.1]
- Based on discussions at the World Heritage Committee, the government will build a monitoring setup to grasp the impact of global warming on world heritage sites. (MOE, MAFF) [Cited in Chapter 1, Section 2, 9.1]
- The government will implement a citizen-based survey, that calls for the collection of the information observed on familiar natural environment including the change in the distribution of wildlife caused by global warming, by participation of various entities including research institutions, private organizations, and experts, in addition to general public, and thereby enhance public awareness on the conservation of biodiversity in Japan. In addition, it will build the system to collect wide range of natural environment data. (MOE) [Cited in Chapter 2, Section 3, 1.1 and Chapter 2, Section 5, 2.1]
- In order to secure routes through which wildlife will migrate or disperse in the case of environmental changes such as global warming, the government will promote forming of an ecosystem network. (MOE, MLIT, MAFF) [Cited in Chapter 1 Section 1]
- Based on the resolution by the ICRI on coral reef and climate change, the government will examine adaptive measures for climate change such as the research to improve coral reef resilience against climate change and the support for activities. (MOE) [Cited in Chapter 1 Section 9 1.4]
- Regarding the expansion caused by global warming of the distribution of living organisms, which give

harmful influence on human health and living environment including mosquitoes that transmit infectious diseases, the government will promote appropriate monitoring and surveys and examine comprehensive extermination methods. (MOE)

- The change in weather and oceanic phenomena due to global warming and long-term increased sea level are concerns, and serious impacts are concerns also for beaches, including aggravation of coastal erosion, increase in flood-prone low-rise area, escalation of damage by high tide, and change in habitats of living organisms. For these reasons, the government will monitor tide level and ocean waves, and promote examination as necessary to cope with those changes. (MAFF, MLIT) [Cited in Chapter 1, Section 9, 3.1]
- Based on the anti-global warming strategy of the Ministry of Agriculture, Forestry and Fisheries (formulated in June 2007), the government will make efforts for the development and dissemination of adaptive measures such as the development of heat-tolerant breeds, to cope with the influence of global warming on agriculture, forestry, and fisheries that is unavoidable in the future. (MAFF)
- As a developed country party of the United Nations Convention to Combat Desertification in Those Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa, the government will support combating desertification for the developing countries experiencing serious drought and/or desertification through ODA and others. (MOFA, MOE, MAFF) [Cited in Chapter 2, Section 4, 2.7]
- The government will examine the methods to comprehensively conserve and manage natural resources and implement research and surveys. In addition, the government will provide the scientific knowledge gained by those methods in the Conference of the parties to the Convention and the meetings of subsidiary bodies, and positively tackle the desertification problem in the world. (MOFA, MOE, MAFF) [Cited in Chapter 2, Section 4, 2.7]

Section 7 Environmental Impact Assessments

(Basic Concepts)

For conservation of biodiversity, it is quite essential to take the conservation of the environment into consideration beforehand when formulating and implementing policies and projects of the central government and other parties. Therefore, when planning and implementing central government policies that are deemed to influence the environment, examination and consideration from the viewpoint of environmental conservation is necessary. When implementing the development projects, it is necessary to survey, predict and assess the environmental impact and, based on the results, take the conservation of the environment into consideration, under the Environmental Impact Assessment Law and so on.

The “Environmental Impact Assessment Law” (enforced in June 1999) prescribes that, with large-scale projects that could have a serious impact on the environment, a proponent that is undertaking a project needs to conduct an environmental impact assessment of the project in advance by surveying, predicting and assessing the likely impact, and needs to reflect the results of such environmental impact assessments in determining the content of the project, and thereby give proper consideration to environmental conservation.

The “Basic Guidelines,” which prescribes the basic matters common to all types of projects on the practical method of environmental impact assessment based on the Law, prescribes that it is necessary to select the items and methods of environmental impact assessment in an appropriate manner based on the characteristics of the relevant project and of the related area. In regard to the “protection of biodiversity and orderly conservation of the natural environment” and the “rich and harmonious contact between people and nature” pointed out as categories for assessment items, proponents are requested to give consideration for a better environment in the project, including not only valuable matters such as important fauna and flora from academic or scarcity-value viewpoints or outstanding landscapes, but also contact with the nature close at hand and familiar living organisms that characterize the regional ecosystem. In regard to the measures for protecting the environment, it is prescribed that, rather than taking compensatory mitigation by creating an equal environment to the one that would be lost by the project, the avoidance and decrease of environmental impact itself should be given priority for examination.

In addition, almost all prefectures and ordinance-designated cities have their own environmental impact assessment ordinance, and appropriate environmental consideration should be taken based on the conditions of the regions.

Furthermore, the idea of strategic environmental assessment to incorporate consideration of the environment into the formulation and implementation of policies and plans that give frameworks for the planning and implementation of individual projects (superordinate plan) should be materialized, and examination to establish the system of this strategic environmental assessment should be promoted.

1 Environmental impact assessment

(Outline of Measures and Policies)

In implementing each project, opinions on the Environmental Impact Assessment will be given as necessary. After completion of procedures, appropriate follow-up needs to be made for the projects for which the Minister of the Environment stated his opinion and follow-up surveys are to be made.

In addition, the situation of the enforcement of the Environmental Impact Assessment Law will be examined, necessary measures including revision of the law taken, and the “Basic Guidelines” checked, thus

enhancing the system. The methods for reasonably conducting surveys, prediction and assessment and measures for protecting the environment are continuously examined, and the practical information and technical support necessary for environmental impact assessment will be continuously provided. The method to promote communication among the people related to environmental impact assessment is also examined.

Furthermore, continuous efforts for the establishment of strategic environment assessment need to be made.

1.1 Enhancement of environmental impact assessment

(Current Situation and Challenges)

The number of the projects that took the procedure of environmental impact assessment based on the Environmental Impact Assessment Law (projects for which the procedure either has finished or is underway) is 169 as of the end of March 2007. After the procedure, each project enter the stage of construction and then of service. Each time, appropriate consideration concerning environmental conservation needs to be taken based on the Environmental Impact Assessment statement.

For better environmental impact assessment in the future, in addition to the examination of the state of enforcement of the law, it is necessary to continuously review the technical method, to examine the function of the “scoping document concerning the environmental impact assessment” to use it to the fullest extent, and to develop the method of promoting communication among the people related to environmental impact assessment.

(Specific Measures and Policies)

- For the implementation of each project, the government will state its opinion on the “scoping document concerning the environmental impact assessment” as necessary, for the environmental impact assessment to be appropriately and smoothly implemented and for appropriate consideration on environmental conservation to be taken based also on the viewpoints of “protection of biodiversity and orderly conservation of the natural environment” and “rich and harmonious contact between people and nature.” (MOE)
- After the process of the environmental impact assessment has finished, the government will appropriately follow up the projects for which the Minister of the Environment stated his opinion and the ones for which ex-post researches are to be made (MOE, relevant government ministries and agencies)
- The government will examine the situation of the enforcement of the Environmental Impact Assessment Law, and based on the result, take necessary measures including revision of the law. (MOE)
- The appropriateness of the Basic Guidelines always needs to be examined. The government will adequately grasp the situation of implementation after the previous examination (March 2005), will implement examination based on the recent scientific knowledge and the implementation status of the environmental impact assessment, and thereby enhance the system. (MOE)
- In regard to the methods to predict and assess environmental impact and the measures for protecting the environment, including avoidance, decrease or compensatory mitigation, the government will improve technical and systematic methods by continuously examining, for example, analysis of the impact actually caused by the implementation of various projects as well as the factors not well known in the past. (MOE)
- The government will continuously provide technical support and information necessary to implement

environmental impact assessment for citizens, NGOs, corporations, local governments, etc. via the Internet and other media. (MOE)

- The government will examine the method to promote wide-range and effective communication among the people concerned with environmental impact assessment. (MOE)

1.2 Introduction of strategic environmental assessment

(Current Situation and Challenges)

Based on the Third Basic Environment Plan (April 2006), Guidelines for the Introduction of Strategic Environmental Assessment (SEA Guidelines) were made in March 2007 by the Advisory Body to the Environmental Policy Bureau of the Ministry of Environment on Strategic Environmental Assessment of academics and experts. SEA Guidelines describe common procedure and assessment method to attempt avoidance or decrease of serious environmental impact caused by the implementation of project, by measuring significant environmental impact, comparatively assessing the environmental aspects of alternatives, summarizing the items to consider for the environment, and reflecting them in the examination of the plan at an early stage before starting the project, for the superordinate plans at the stage of examining location, size and so on.

Related efforts have been developing also for public works for roads, rivers, airports, ports and harbors, as seen in the disclosure of information in their planning process and presentation of guidelines for participation by citizens.

In the future, continuous efforts for the establishment of strategic environment assessment need to be made.

(Specific Measures and Policies)

- Concerning the strategic environment assessment, at the stage of examining the location and size of a project, the government will examine the implementation and accumulate implementation samples based on the report of the Advisory Body to the Environmental Policy Bureau of the Ministry of Environment on Strategic Environmental Assessment (March 2007), the characteristics of the project, and SEA Guidelines, etc. In addition, based on those implementations, the government will constantly revise the SEA Guidelines. (MAFF, MLIT, MOE, MOD)
- The government will provide information on SEA Guidelines, and organize the method for local governments to put in order and provide regional environmental information. (MOE)
- The government will promote the examination regarding strategic environmental assessment for making decisions on superior plans and policies. (MOE)

2 Other major efforts to reduce the environmental impact

(Outline of Measures and Policies)

Based on the Environmental Impact Assessment Law and other laws, environmental conservation will be considered in the implementation of public works. Furthermore, “Environmental Action Plan of the Ministry of Land, Infrastructure and Transport” (June 2004) and the “Technical Guidelines on the Research Plan and Design for Implementation of the Projects that Considers Harmony with Environment” (March 2006) that describes environmental considerations in land improvement projects, have been made to decrease

environmental impact in the implementation of public works.

Concerning the environmental impact of Japan's Official Development Assistance, the Japan International Cooperation Agency (JICA) has formulated the "JICA Guidelines for Environmental and Social Considerations" (April 2004), and is trying to avoid or minimize environmental impact also from the viewpoint of biodiversity, and thereby considering environments for their projects.

2.1 Environmental consideration in dam constructions [Cited in Chapter 1, Section 8, 1.4]

(Current Situation and Challenges)

In implementing dam projects, environmental research is conducted beforehand to fully grasp the living and breeding environment of living organisms, and the impact dam projects would exert on the environment is examined. From the planning stage of the project, measures for environmental conservation are taken to avoid, decrease, or compensate for the impact on living and breeding environments of various living organisms as much as possible, by locational changes of the mountain from which rocks for dam construction are extracted and of alternative road, establishment of the facility to change sluice gates, consideration in operation plan, restoration of woods at the construction facility site, and protection and maintenance of biotopes. Thus, natural environment is taken into consideration. Furthermore, during construction and after starting service, environment research is conducted to grasp the degree of the project's influence and effect of environmental conservation measures.

(Specific Measures and Policies)

- When implementing dam projects, the government will conduct careful examination for paying sufficient attention to the natural environment from its planning stage. In addition, by taking environmental conservation measures such as previous environmental research and environmental impact assessment, the government will try to avoid and decrease the impact on inhabitation, growth, and breeding environment of various living organisms as much as possible. (MLIT)

2.2 Measures for roads to alleviate environmental impact

(Current Situation and Challenges)

In implementing the project to construct roads, detailed research on natural environment is conducted at an early stage of planning and designing a road, and the route is selected which can harmonize with rich nature as much as possible. The measures that take the ecosystem into account are promoted, such as selection of structure to avoid big changes in terrain and vegetation, construction of fences to avoid animals to enter into the road area or of a crossway for animals to avoid having them cross the road and have collisions with cars, and preparation of alternative environments to restore the habitat that is changed by road construction. Furthermore, efforts are promoted by introducing the road planning process that citizens can participate in at the planning stage.

(Specific Measures and Policies)

- In implementing a road project, the government will consider the following points to promote the measures that ecosystem is taken into account. (MLIT)
 - (1) The government will conduct detailed research and accumulation of data on natural environment.

Based on them, the government will make efforts to select the route that can conserve rich nature and to adopt structure to avoid big changes in landscape and vegetation as necessary.

- (2) For a base with rich nature such as national parks, the government will induce the use of roads that harmonizes with nature, by constructing, for example, a parking lot in a surrounding area to enable park-and-ride from private vehicle to public transportation such as a bus.
- (3) From the viewpoint of avoiding cutoff of animals' habitat and of conserving the growing environment for plants, the government will make effort to construct the roads taking the ecosystem into consideration, by constructing animals' crossways and setting signs to call for attention on animals.
- (4) In regard to the slopes of embankment caused by road constructions, the government will restore them as close natural status as possible by revegetation, by using the vegetation that best matches natural conditions of weather and soil of the region, including the use of existing infrastructure.
- (5) For the road constructions of some regions, the government will positively make efforts concerning the formation of inhabitation and growth environment for fauna and flora (biotopes), by devising the types of plant for planting with consideration on the surrounding natural environment.

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