PART II

Chapter 7

Nature and Biodiversity

Nature conservation is identified as a priority in Japan, and is one of the three pillars of the 2007 Sustainable Society Strategy. However, biodiversity loss is increasing and greater efforts are needed to converge with good practices in other OECD countries. This chapter examines the management of biodiversity in protected areas and activities outside protected areas that affect species and their habitats, in particular agriculture, forestry and fisheries.

Assessment and recommendations*

In recent years, protection of biodiversity has been assigned a higher priority in Japan: it is one of the three pillars of the 2007 Strategy for a Sustainable Society, and Japan will host the 10th meeting of the Conference of the Parties to the Convention on Biological Diversity (CBD) in October 2010. In 2007, Japan adopted its *3rd National Biodiversity Strategy*, and in 2008, the *Basic Act on Biodiversity* that is intended to guide the review of existing laws. In March 2010, Japan released its 4th National Biodiversity Strategy. However, protection of biodiversity within and outside protected areas has not been sufficient to significantly reduce the rate of biodiversity loss, which is the target agreed by the CBD Conference of the Parties in 2002.

Japan has a relatively high share of endemic species. *A high portion, by OECD standards, face extinction*; nearly a quarter of mammal species and more than a third of freshwater fish species. Conservation programmes are being implemented for 82 endangered species. The situation has deteriorated since the 2002 *OECD Environmental Performance Review*, underlining the need for strengthened protection measures. Intensive agricultural production, insufficient integration of environmental considerations into forestry and marine policies, and, increasingly, invasive alien species have been the main sources of pressure on species and their habitats. Global warming is intensifying these pressures.

About 24% of Japan's territory is designated as protected in various forms, such as natural parks. However, *only 3.3% of Japan's territory has nature conservation as its primary function* (IUCN categories I and II), which is low by OECD standards. Japan hosts three UNESCO World Natural Heritage Sites, and 37 wetlands of international importance. Although two-thirds of Japan's land area is covered in forest (25 million hectares), only 781 000 hectares of national forests are protected as ecosystem reserves. The length of coastline in a natural state has continued to decline. Hence, there is scope to significantly increase the portion of *national forests and marine areas* dedicated to nature conservation and biodiversity protection. The variety of protection regimes has resulted in heterogeneous management practices, and a need to further streamline nature conservation laws. *Financing for nature conservation* remains at a low level and has not noticeably improved since the last OECD review. Opportunities to charge people for accessing nature conservation sites remain insufficiently exploited.

A number of efforts have been made to *monitor ecosystems* and to *restore habitats*. However, a national strategy should be developed and implemented for restoring nature along rivers which serve as important corridors for biodiversity. More generally, biodiversity corridors need to be expanded to allow species to adapt to global warming.

There has been some progress in *inter-ministerial co-ordination in the management of protected areas*, for example, the Ministry of the Environment and the Ministry of Agriculture, Forestry and Fisheries have worked to connect existing protected forests.

* Assessment and recommendations reviewed and approved by the OECD Working Party on Environmental Performance at its meeting on 4 May 2010.

However, there is generally a need for closer, more effective co-ordination, particularly between these two ministries. An effective and policy-relevant biodiversity monitoring system involving all relevant ministries is needed.

The area of farmland has decreased continuously over the last 20 years, due to residential, commercial and infrastructure development. *Agricultural production is heavily supported*; 85% of assistance to farmers is in the form of market price support, which is more environmentally damaging than some other forms of support. Japanese agriculture is generally very intensive. More effective means must be found to integrate biodiversity protection into sectoral policies, particularly for agriculture, forestry and fisheries. This includes withdrawing or redesigning subsidies to provide better incentives to protect biodiversity, and establishing payments for ecological services.

The Japanese government is actively promoting the *Satoyama Initiative*. Domestically, this involves revitalising landscapes that once had achieved a balance between production and conservation of biodiversity and ecosystem services. However, there are questions about the extent and changes in the area of *satoyama* landscapes. Moreover, many *satoyama* areas have not proven to be economically viable under current policies. Many have been abandoned, and the increasing age of local communities has reinforced this trend.

There have been many valuable initiatives at the local level in rural, coastal and urban areas. Local populations have actively participated in protecting biodiversity in designated areas and in developing *green urban areas*. The national target of establishing 13 square metres of public open space per resident in urban areas was achieved. However, there is scope for better *co-operation among prefectures* to address biodiversity protection issues, such as maintaining game populations to an optimal size that cut across their jurisdictions.

Recommendations

- Consolidate the *policy framework for biodiversity protection*, in particular streamline nature protection legislation, strengthen inter-ministerial co-operation and better link biodiversity monitoring with policy-making.
- Expand the territory allocated to nature protection, in particular in *national forests and marine areas*, and provide additional finance for this purpose.
- Develop a *strategy for biodiversity corridors*, particularly in forests and along rivers, taking account of possible impacts of climate change.
- Redesign *agricultural support measures* so as to reduce the negative impacts on biodiversity, and provide incentives to protect it.
- Establish *payments for ecological services* as a means to protect biodiversity, including in *satoyama areas*.

1. Policy framework and objectives

Legal framework

Nature conservation in Japan is based on a *range of laws*. Since the last *OECD Environmental Performance Review* (EPR), new legislation passed for conserving nature includes the Law for the Promotion of Nature Restoration (2002) and the Alien Species Act (2004). The *2008 Basic Act on Biodiversity* is intended to guide the review and revision of all

nature legislation and provide a legal basis for future biodiversity strategies. It has already led to revision of the National Parks Law and the Nature Conservation Law in June 2009. A new national biodiversity strategy (NBS) was released in March 2010.

National biodiversity strategy

Japan has implemented the 2002 OECD recommendation to "*review and revise the national biodiversity strategy*". The 1995 NBS has been revised three times over the review period (2002, 2007 and 2010). The 3rd NBS, released in November 2007, reiterates the main thrust of the 2nd NBS, which is that biodiversity should support life and livelihood.[1] The 3rd strategy also reiterates the importance of addressing the three issues identified in 2002: *i)* species and habitat degradation due to excessive human activity (over-use); *ii)* degradation of biodiversity in the countryside (*satochi-satoyama*) due to insufficient management (under-use); and *iii)* ecosystem disturbances caused by alien species. It also adds a new critical issue: *iv)* the potentially huge threat of species extinction and ecosystem collapse caused by global warming (MOE, 2008a). The 4th NBS provides a set of measures to halt biodiversity loss in Japan in the short-term (by 2020) and sets the target to improve the state of biodiversity from the current level by 2050.

The 3rd NBS sets the following *three broad goals* to create a "society in harmony with nature": conservation of flora and fauna and indigenous ecosystems; sustainable use of land and natural resources; and integration of biodiversity concerns into social and economic policies.

The 3rd NBS' Action Plan sets *quantitative targets*, notably:

- By 2012, designate ten new sites for inclusion in the List of Wetlands of International Importance under the 1971 Ramsar Convention Wetlands, in addition to the 33 existing sites in 2006.
- Designate 15 new species for protection by 2012 on top of the existing 73 designated for protection under the Law on the Conservation of Endangered Species of Wild Fauna and Flora.
- Increase the number of wildlife management plans from 90 in 2006 to 170 by 2012 under the Wildlife Protection and Hunting Management Law.
- Increase the number of eco-farmers from 110 000 in 2006 to 200 000 by end 2009.
- By 2012, increase the number of nature restoration committees by ten (from 19 in 2006) under the Law for the Promotion of Nature Restoration.
- Return Japanese ibises to the wild and make 60 of them settle in the Niigita prefecture (by 2015).
- Increase public awareness of the word "biodiversity" so that at least 50% of the population know what it means (by 2012).[2]

The Convention on Biological Diversity (CBD)

The 10th meeting of the Conference of the Parties (COP 10) to the Convention on Biological Diversity (CBD), which Japan will host in Nagoya, Aichi prefecture, in October 2010, will mark an important milestone: 2010 is the UN International Year of Biodiversity. It is also the deadline for the *2010 biodiversity target* adopted at the COP 6 (The Hague, Netherlands, 2002), which requires contracting parties to significantly reduce the

rate of loss of biological diversity by 2010. For this occasion, Japan committed itself to prepare indicators to monitor progress in meeting the CBD 2010 biodiversity target, and to designate biodiversity conservation "hot spots" in Japan.

The private sector

Following a declaration of intent on nature conservation in 2003, the *Japan Business Federation* (Keidanren) released, in March 2009, its "declaration on biodiversity". The overall objective is to establish a corporate management vision for dealing with biodiversity concerns. More specifically, Keidaren encourages its members to:

- Assess the impacts of their planned activities on biodiversity, both at home and abroad.
- Consider biodiversity trading or off-setting measures, as appropriate.
- Engage in biodiversity programmes not directly linked to the operations of the company; and promote biodiversity-friendly technology.

Recommendations of the 2002 OECD Environmental Performance Review (EPR)

A benchmark for assessing Japan's performance related to biodiversity is provided by the recommendations of the 2002 EPR (OECD, 2002). Important steps have been taken to implement the OECD recommendations (Table 7.1), but in many cases further efforts are needed.

Table 7.1. **Actions taken on the 2002 EPR recommendations for nature and biodiversity**

Recommendations	Actions taken
Strengthen measures to prevent the decrease, fragmentation and degradation of habitats in *protected areas* and extend such areas and their interconnection within a national nature network.	The first Regulated Utilisation Area (2006) and a new national and a quasi-national park (2007) were designated; there are now 29 national parks and 56 quasi-national parks in Japan. The 3rd national biodiversity strategy (2007) and MOE's "National Ecological Network Concept" (2008) stress the importance of conservation and restoration through networking ecosystems. The Natural Parks Law and the Nature Conservation Law (2009) were revised to enhance marine conservation measures and establish an ecosystem maintenance and recovery programme.
Intensify efforts to *integrate nature and biodiversity concerns* in agriculture, forestry, fishery and spatial planning policies (*e.g.* by gradually phasing out environmentally harmful subsidies, making support conditional on compliance with environmental and nature conservation standards, or rewarding efforts to improve biodiversity and amenities).	The level of support to farmers has been reduced, although it remains high by OECD standards and mostly linked to agricultural production. In 2007, Japan introduced new payments to promote environmentally friendly farming on 10% of commercial farms. Allotment gardens in urban areas have improved to function more as public green space. 63 resource recovery plans to restore fish stocks and ensure sound fishery management were implemented by 2008.
Review and revise the *national biodiversity strategy*.	The 3rd national biodiversity strategy was released in 2007; it includes 660 specific measures and sets 34 quantifiable targets. The 4th national biodiversity strategy was released in 2010.
Further strengthen the financial means, human resources and institutional capacities for *management of protected areas*; explore options for establishing financial mechanisms (*e.g.* a compensation fund for nature, financed by charges on land conversion and habitat interference).	Number of Active Rangers increased from 60 in 2005 to 80 in 2008.
Continue to promote *re-naturalisation projects* to rehabilitate degraded ecosystems and to return to nature unused agricultural or industrial land and reclaimed wetlands.	The Law for the Promotion of Nature Restoration and the Basic Policy for Nature Restoration came into effect in 2003, and the Policy was revised in 2008. Nature Restoration Committees have been established under the law at 21 sites and 20 Implementation Plans for the Nature Restoration Programme have been formulated.
Accelerate progress in preserving and creating urban or peri-urban *open green space* and in revitalising *river banks*, with appropriate public participation.	Greening has been made mandatory for new and existing buildings above a certain size. As of 2008, 113 207 ha of urban parks were improved; 2 106 ha of special green conservation areas and 3 456 ha of special suburban green conservation areas were designated; 77 ha of civic green space were contracted; and the green area system was implemented in two areas. The National River Basin Census for River Basins was carried out and Basic Guidelines on Nature-Oriented River Improvement were issued.

Source: OECD, Environment Directorate.

2. The state of nature and biodiversity

Besides the Ministry of the Environment (MOE), many ministries and agencies collect information on biodiversity (*e.g.* in forests, agricultural areas, rivers, oceans). Effective conservation measures could be better implemented at the local and regional levels if such information were shared and managed collectively (and not individually, as is often currently the case). For this reason, an *inter-ministerial monitoring system* on biodiversity should be created. This would also help prepare indicators to monitor progress in meeting the CBD 2010 biodiversity target and to designate biodiversity conservation "hot spots", which are both objectives that Japan is committed to reaching under the COP 10 CBD.

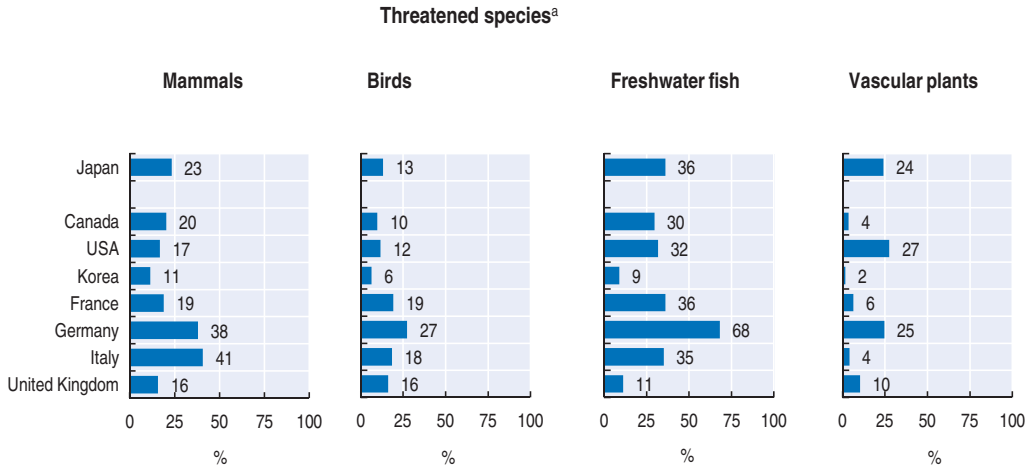
2.1. Endangered species

Japan has a *high share of endemic species*, reflecting habitats long isolated, including islands (*e.g.* Okinawa, Amami and Ogasawara) and mountainous regions. Approximately 40% of terrestrial mammals and vascular plants, 60% of reptiles and 80% of amphibians are endemic to Japan.

Overall, more than a third of freshwater fish, more than 30% of Japan's reptiles and amphibians, nearly a quarter of mammal species and of vascular plants, and more than 10% of birds living in Japan face a significant threat of extinction. These are high proportions by OECD standards (Figure 7.1). The *situation has deteriorated* since the last EPR (2002), reflecting insufficient attention given to nature protection within and outside protected areas. The 2nd revision (2006-07) of the Red List of Endangered Species includes 3 155 species, *i.e.* 461 species more than in 2002; however, this may also partly reflect scientific progress in identifying endangered species.

Japan is on track for meeting the 3rd biodiversity strategy objective of designating 15 new species for protection by 2012, which would be in addition to the 73 species designated for protection in 2006. Based on the Law on the Conservation of Endangered Species of Wild Fauna and Flora, 82 species have been classified as national endangered species so far, for which MOE has implemented *conservation programmes*. Thanks to the collaboration of local people and other stakeholders, success has been achieved in some

Figure 7.1. **Fauna and flora**



a) IUCN categories "critically endangered", "endangered" and "vulnerable" in % of known species.

Source: OECD, Environment Directorate.

Box 7.1. **Initiatives to reintroduce large birds and protect migratory birds**

Oriental white storks and crested ibises, widespread in rural areas throughout the country until around the 18th century, have become extinct in the wild because of over-hunting and other factors. Following successful captive breeding (initiated in 1965), this stork was successfully reintroduced in the wild in 2005 in the Hyogo prefecture. This is the result of a bottom-up approach, regrouping efforts by the local government (Toyooka City), NGOs and local residents. Stork-oriented rice farming has become the symbol of biodiversity friendly farming. As for the crested ibis, following successful captive breeding (since 1999), experimental release in the wild started in 2008 in Niigata prefecture (Sado City). The aim set by the 3rd biodiversity strategy is to make 60 ibises settle in Niigita prefecture by 2015. These *attempts to reintroduce large birds* to populated areas are among the first in the world and would not have been made possible without good co-operation with the Russian Federation (stork) and China (ibis). Under the US-Japan Migratory Bird Treaty, which entered into force in 1974, the breeding of short-tailed albatrosses in wild habitat has been successfully realised on Torishima island (an uninhabited island in the Pacific Ocean).

Some bird species travel a long distance between northern and southern hemispheres for wintering and breeding. On the initiative of the Australian and Japanese governments, the *Partnership for the East Asian Australasian Flyway* was established in 2006 to conserve such migratory birds and their habitats in their flyway. This partnership involves ten governments, as well as NGOs and international organisations.

localities in protecting some critically endangered species, such as the Tsushima leopard cat, the Okinawa rail, the Japanese wood pigeon, the Abe salamander, the Itasenpara bitterling, and the Blakiston's fish owl (MOE, 2008b). Initiatives have also been taken to reintroduce large birds and protect migratory birds (Box 7.1).

Over the last 25 years, the number and distribution of some large mammals, such as the sika deer and wild boar, have greatly expanded, causing serious impacts on natural ecosystems. Animal fences have been installed and buffer zones created to control the increase of deer populations. The affected prefectures or local governments have authorised more hunting, which increased from 150 000 to 200 000 head a year between 2000 and 2005, for both deer and boars. However, there are no co-ordinated efforts among prefectures to revise hunting plans so as to *maintain game populations at an optimal size*. The Wildlife Protection and Hunting Management Law has been revised several times (1999, 2002, 2006) for this purpose. The number of wildlife management plans was increased from 90 in 2006 to 104 in 2009. The 3rd biodiversity strategy has set a target of 170 wildlife management plans, to be reached by 2012.

Global warming is expected to intensify pressures on species and their habitats. For example, it is predicted that a 1-3°C increase in sea-surface temperature would result in the bleaching and extensive death of coral reef (MOE, 2008b). Further efforts are needed to create biodiversity corridors that would allow species to adapt to global warming, as highlighted in Japan's 3rd national biodiversity strategy.

2.2. Alien species

Alien species did not become a concern for Japan until the mid-1990s, when their adverse effects manifested themselves in various parts of the country.[3] Many invasive alien species (IAS) have since *expanded their range and become one of the major factors threatening biodiversity* (Washitani, 2008). Of the estimated 2 232 foreign IAS that have been brought into Japan and

"established" there, 28 are mammal species, 39 bird, 13 reptile, 3 amphibian, 44 fish, 415 insect, 39 arthropod (other than insects), 57 mollusc (plus 13 other of invertebrate), 1 548 vascular plant, 3 other plant, and 30 are parasite species (Murakami and Washitani, 2002).

As a result, *Japan's flora and fauna have changed significantly.* For example, alien fish species are already found in three out of four of the country's largest rivers (*e.g.* large-mouth black bass), and alien plants are found in almost all of these rivers (*e.g.* African love-grass, Italian ryegrass, late goldenrod) (Figure 7.2). In Japan's 109 largest rivers, one out of four to five plant species is alien. Monitoring of IAS should be expanded to other ecosystems, with priority given to Japanese islands where the risk of exotic species significantly changing local biota and ecosystems is particularly high, given the high level of endemic species.

The *Alien Species Act* (2004) regulates the feeding, cultivation, storage, transport and import of IAS. So far, 97 IAS have been designated pursuant to the Act.[4] One of them is the racoon, for which a nationwide distribution survey was carried out in 2007 to help devise effective eradication measures. Another is the goat, which was originally introduced in the Ogasawara islands where it became wild. Removal of wild goats on several Ogasawara islands was completed in 2003; it was then started on other islands in 2004. Eradication of this alien species is all the more necessary if Japan wants the Ogasawara islands to become a UNESCO World Natural Heritage site, as announced in 2007. Ratification of the International Maritime Organisation's *Ship Ballast Water Convention* (Chapter 4) would provide an additional means of enhancing protection against IAS.

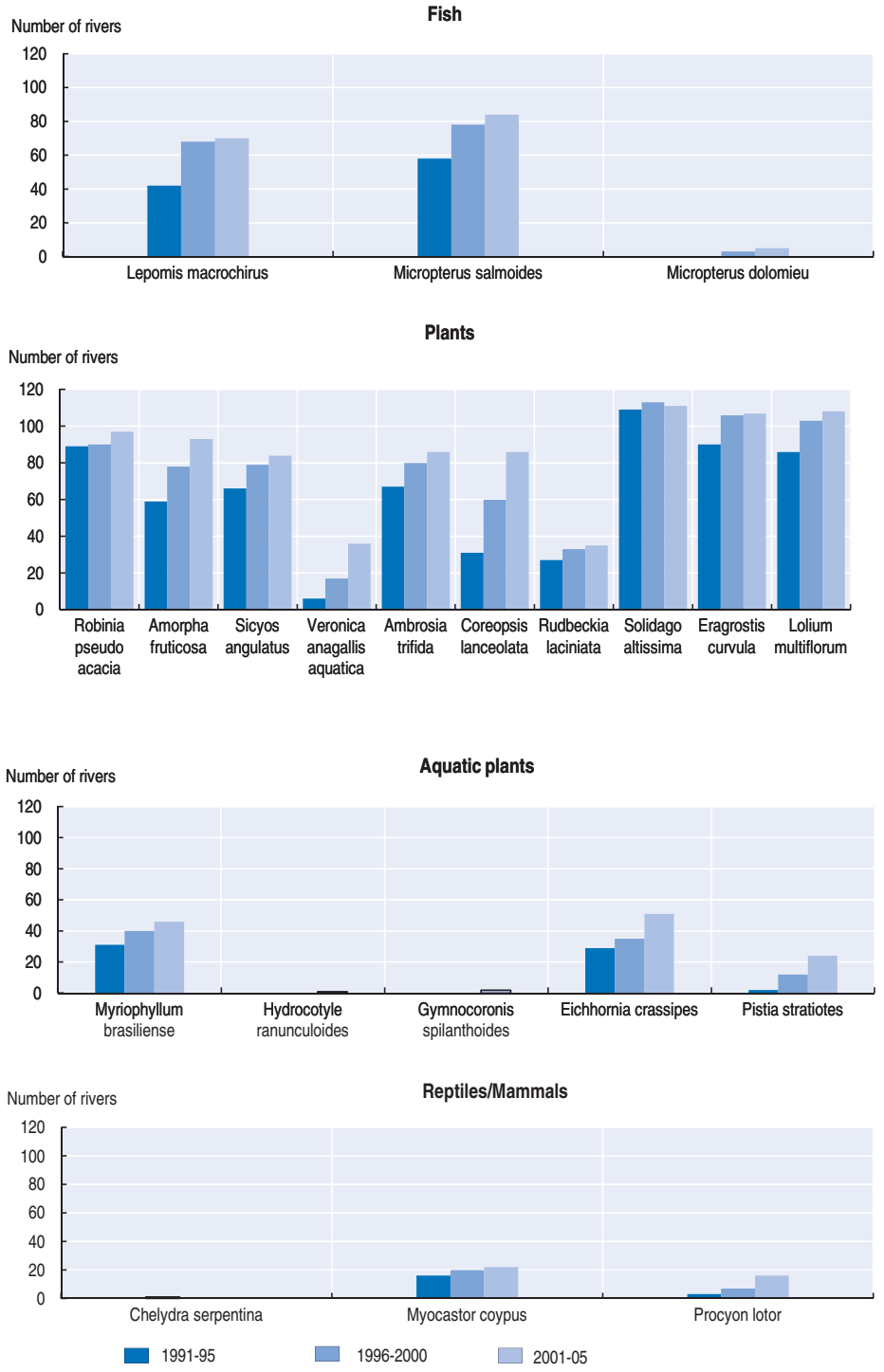
2.3. Ecosystems

The National Survey on the Natural Environment examines the condition of a range of ecosystems, including rivers, lakes, wetlands and coastal habitats. The survey has been conducted for more than 30 years, at approximately five-year intervals. Undertaken with broad support from civil society (*e.g.* schools, NGOs) it has provided extremely valuable information.

The 5th survey, conducted in 1998, focused on *coastal habitats*. It shows that the natural coast has continued to decrease and accounts for 53% of the over 33 000 km of Japanese coastline (including islands) (MOE, 1998). Semi-natural coast accounts for 13%, artificial coast for 33% and estuaries for the remaining 1%.[5] Tidal flats, seaweed and sea-grass beds, and coral reefs[6] have also continued to decrease. The number of common orient clams, which is an indicator species for tidal flats of large inner bays, has been declining rapidly in recent years, and the fragmentation of the clam's habitat raises concern for the species' survival.

The *Monitoring Sites 1 000 project*, initiated in 2003, aims to detect signs of ecosystem degradation over the long term (100 years or more) through monitoring about 1 000 sites throughout Japan. It includes terrestrial and marine ecosystems. It is too early to draw conclusions at this point. *Nature restoration projects* have been carried out in a range of ecosystems – such as rivers, wetlands, tidal flats, seaweed beds, *satoyama* (rural ecosystems) and forests, as recommended by the previous *OECD Environmental Performance Review* of Japan (Table 7.1). MOE and the Ministry of Land, Infrastructure, Transport and Tourism (MLIT) have taken co-ordinated action (nationwide) to restore nature along rivers (greening of river banks) and for improving the habitat of fish and other aquatic organisms in community waterways, such as rivers and irrigation channels. Manuals have been compiled for improving the effectiveness of such project co-ordination. MLIT published in 2005 a "Guide for Creating Rivers That Fish Can Easily Ascend", based on 19 model rivers that have fish ladders. In 2006, MLIT issued basic guidelines on nature oriented-river improvements.

Figure 7.2. **Invasive alien species in rivers, 1991-2005**



Source: Study Group on Impacts and Management of Alien Species (2008).

However, Japan does not yet have a national vision and policy or target for re-naturing its rivers (*i.e.* returning them to a more natural state) or for restoration of natural habitats along river banks. This should be a key component of Japan's nature conservation policy, as rivers are very important biodiversity corridors. Many dams have been built on Japanese

rivers to control floods, with the result that fish can run up to 80% of the total length in only nine major rivers (out of 109). The MLIT is committed to pursuing *integrated water resource management* (IWRM), which also involves looking at water quality and nature management of river basins. Further efforts are needed to develop a comprehensive ecosystem approach to integrated water resource management by MLIT.

3. Nature and biodiversity protection in designated areas

Overall, Japan has designated some 24% of its land area for protection, totalling more than 9 million ha (Table 7.2). Protected areas are shared across the whole territory, including islands, covering a variety of ecosystems. *Only 5.8% of Japan's territory has been registered by the International Union for Conservation of Nature (IUCN)*, which is low by OECD standards (Figure 7.3). Only 3.3% of Japan's territory conforms with IUCN categories I and II (strict nature reserves, wilderness areas and national parks).

Little progress has been made in expanding protected areas since 2000 (Table 7.2): 44 areas have been designated in recent years (totalling 140 000 ha), mostly in the form of (little restrictive) wildlife protection areas (74 000 ha). Since 2000, 12 new nature conservation areas have been established, totalling 2 700 ha only, and none at the national level. One national park – Oze National Park, formerly a part of the Nikko National Park – was the first new national park to open in 20 years. One quasi-national park[7] (in Kyoto prefecture) was the first new designated such protected area in 17 years.

Table 7.2. **Protected areas, 2000-08**

Type of protected areas	2000		2008					
	Number[a]	Area (1 000 ha)	Number[a]	Area (1 000 ha)	Area[b] (% of Japan's land area)			(% nature[c])
					Total	SZ	SPZ	
Wilderness areas[d]	5	5.6	5	5.6	*0.01*		*0.01*	*100*
Nature conservation areas[d]	534	95.3	546	98.0	*0.26*	*0.12*	*0.05*	
National	10	21.6	10	21.6	*0.06*	*0.05*	*0.04*	*67*
Prefectural	524	73.7	536	76.4	*0.20*	*0.07*	*0.01*	*5*
Natural parks[e]	390 (63)	5 347.1 (2.7)	394 (69)	5 409.9 (3.8)	*14.31*	*9.20*	*0.91*	
National parks	28 (32)	2 046.5 (1.3)	29 (38)	2 086.9 (2.4)	*5.52*	*3.97*	*0.73*	*13*
Quasi-national parks	55 (31)	1 343.2 (1.4)	56 (31)	1 362.0 (1.4)	*3.60*	*3.35*	*0.18*	*5*
Prefectural natural parks	307	1 957.4	309	1 961.0	*5.19*	*1.88*	–	–
Wildlife protection areas[f]	3 858	3 567.0	3 884	3 641.0	*9.63*	*0.78*	*0.78*	
National	54	493.0	69	548.0	*1.45*	*0.39*	*0.39*	*27*
Prefectural	3 804	3 074.0	3 815	3 093.0	*8.18*	*0.39*	*0.39*	*5*
Natural habitat conservation areas[g]	7	0.9	9	0.9	*0.00*		*0.00*	*100*
Total protected areas[h]	**4 794 (63)**	**9 015.9 (3.8)**	**4 838 (63)**	**9 155.4 (3.8)**	***24.21***	***10.10***	***1.75***	***7***

a) Figures in parentheses are for marine park zones. There can be several such zones in a natural park.
b) Protected areas are further subdivided into ordinary zones, special zones (SZ) and special protection zones (SPZ). SPZ are the most strictly controlled, and ordinary zones the least controlled.
c) Share of the area protected for nature conservation purposes (SPZ/total land's area under protection).
d) Under the 1972 Nature Conservation Law.
e) Under the 1957 Natural Parks Law.
f) Under the 1918 Wildlife Protection and Hunting Law.
g) Under the1992 Law on Conservation of Endangered Species.
h) Some protection categories overlap.
Source: Ministry of the Environment.

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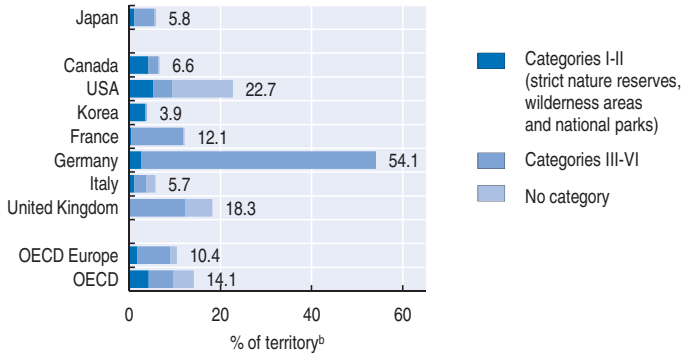
Figure 7.3. **Protected areas, 2009**[a]



a) Designated terrestrial and marine areas. IUCN management categories I-VI and protected areas without IUCN category assignment. National classifications may differ.
b) Surface area, inland waters and territorial waters out to 12 nautical miles.

Source: IUCN/UNEP-WCMC (December 2009), *World Database on Protected Areas; Global Maritime Boundaries Database* (December 2009).

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A key joint initiative of the Ministry of Agriculture, Forestry and Fisheries (MAFF) and MOE for national forests has been to *interconnect existing ecosystem reserves in national forests*. As of April 2009, 509 000 ha of "green corridors" have been established by the MAFF's Forestry Agency (*i.e.* 7% of the national forest area). Such green corridors may prove crucial in the context of climate change where many wildlife species may need to move to new habitats.

Japan hosts *three UNESCO World Natural Heritage Sites* and is promoting the creation of a fourth one (Ogasawara islands). Japan has designated *37 wetlands of international importance*, an increase from 11 in 1999 and 33 in 2005,[8] and is therefore on track for meeting the 3rd national biodiversity strategy objective of 43 wetlands by Ramsar COP 11 in 2012. This result was made possible by designating rice paddies, in accordance with the Ramsar Convention on Wetlands (1971).[9]

3.1. Management of protected areas

Nature conservation is based on a range of laws and the approach to nature conservation and biodiversity concerns in these laws varies considerably depending on the law's primary purpose. The variety of protection categories has led to *heterogeneous management practices*. In contrast to wilderness areas, natural habitat conservation areas and national nature conservation areas, which are protected exclusively or largely for nature conservation purposes,[10] natural parks were primarily established to preserve the scenic beauty of landscapes with high amenity value. Promoting recreational and tourist activities and conservation of biodiversity are the key intents. The main management feature of wildlife protection areas is that hunting is banned. Construction, tree felling and some other activities are restricted on only 7% of the total area of these zones, those having the status of special protection area (Table 7.2). Benefits could be gained from streamlining nature legislation and making the overall system of nature protection more coherent.

To address pressures resulting from an ever-increasing number of visitors,[11] the Natural Parks Law was amended to create *regulated utilisation areas*, where only a limited number of entrants are allowed (*e.g.* 100 people per day in peak tourism periods, fewer

during the rest of the year).[12] Entrance is subject to a permit. Fines for breaking the rules specific to these areas (*e.g.* no littering, no feeding of animals, and limited noise) may be up to JPY 500 000 or six months penal servitude.

Since 2005, the *national park management staff* has been increased. The MOE's 73 ranger offices[13] now have 80 "active rangers" to patrol nature protection areas and provide guidance to visitors. The Tokyo Metropolitan Government (TMG) has its own wildlife rangers. In 2004, the TMG also started to employ its own park rangers to enhance nature protection in Tokyo's natural parks.

3.2. Institutional co-ordination

There have been some *encouraging initiatives to foster inter-ministerial co-ordination*. In particular, the (ongoing) establishment of green corridors in national forests is a very positive step towards enhanced co-operation between MOE and the Forestry Agency. Regional liaison committees have been established for the UNESCO World Natural Heritage Sites. For each site, management activities (*e.g.* patrolling, promoting appropriate use, disseminating information) are implemented based on a management plan that was established through close collaboration between the relevant government agencies (MOE, 2006).

However, much remains to be done to improve *co-ordination between government agencies*, particularly between MOE and the Forestry Agency. Designation, management and administration of protected areas under nature legislation are the responsibility of MOE. In contrast, forest ecosystem reserves are established and managed in national forests by the Forestry Agency. As a result, while most nationally owned land in Japan is national forest, 781 000 ha of national forests have been protected as ecosystem reserves, compared with the nine million ha of protected areas administered by MOE.[14] Stronger co-operation between MOE and the Forestry Agency is needed to enhance nature conservation in national forests and expand the number of ecosystem reserves. This would raise the share of national territory under nature protection, and improve Japan's profile against OECD standards in this area.

Japan has placed great importance on *partnerships with local governments, citizens and NGOs* in promoting nature and biodiversity protection in designated areas. For example, under the Green Workers Programme, established in 2004, local residents have helped in managing natural parks (on 165 sites nationwide). Another example is the creation of nature restoration committees in 21 regions to restore ecosystems through voluntary participation of local communities; however, the 3rd biodiversity strategy objective of increasing the number of these committees to 29 by 2012 has not yet been met. The Basic Policy for Nature Restoration, first released in 2003, was revised in 2008 with a view to promote effective implementation of nature restoration projects.[15] There are several good examples of local governments fostering co-ordination with citizens' groups to protect biodiversity (*e.g.* reintroduction of the oriental stork in Toyooka City) or to restore habitats (*e.g.* sea grass beds in the few remaining natural coasts of Tokyo Bay; fish biodiversity corridors between the rice paddies and Lake Biwa in Shiga prefecture).

3.3. Urban green parks

Following to the 2002 OECD EPR recommendations (Table 7.1), the City Parks Law and the City Green Zone Conservation Law were amended in 2004. The amendment introduced three new schemes to expand the scope for urban green space. The Green Zone Conservation Scheme aims to protect relatively large-scale green zones near cities, such as

satoyama. The Greenery Area Scheme imposes greening requirements on large-scale construction projects in areas where greenery is especially scarce. The Horizontal City Parks Scheme promotes the greening of artificial grounds and rooftops.

As a result, the national targets of tripling urban green space and reaching 13 m^2 *urban public open space per resident* – set by the 3rd biodiversity strategy – were achieved in 2008, when urban parks covered 113 000 ha. This was primarily due to the introduction of greening requirements for large-scale buildings and of horizontal city park schemes. In addition, agreements have been made with landowners to give public access to 77 hectares of privately owned green urban areas ("civic green space").[16] In 2009, MLIT raised the national target to 14 m^2 urban public open space per resident.

Initiatives have been taken to enhance *public participation*. For example, under the Tokyo Greenship Action Programme (TGAP), launched in 2003, projects have been carried out by volunteers (including municipal employees) in collaboration with non-profit organisations (NPOs) to protect forests in ten (out of 47) conservation zones selected by the Tokyo Metropolitan Government (TMG).[17] In 2007, it launched the ECO-TOP Programme to develop expertise on nature conservation in collaboration with the national government, companies and NPOs. This resulted in TMG certifying, in 2008, two nature and conservation courses (undergraduate and graduate levels) at the Tokyo Metropolitan University (TMG, 2009). Since the last EPR in 2002, there have been various other initiatives to enhance the greening of urban areas.

4. Nature and biodiversity protection outside of designated areas

The 2007 *MAFF biodiversity strategy* primarily seeks conservation of: *i)* the rural environment and *satoyama* through, for example, promotion of sustainable agriculture, including organic farming and on-farm biodiversity enhancement; *ii)* forests (*e.g.* appropriate thinning); and *iii) satoumi* (*e.g.* tidal flats and seaweed beds). To monitor progress in implementing the strategy, MAFF is developing indicators for measuring biodiversity in agriculture, forestry and fisheries.

4.1. *Agricultural areas*

The *objective to preserve agricultural land* is rooted in the many roles that paddy land plays – as part of the social landscape, as a buffer for water flows and as a contributor to food security. However, the farmland area has decreased continuously over the last 20 years. This is largely due to the conversion of farmland for non-agricultural use.

Conservation and revitalisation of satoyama landscapes

The 2007 Strategy for a Sustainable Society states that "Japan will revive and further develop the wisdom of living in harmony with nature and propose the Satoyama Initiative to the world". In May 2008, the Satoyama Initiative was presented in the "Call for Action for Biodiversity" at the G8 Environmental Ministerial Meeting and in the Japanese Minister of the Environment's declaration at the CBD COP 9 held in Bonn (Germany). The Initiative proposes a vision for resource management and land use that achieves a balance between economic production and conservation of biodiversity and ecosystem services on a global scale.

Traditionally, *satoyama* refers to secondary woodlands or grasslands that are managed for thatch, fodder and compost. Japan's traditional landscape also includes other rural environments, such as arable fields and orchards, rice paddies, irrigation ponds and

ditches, and the villages and farmsteads themselves. The *complex rural ecosystem* formed by the combination of *satoyama* and these other environments is called the "*satoyama* landscape" (MOE, 2009).[18] By forming a mosaic of different kinds of woodland, grassland and wetland environments, the satoyama landscape can provide a transition between different ecosystems (ecotones) and *habitats for wildlife*. It can also provide other ecosystem services, such as disaster prevention and watershed protection. According to MOE, areas classified as *satoyama* make up approximately 40% of Japan's land area (MOE, 2008a).[19] Japanese people often feel a deep emotional attachment to the *satoyama* landscape and it has been a source of inspiration, imagination and creativity in Japanese culture.

A 2003 MAFF survey of paddy fields revealed that traditional satoyama landscapes provide habitat for one-third of total fresh water fish species and dragonflies, a quarter of reptiles and amphibians, about one-fifth of birds and 14% of plants. Nevertheless, the contribution of satoyama landscapes to biodiversity conservation is the subject of debate. Many experts consider that only few satoyama areas are still endowed with high biodiversity. Most have been *abandoned due to unfavourable economics of farming, the ageing of the farming community* and also, paradoxically, as a result of policies designed to keep land in agriculture and prevent land conversion.[20]

Ongoing initiatives by MOE aim to identify good satoyama practices, support selected satoyama, develop innovative use of satoyama resources, promote participation of urban citizens and private companies in these efforts, and develop an action plan for satoyama restoration. Since 2004, pilot projects for satoyama restoration have been conducted in four regions, and activities developed in these pilots have been widely published to encourage their dissemination. MAFF has taken similar initiatives, for example to promote "beautiful villages".

The effectiveness of the Satoyama Initiative in protecting biodiversity could be enhanced by better targeting payments to farmers so as to provide incentives for biodiversity protection. Consideration could also be given to *creating demand for products from satoyama areas by raising consumer awareness*. In 2008, MAFF started to recommend the use of a voluntary eco-label called the "living creature mark". It applies to agriculture, forestry and marine products produced in a way that preserves local living creatures (*e.g.* rice with an oriental white stork mark). These brands may support local economies and are welcomed by consumers,[21] who recognise that rice grown in paddies where abundant fish and birds live is also safe and healthy for humans. Finally, more effective biodiversity protection in the context of satoyama conservation and restoration requires better monitoring.

Agricultural policy and biodiversity conservation

In 2007, Japan introduced an agricultural support scheme designed to promote more *environmentally friendly farming*. The scheme applies to five crops plus rice. To be eligible, producers have to be certified (by governors) as "eco-farmers". This involves reducing the use of chemical fertilisers and pesticides by half compared to conventional farming. The number of eco-farmers has rapidly increased, from 12 in 2000 to 186 000 in 2008 (or 10% of commercial farms), and Japan is on track for meeting the target set by the 3rd biodiversity strategy (200 000 eco-farmers). Such rapid enrolment in the scheme would not have been possible without (sufficient) incentives in the form of interest concessions and payments (by prefectures). Further expanding the scheme would require additional budgetary support, which was JPY 3 billion (about USD 30 million) a year in 2007 and 2008. *Payments for environmentally friendly farming* account for only 0.5% of total payments to farmers, a very low share compared with agri-environmental payments in the EU and the US.

The government is increasingly reducing its involvement in the price formation of agricultural products. Overall, there has been a *reduction in the level of support to producers*: the percentage Producer Support Estimate (% PSE) of Japan decreased from 58% in 2000-02 to 49% in 2006-08. However, *many production incentives remain* that have the potential to distort commodity production, and thereby make farmers more likely to take decisions based on production rather than environmental criteria. The level of producer support, as measured by the % PSE, is still almost twice the OECD average (Chapter 2). Further efforts are needed to reduce the high level of support to farmers and increase market access, while moving towards more decoupled policies that are better targeted to farm income, rural development, and environmental objectives (OECD, 2009a).

Direct payments to farmers in mountainous and hilly areas were introduced by MAFF in 2000 to lower the rate of farmland abandonment. Targeting agricultural areas that bring the greatest environmental benefits with policies aimed at securing those benefits will work better than policies affecting the agricultural sector more broadly (OECD, 2009b). To make the Satoyama Initiative a successful one, Japan should consider introducing *payments targeted to satoyama services*. This may help to achieve the first objective of the MAFF 2007 biodiversity strategy, namely conservation of the rural environment and satoyama.

Environmental performance of agriculture

MAFF is developing indicators to measure biodiversity in agriculture, an objective of the 2007 MAFF biodiversity strategy. A key agri-environmental challenge in Japan is strengthening the sector's capacity to provide *ecosystem and biodiversity services* in a context of abandonment of agricultural land. Many common species in agricultural landscapes (freshwater fish, insects, amphibians, paddy weeds, grassland plants) are now listed on national and prefectural red lists, suggesting that the biodiversity of agricultural landscapes is increasingly under threat (Washitani, 2008).

The intensity of pesticide use in Japan remains very high by OECD standards (Chapter 3). *Organic farming* techniques have yet to be adopted, for which MAFF has established demonstration farms at a budgetary cost of JPY 4.4 billion (USD 47 million). It is expected that by 2011 all prefectures and half of the municipalities will have launched promotional plans for organic farming; 14 prefectures have already done so. Organic products currently account for only 0.2% of agricultural production (in volume).

4.2. Forestry

Forests play a key role in shaping Japan's nature and biodiversity as they cover *two-thirds of Japan's land area* (25 million ha). The area covered by forests has remained constant over time. The multifunctional role of forests is well rooted in public perception, and environmental functions have largely taken precedence over economic functions (*i.e.* wood production) in successive opinion polls (Table 7.3) Carbon sequestration has become the top forest management priority for the Japanese government. Disaster prevention, particularly protection against flooding, and headwater conservation are still fairly highly ranked forest functions, while social functions (*i.e.* recreation) rank in the middle.

Between 2000 and 2008, the forest areas designated as *protection forests* increased from nine million to nearly 12 million ha. Restrictions on forestry activities in these areas vary according to the services they are expected to fulfil: water resource conservation, erosion control, or public health and recreation. The conversion of these forests to other land uses is

Table 7.3. **Forest functions in public perception,[a] 1980-2007**

Forest functions	1980	1993	1999	2003	2007	Trends
Global warming mitigation	n.i.	n.i.	39	42	54	++
Disaster prevention	62	65	56	50	49	–
Headwater conservation	51	59	41	42	44	–
Air purification/noise reduction	37	38	30	31	39	=
Health and recreation	27	14	16	26	32	+
Wildlife habitat	n.i.	45	26	23	22	–
Outdoor education	n.i.	14	24	19	18	=
Wood production	55	27	13	18	15	–
Non-wood forest products	18	10	15	14	11	–

n.i.: Not included in poll.
a) % of responses in opinion polls with a maximum of three answers per multiple choice.
Source: Cabinet Office.

strictly controlled, and permission from MAFF is required. *Intensity of forest use* is very low in Japan, with only about one-third of the annual growth harvested, mainly because of difficult access to forest areas.

The *river basin approach* provides a context for sustainable forest management, since well-maintained forests have a key role in preventing landslides and flooding, and in protecting headwater quality. In particular, the river basin approach permits links between upstream and downstream communities, so that mechanisms for compensation and equitable sharing of benefits and burdens can be developed.

Progress has been made to achieve the 2007 MAFF biodiversity strategy objective of *improving forest conservation through appropriate thinning*. For example, in Kyoto prefecture (where forests cover 75% of the land) enhanced thinning has been pursued to increase timber productivity (less competition among trees) and carbon sequestration, but also to support biodiversity (more light on the underground). The thinned wood is then used for biomass production. This type of forest management is certified under the "Miyako Somagi" forest certification system. In addition, Kyoto prefecture encourages more intense forest use, for example by subsidising the use of local timber to build local houses.

However, the share of conifer plantations (primarily Japanese cedar) has increased at the expense of *natural forests* and now accounts for 47% of the total forest area in Japan. MAFF is developing indicators to measure biodiversity in relation to forestry, which is an objective of the 2007 MAFF biodiversity strategy.

Some 781 000 ha (or around 10%) of national forests are protected by MAFF as *ecosystem reserves*. The goal of such reserves is to preserve primeval forests of substantial size and particular forest types, with a view to protecting biodiversity and ecosystems, preserving genetic resources and contributing to research.

4.3. Fisheries

Measures have been taken to enhance the *protection of living marine resources*. The capture of sea turtles (two species), whales (blue whale, bowhead whale and finless porpoise) and dugongs has been banned. Studies and field research have been carried out to investigate the ecology, stock and migration of blue whales. Also, efforts have been made to eradicate invasive alien fish species, and by-catch prevention technologies have been developed. However, among the various types of marine protected areas, the extent of *marine areas strictly protected* from any human activity has remained extremely small. Efforts are underway to define the

various types of marine protected areas as indicated by the 2007 Basic Act on Ocean Policy. The 2009 amendment to the Nature Parks Law and Nature Conservation Law stresses the importance of biodiversity conservation in marine areas. As part of its biodiversity strategy, MAFF is developing indicators to measure biodiversity in relation to fisheries.

Japan manages its fisheries through *fishing effort regulation*. Japan's Total Allowable Catch (TAC) systems currently cover 30% of total fishing in Japan's Exclusive Economic Zone (EEZ). Introduced in 2003, the Total Allowable Effort (TAE) sets an upper limit on the number of fishing days and the number of operating vessels in a specific area within the EEZ. For offshore fisheries, a license (per vessel) specifies detailed terms and conditions for the major fishery operations, including limitations on fishing areas, fishing seasons, base port, gear use and fishing methods. This "fishery licensing system" coexists with the TAC and TAE schemes. Moreover, the government maintains a "fishery vessel registration system", and the total number and the total gross tonnage of fishing vessels are closely monitored (OECD, 2009c).

Resource Recovery Plans are being implemented to rebuild the stocks of 74 fish species. A key component of these plans is to *preserve and rehabilitate fishing grounds* (*e.g.* sea grass beds, tidal flats). *Fishery management in coastal areas* is based on traditional local fishery rights, and could serve as a model for other OECD countries. Groups of fishermen (fishery co-operative associations) traditionally have exclusive rights for operating certain fisheries, and thus assume all responsibility for ensuring the long-term sustainability of the resources. Also, interest concessions are granted for the renewal of small fishing boats in an effort to perpetuate Japanese coastal fisheries.

5. Expenditure on nature conservation

5.1. *Public expenditure*

Little has been done since the 2002 OECD EPR to improve financing of nature conservation. In 2009, MOE was allocated JPY 16 billion (USD 170 million) from the *central budget* for its nature management activities. The same amount was allocated to nature protection by the Ministry of Education, Culture, Sports, Science and Technology.[22] Significantly more was allocated to nature protection by MAFF and MLIT. However, this represents a very minor part of the annual budgetary transfers to farmers and to MLIT water resource development plans, the latter being primarily used for building dams, canals and reservoirs. In 2009, nature management accounted for 7% of the total budgetary transfers to MOE, and for 12% of the total budgetary transfers to all ministries for environmental management.

Despite "society in harmony with nature" being one of the three pillars of Japan's 2007 Strategy for a Sustainable Society,[23] the JPY 15.4 trillion (USD 165 billion) government contribution to the *policy package to address the economic crisis*, released in April 2009, does not include support specifically intended for nature management.[24] In contrast, some 10% of this package (USD 16.7 billion) is devoted to further supporting the farming and tourism sectors. In September 2009, the new government announced its intent to *increase support to farmers* to JPY 1 trillion (over USD 10 billion) by 2013, a 50% increase over the current level of direct payments. This contrasts with the OECD recommendation to reduce the (already) high level of support to Japanese agriculture (OECD, 2009a). At a minimum, environmental cross compliance requirements should be attached to such support, which should not further distort agricultural production and trade; ideally, such support should also be linked to otherwise unremunerated but beneficial public services, such as environmental and biodiversity protection.

5.2. Financing

There is no *entry fee for national parks* but a service fee is sometimes charged for visitors' information centres (when these are managed by the private sector or a municipality). Parking fees are sometimes charged, in which case the revenues are used to clean up the park. An access fee (JPY 1 000) is charged for regulated utilisation areas. In *Okinawa*, a service fee for scuba diving has made it possible to raise money to fund nature protection projects. Such financing instruments could be introduced on other islands and applied to eco-tourism.

Thirty (out of 47) prefectures levy a *forestry protection tax* aimed at complementing allocations from the central budget for forest management and conservation activities. In most cases, a surtax is added for the management and conservation of regional forests, including the protection of headwaters critical to the water supply. In addition, in some prefectures, private companies, organisations and individuals living adjacent to downstream rivers may contribute to a fund for afforestation and thinning in upstream forests in exchange of tax breaks.

In 2009, Yokohama City began collecting a new tax, the *Yokohama greenery tax*, which will be applied for an initial 5-year period. The tax rate is JPY 900 (USD 10) per household and per semester. It will raise JPY 2.4 billion (USD 26 million) per year, which represents 15% of the central budget's annual allocation for MOE's nature management activities. Yokohama is the first (and so far only) city in Japan that applies such a greenery tax. The greenery tax rate should be differentiated based on the increase in property value, with houses close to new green spaces paying more than others.

In 2007, the Tokyo Metropolitan Government (TMG) established the *Fund for Green Tokyo*. Donators are eligible for income or individual inhabitant tax breaks. They can select the type of project their donation should be used for (*e.g.* roadside trees, planting grass in schoolyards).

There is scope to further develop *payment for ecosystem services* in Japan (Box 7.2). For example, private landowners could be compensated for the provision of well-defined and monitored biodiversity services, including in protected areas. This could prove a more cost-effective means of protecting biodiversity than relying on the public budget to finance additional MOE staff. Similarly, there is scope to increase or introduce fees for accessing environmental resources, for example in pristine coastal areas and protected areas.

Box 7.2. **Paying for ecosystem services: The Yodo River**

One example of a scheme involving payments for ecological services involves upstream and downstream communities on the Yodo River. It shows how mechanisms for compensation and equitable sharing of benefits and burdens can be developed. For 30-40 years Osaka prefecture has paid Shiga prefecture a cumulative amount of JPY 50 billion (about USD 530 million) for sustainable forest management around Lake Biwa as part of MLIT's Yodo River water resource development plan and the Lake Biwa comprehensive development plan.* The aim is to protect Lake Biwa (located in Shiga prefecture), which is the source of the Yodo River that supplies drinking water to Osaka prefecture and Osaka City. Effectively the downstream community is paying the upstream community to maintain its source of water supply. Such payments for ecosystem services could be extended to other river basins, based on a cost-effectiveness analysis of meeting the desired objectives (*e.g.* protect the city's water supply sources from pollution).

* The Lake Biwa comprehensive development plan is co-ordinated between MOE, MAFF and MLIT (through their regional offices in Kinki).

Notes

1. Biodiversity: *i)* is the basis for the existence of all life on earth (*e.g.* oxygen supply, soil fertility); *ii)* has a use value (*e.g.* food, timber, medicine); *iii)* is the basis for enriching culture (*e.g.* cultural diversity fostered by local natural environment); and *iv)* provides security of livelihood (*e.g.* disaster reduction).
2. An opinion poll in June 2009 revealed that 61.5% of Japanese had never heard of the word. This is particularly true in rural areas and among Japanese women.
3. For example, the redback spider, which is harmful to humans, was found in Takaishi City (Osaka prefecture) in 1995, and the Java mongoose was found to be a threat to rare species such as Amami rabbits, on Amami-Oshima island (Kagoshima prefecture).
4. The banded mongoose was added to the list of IAS in 2010.
5. A natural coast is a coastline in its natural state, unchanged by human activity and without artificial structure. A semi-natural coast includes roads, dikes and other concrete structures, but its intertidal zone is in a natural state.
6. These ecosystems provide important habitats for fish, shellfish and migratory water birds (tidal flats), and for organisms living in shallow coastal waters and marine resources in bays and estuaries (seaweed beds). Coral reefs support an enormous variety of organisms and have very high biological productivity.
7. Quasi-national parks are designated by MOE and managed by prefectures. They are not eligible to transfers from the central budget but get support from the prefecture.
8. The rapid increase between 1999 and 2005 was a response to the global objective set at COP 7 in 1999 to double the number of sites by 2005.
9. Japan always stressed the importance of rice paddies as wetland systems in the ambit of the Convention on Wetlands.
10. "Natural habitat conservation areas" have been established to protect habitats of the 82 national endangered species. "Wilderness areas" are areas where the natural environment has maintained an ecological stability without being influenced by human activities. "Nature conservation areas" must satisfy certain criteria, such as having outstanding natural forests.
11. National parks attract around 1 billion visits per year.
12. Restrictions in regulated utilisation areas are more stringent than in special protection zones, traditionally the most strictly controlled parts of national parks.
13. Including 67 ranger offices evenly distributed across the territory and six offices on Japanese islands.
14. MOE's protected areas include a (small) part of the forests that are privately owned or that belong to prefectures and municipalities.
15. Nature restoration committees fall under the 2002 Law for the Promotion of Nature Restoration, which is shared between the MOE, MAFF and MLIT. The need to consider upon a variety of opinions within committees has slowed down the decision-making process.
16. The use of privately owned open land in urban areas is strictly regulated (*e.g.* farmland and hilly areas cannot be used for construction).
17. 46 conservation zones (740 ha) have been designated so far, under the Tokyo Metropolitan Nature Conservation Ordinance.
18. Literally *sato* means the surrounding of a village and *yama* means mountain. The *satoyama* concept is also referred to as *satochi-satoyama* (*chi* means ground area or agriculture field).
19. There are broad estimates that 50% of farmland is intensive, 40% is satoyama and 10% is eco-farming.
20. Policies aimed at preserving farmland have also had the effect of reducing the attractiveness of land rental transactions and have led to under-use of agricultural land.
21. Though twice as expensive as common rice, Japanese consumers seem to be prepared to buy such rice brands, as shown by the rapidly increasing success of "consumer co-operation" shops where they are sold.
22. The Ministry administers the natural monuments (*e.g.* specific animal and plant habitats, geological and mineral features), based on the Law for the Protection of Cultural Properties.
23. Together with a "low-carbon society" and a "sound material-cycle society".
24. 10% of the overall recovery package has been allocated to low-carbon measures.

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