PART I

Chapter 1

Developments since the 2002 Review

In a changing economic, social and international context, Japan has managed to reduce some of the pressures on the environment, notably energy use, air emissions, water abstractions and municipal waste generation. However, greenhouse gas emissions and generation of non-municipal waste have grown, pressures on nature and biodiversity have intensified, and air and water pollution remain of concern in some areas. Japan defined its own model of a sustainable society, based on a low-carbon economy, sound material cycle and biodiversity conservation. These three priority areas are reflected in the environmental plans that were approved at both national and local levels during the review period. Japan has also taken steps to improve inter-institutional co-ordination and the integration of environmental concerns into sectoral planning.

Assessment and recommendations*

Prior to the 2008-09 global economic downturn, Japan's economy had grown steadily, albeit at a much lower rate than in other Asia Pacific region and OECD countries. The economic expansion phase was characterised by a reduction in both energy and resource intensities. Progress was made in reducing some *pressures on the environment*, notably air emissions, water abstractions and municipal waste generation. However, further efforts are needed to reduce the generation of non-municipal waste, manage the risks associated with chemicals, and tackle air and water pollution in some areas. Greenhouse gas emissions have grown and are above the Kyoto target. Pressures on nature and biodiversity have also intensified.

In recent years, there has been a move from a strictly environmental *interpretation of sustainable development* to a more integrated approach, recognising the linkages between environmental protection, economic growth and social change. These linkages are given much emphasis in the 2006 Third Basic Environment Plan and the 2009 New Growth Strategy. The 2007 Strategy for a Sustainable Society outlines the pillars of Japan's sustainable society model: low-carbon economy, sound material-cycle and harmony with nature. However, there is no specific institution that co-ordinates governmental policy on sustainable development. While mechanisms are in place to ensure policy co-ordination, *integrated policy-making remains difficult*, with ministries and local authorities focussing on the implementation of their respective sectoral and local plans.

As recommended by the 2002 *OECD Environmental Performance Review*, Japan reinforced its evaluation procedures to *ensure accountability for the implementation of environmental plans*. The Ministry of the Environment and its major advisory body, the Central Environment Council, annually conduct progress reviews and disclose the results to the public. However, these reviews do not sufficiently assess the *cost-effectiveness of the policy mix*. In many cases, considerations other than effectiveness and efficiency guide policy choices, which are often selected from a limited set of options. Japan's environmental administration would also benefit from further strengthening the independence of its advisory bodies.

Recommendations

- Clarify linkages and priorities among different *sectoral plans and the basic environment plans*.
- Strengthen *inter-institutional co-operation*, so as to ensure more effective and coherent integration of sectoral and environmental policies at all levels of government.
- Improve the *evaluation of environmental policy* by strengthening *ex ante* and *ex post* economic analysis and enhancing the independence of advisory bodies.

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

1. Key socio-economic developments

1.1. *Economic structure and performance*

Japan is the *OECD's second largest economy*[1] and a major player in world trade. After the so-called "Lost Decade" of the 1990s, a prolonged period of economic stagnation and deflationary pressures, Japan began to recover in the early 2000s, driven by its exports. However, between 2000 and 2008, Japan's economy grew at a much lower rate than the OECD average (Table 1.1). The global economic slowdown of 2008 and the simultaneous rise in the

Table 1.1. **Socio-economic trends and environmental pressures**

	Japan (2000-08, % change)	OECD (2000-08, % change)
Selected economic trends		
GDP[a]	10.6	18.5
Private final consumption[a]	9.2	20.0
Agricultural production[b]	–2.0	. .
Industrial production[c]	5.5	10.3
Road transport[b]		
Freight transport[d]	10.8	. .
Passenger car transport[e]	–2.3	. .
Vehicle stock	9.9	15.0
Energy		
Total primary energy supply	–5.1	3.5
Total final consumption of energy[b]	–0.8	4.6
Energy intensity	–18.2	–26.1
Renewable energy supply	–7.7	18.8
Selected social trends		
Population	0.6	5.6
Life expectancy at birth[b]	1.7	. .
Ageing index[f]	37.9	18.9[b]
Poverty rates[g]	8.8	. .
Unemployment	–15.9	–0.6
Selected environmental pressures		
Pollution[b]		
CO_2 emissions from energy use[i]	4.7	4.1
Emissions of SO_x	–15.3	–20.4
Emissions of NO_x	–8.0	–15.3
Resource use		
Water abstractions[h]	–4.1	. .
Municipal waste[b]	–7.3	–5.3
Waste from manufacturing industries[b]	14.5	. .
Material intensity[h]	–18.2	–8.2
Nitrogenous fertiliser use[b]	11.2	7.6
Pesticide use[j]	–20.7	. .

a) Based on values in USD at 2005 prices and PPPs.
b) To 2007.
c) Mining and quarrying, manufacturing, and production of electricity, gas and water.
d) Based on values in tonne-kilometres.
e) Based on values in passenger-kilometres.
f) Number of persons over 65 years old per hundred persons under 15 years old.
g) Share of population with an income under 40% of the median income, after taxes and transfers. Between mid-1990s and mid-2000s.
h) To 2005.
i) Sectoral approach; excluding marine and aviation bunkers.
j) To 2006.
Source: OECD, Environment Directorate; OECD-IEA.

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value of the Japanese currency sharply reduced the volume of exports. As a result, the Japanese economy contracted by 1.2% in 2008 and by 5.2% in 2009, and was dragged into the sharpest recession since the Second World War (Chapter 2). The recession bottomed out in late 2009, owing to a rebound in exports and a fiscal stimulus, which limited the negative impact of lower employment and wages on domestic demand (OECD, 2009a).

Industry

Manufacturing industry makes up a larger part of the economy than in many other OECD countries, despite the growth of the service sector. Industrial activity amounted to nearly 30% of GDP in 2007, in line with the OECD average, while the manufacturing sector alone accounted for 21.6% (compared to an estimated OECD average of about 17.5%). Overall, industrial production grew between 2000 and 2008 (Table 1.1). Japan is one of the largest merchandise exporters. High- and medium-high-technology industry, such as transport equipment, electronics and chemicals, make up the largest share of manufactured goods and exports.[2] More traditional sectors, such as steel and metals, also play a key role. Japan is among the largest exporters of technology-intensive goods, although its share in OECD technology exports has considerably decreased (OECD, 2007).

Agriculture

Agricultural production continued to decrease during the review period, as did its share of the economy, going from 1.8% of GDP in 2000 to 1.5% in 2007 (Table 1.1). Japan's agricultural production comprises mainly rice, fruit and vegetables. Japan is the largest net importer of agricultural and wood products in the world. Agriculture is a highly protected sector in Japan. Support to agriculture has decreased, although this support remains among the highest in OECD. Moreover, the vast majority of agricultural subsidies are linked to production levels, with potentially negative impacts on the environment (Chapters 2 and 7).

Energy

While the economy and industrial production grew between 2000 and 2007, Japan's *total final consumption* (TFC) of energy and *total primary energy supply* (TPES) decreased by 1%. Energy use drastically fell in 2008 as a consequence of the economic crisis (Table 1.1). Industry accounts for the largest part of TFC in Japan, with a share of about 30%. Industrial energy consumption has remained largely stable, owing to investments in energy efficiency in some manufacturing sectors. However, growing electricity consumption in the residential and commercial sectors is of concern. Japan's *energy intensity* (TPES per unit of GDP) has decreased, albeit at a lower rate than in many countries, and is among the lowest in OECD (Table 1.1). As in most OECD countries, fossil fuels account for most of TPES. The contribution of *renewables* to energy supply, mostly from hydroelectric power, is relatively modest (Chapter 5).

Transport

Japan has well-developed transport networks. The increasing commercial integration of Japan into the East Asia region has led to intensive air and maritime traffic. Nonetheless, road remains the dominant *freight transport* mode and its volume (in tonne-kilometres) has increased at the same rate as the economy (Table 1.1). However, improved logistics has led to a decline in distance travelled and freight traffic volumes (in vehicle-kilometres). Moreover, contrary to most OECD countries, *passenger transport* by car has decreased since the early 2000s. Several factors explain this trend, including rising fuel prices (Chapter 5).

Compared to other OECD countries, passenger car ownership in Japan has increased at a lower rate and remains below the average (Table 1.1). However, there are significant differences between the major metropolitan areas, where public transport has gained passengers at the expense of private vehicles, and smaller cities and rural areas (MLIT, 2008). Here, passenger travel is increasingly dependent on private cars to cope with the relocation of many public facilities and cultural activities to suburban areas.

1.2. The social context

Japan is one of the most densely populated countries in the world, with a population of over 128 million and a *population density* of 338 inhabitants per square kilometre (km^2), far exceeding the OECD average. Japan's population is mostly concentrated in coastal plains, resulting in large variations of population density across regions. The low fertility rate and immigration levels have led to a *slow population decline*, especially in rural areas (Table 1.1). On the other hand, the number of households has grown, with consequences for energy and resource use.[3] Japan's population is also *rapidly ageing*. Life expectancy at birth exceeds the OECD average by a fair margin and has continued to rise (Table 1.1). Overall, health indicators for the Japanese population are excellent.

The Japanese *unemployment* rate remains low by OECD standards, although it rose to 5% in 2009 due to the economic downturn (Chapter 2). More and more women are part of the labour force. The growing number of non-regular workers is aggravating income inequalities and poverty.[4] The *poverty* rate climbed by about 9% in the last decade, and reached a relatively high level compared to the OECD average (Table 1.1).

The Japanese people demonstrate a growing *awareness of environmental problems* (Chapter 3). For example, 98% of the respondents to recent opinion polls declared to know something or a great deal about climate change. This awareness is translating into concrete action more often than in the past, especially with regard to reducing waste, increasing recycling, and saving energy.

2. Key environmental pressures

Japan's archipelago consists of *four main islands and thousands of small islands* (Box 1.1). More than two-thirds of the country is covered with forests, while arable land constitutes only 13% of the land area and is intensively cultivated (Figure 1.1). Most industries, agricultural activities and people are concentrated in the coastal plains and basins.

Nature and biodiversity

As a result of its wide range of climatic conditions, Japan's vegetation and wildlife are diverse (Box 1.1). However, *pressures on biodiversity are rising*. Relatively high shares of fauna and flora species are threatened by deteriorating and fragmented habitats, and by invasive alien species (Figure 1.1). *Protected areas* registered by the International Union for Conservation of Nature (IUCN) cover less than 6% of the territory, which is low by OECD standards, and very few protected areas have been designated in recent years (Chapter 7). Complex coastlines with many bays and small islands provide Japan with an abundant marine life. However, only a few marine areas are protected. Consumption of *fish* per capita is among the highest in OECD countries. Despite decreased fish production, Japan accounts for the second highest share of the world's fish catches (Figure 1.1). Agriculture is also a major source of pressure on biodiversity. Japan's use of *fertilisers and pesticides* per km^2 of agricultural land remains well above the OECD averages (Chapter 3).

Box 1.1. **Physical context**

Japan is an *archipelago of about 6 800 islands*. Honshu is the largest island, followed by Hokkaido, Kyushu and Shikoku. Together, these four islands represent 98% of Japan's land area, totalling some 378 000 km^2. Japan stretches from 25 to 45 degrees latitude north, has an extensive coastline of about 35 000 kilometres and no land border. Mountains and hilly terrain cover some two-thirds of the country; some mountains in Honshu are over 3 000 metres high, including the well known Mount Fuji. Hills and mountains are cultivated as much as possible. Japan is very *prone to seismic activity*. It experienced around one-fifth of the word's earthquakes of magnitude seven between 1997 and 2006.

As a result of its length, mountainous terrain and proximity to the Asian monsoon area, Japan has *very diverse climatic conditions with great seasonal variations*. Hokkaido has long winters with frequent snowfalls, while the southern islands around Okinawa enjoy a subtropical climate. The central Honshu island is characterised by cold winters and warm, moist summers. Annual precipitation also varies greatly between regions and seasons. In the last few years, *extreme weather events* have become more frequent in Japan, along with a general rise in heavy rain episodes. This increases the risk of floods and has a significant impact in a country where a large part of the population, infrastructure and assets are concentrated in coastal areas and many of the largest bays are below sea level.

Japan's large range of latitude also results in a *wide diversity of flora*. Vegetation ranges from subtropical to temperate and cold temperate, and even alpine. The northern and central islands have a wide variety of evergreen broad-leafed and coniferous forests and deciduous broad-leafed forests. Subtropical rain forests are found in the south western islands. Natural forests make up about half of the total area; the other forests are secondary or planted.

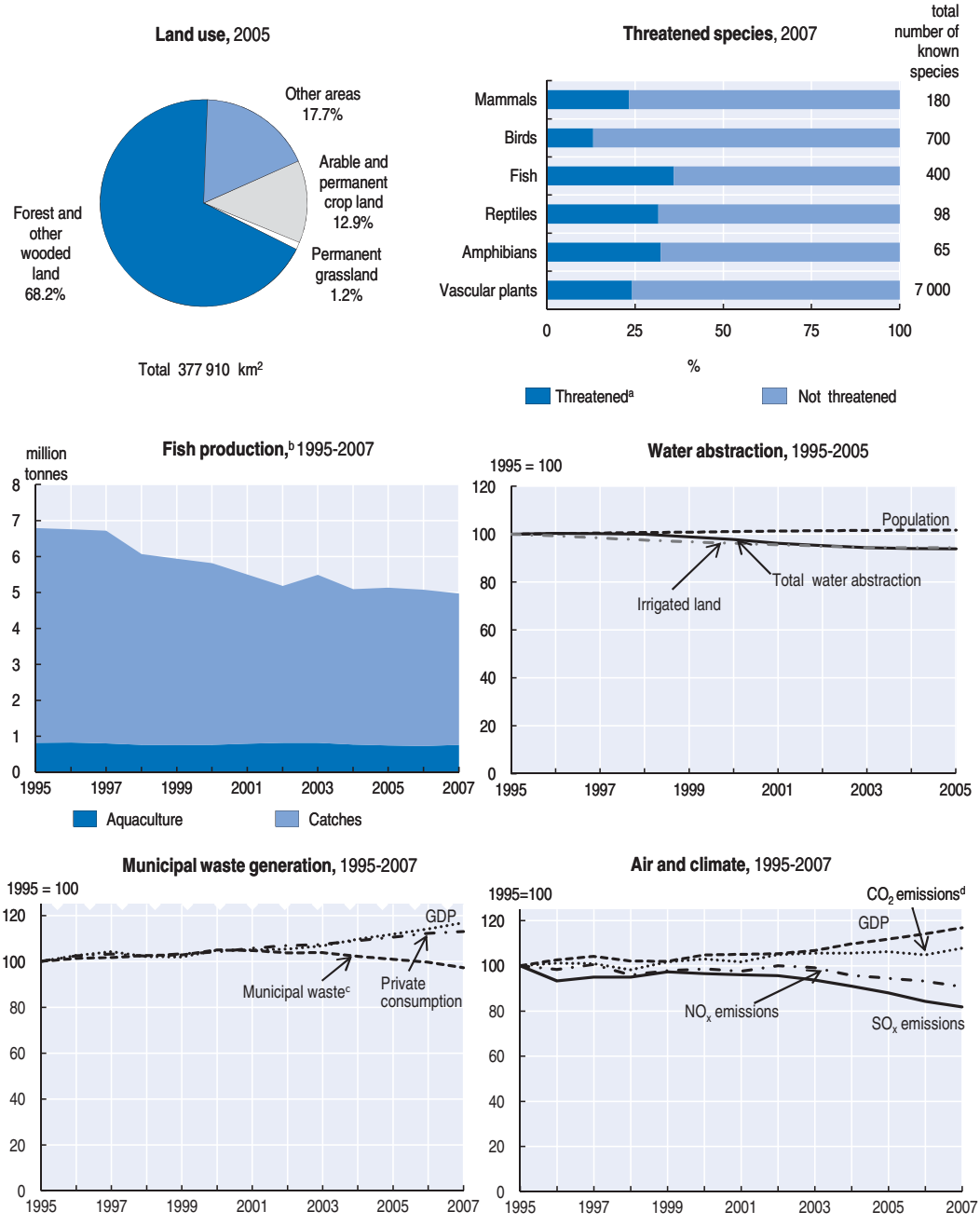
Japan's *wildlife* is diverse. In the southern islands, tropical animals such as the flying fox and the serpent eagle can be found, in addition to the Iriomote cat (found only on Iromotejima Island). The mainland islands host sika deers, mandarin ducks and coppers pheasants. The mainland is also home to the only Japanese indigenous primate, the Japanese macaque. Two bear species are present in Japan: the higuma, found only on Hokkaido, and the smaller Asiatic black bear. Japan seas host an abundant marine life, including seals, sea lions, whales and porpoises. Commercial fish, such as tuna, sardine and squid, play an important economic and social role in the country.

Japan is relatively poor in *natural resources*. It has enough resources in magnesium, gold and silver to meet its needs, but has to import a wide variety of minerals, including bauxite, copper, iron ore and coke. Almost 90% of Japan's energy supply (fossil fuels and uranium) is imported. Japan is also a very large importer of wood and wood products, as domestic round wood production meets less than a fifth of national demand, as well as of living marine resources, which constitute a large share of the Japanese diet.

Water

Water abstraction decreased during the review period, following the decreasing trends in population, agricultural production, and irrigated areas (Figure 1.1). With 650 cubic metres per inhabitant, Japan's water abstraction per capita is below the OECD average, but remains above a large number of OECD countries, notably European. Gross freshwater abstraction represents about 20% of available water resources, indicating a moderate water stress. The overall quality of Japanese rivers has improved, owing to the extension of

Figure 1.1. **Selected environmental indicators**



a) IUCN categories "critically endangered", "endangered" and "vulnerable" in % of known species.
b) Fish catches and aquaculture in inland and marine waters, including freshwater fish, diadromous fish, marine fish, crustaceans, molluscs and miscellaneous aquatic animals. Catches exclude marine mammals, crocodiles, coral, pearls, sponges and aquatic plants.
c) Waste collected by or for municipalities, waste directly delivered and separate collection for recycling by the private sector. It includes household, bulky and commercial waste and similar waste handled at the same facilities.
d) Emissions from energy use only; excludes international marine and aviation bunkers; sectoral approach.

Source: OECD, Environment Directorate; OECD-IEA (2008), *CO_2 Emissions from Fuel Combustion*; OECD (2009), *OECD Economic Outlook*, No. 86.

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wastewater systems. However, lakes and coastal waters continue to suffer from frequent algae blooms, due to the still high nutrient load from agriculture, discharges from small wastewater treatment plants and small factories (Chapter 3).

Waste and material intensity

While GDP and private final consumption increased during the review period, the *generation of municipal waste* decreased by 7% (Figure 1.1). The generation of waste per capita (400 kg in 2007) is among the lowest in OECD countries. Recycling of selected waste streams has improved, and final disposal amounts of waste have been reduced by more than half (Chapter 6). However, waste generation by manufacturing industries has grown faster than GDP. Japan's domestic material consumption (DMC)[5] decreased during the review period. Only DMC of fossil fuels grew, reflecting increasing imports of these fuels and their dominant role in the energy mix (Chapter 5). *Material intensity* (as measured by DMC per unit of GDP) decreased faster than in the other OECD countries and has remained well below the OECD average since 1980 (Table 1.1).

Air pollution

Emissions of sulphur (SO_x) and nitrogen oxides (NO_x) continued to decrease during the economic recovery period (2002-07), showing a strong decoupling from GDP growth and fossil fuel use (Figure 1.1). Emission intensities decreased further during the review period: with 0.2 kg of SO_x and 0.5 kg of NO_x per unit of GDP (USD 1 000), Japan is one of the least pollution-intensive OECD countries. Notable progress was made in reducing emissions of dioxins, especially from waste incineration, as well as transport-related emissions (*e.g.* volatile organic compounds, carbon monoxide and particulate matter), owing to technological improvements of the vehicle fleet. Nonetheless, *air quality in urban areas* remains a problem (Chapter 3). High levels of photochemical oxidants occur, due to emissions from stationary and mobile sources, as well as from sources outside the country (Chapter 4).

Climate change

Greenhouse gas (GHG) emissions further increased; in 2007, they were 9% above the 1990 level, far exceeding the Kyoto Protocol target. The economic recession brought GHG emissions down by 6.4% in 2008. *CO_2 emissions* from energy use have increased by nearly 5% since 2000, albeit at a lower rate than GDP (Figure 1.1). As a result, the carbon intensity of the Japanese economy has decreased and is now below the OECD average. However, progress has been slower than in other major OECD economies, mainly due to a high share of fossil fuels in the energy and electricity mix. Efficiency improvements have helped to moderate the increase of industrial emissions, and higher fuel efficiency of vehicles has largely contributed to the decline in CO_2 emissions from transport (Chapter 5).

3. The framework for sustainable development and environmental management

3.1. *Institutional framework*

Japan's *central environmental administration* was last reorganised in 2001, within the framework of a central government reform. On that occasion, the Ministry of the Environment (MOE) was established, replacing the Japan Environmental Agency (OECD, 2002). MOE has remained the main authority in charge of national environmental policy, and oversees a number of affiliated institutions.[6] Among these, the Japan Environmental

Safety Corporation and the Environmental Restoration and Conservation Agency were established in 2004 to manage the PCB (polychlorinated biphenyls) waste treatment programme and the pollution-related health damage compensation and prevention programmes, respectively (Chapters 3 and 6). Other ministries have key environment-related responsibilities, including: the Ministry of Agriculture, Forestry and Fisheries (MAFF); the Ministry of Land, Infrastructure, Transport and Tourism (MLIT); and the Ministry of Economy, Trade and Industry (METI) (OECD, 2002).

Prefectures and municipalities of metropolitan areas are responsible for local administration, including the implementation of environmental policies.[7] Smaller municipalities do not have environmental regulatory responsibilities, except for municipal waste management. With some 75 000 officials in 2008, the local environmental administration accounts for 3% of the local government staff, and is much larger than the national environmental administration, whose total staff is around 1 500 (MOE, 2009). The human and budgetary resources for environmental management in local governments continued to decrease over the review period, partly due to the outsourcing of waste collection and management to the private sector (Chapter 6). In 2005, MOE established *seven Regional Environmental Offices*[8] to assist local authorities in implementing environmental policies, in particular for waste management and nature conservation. These offices are also responsible for cross-cutting activities, including the development of environmental awareness and education initiatives.

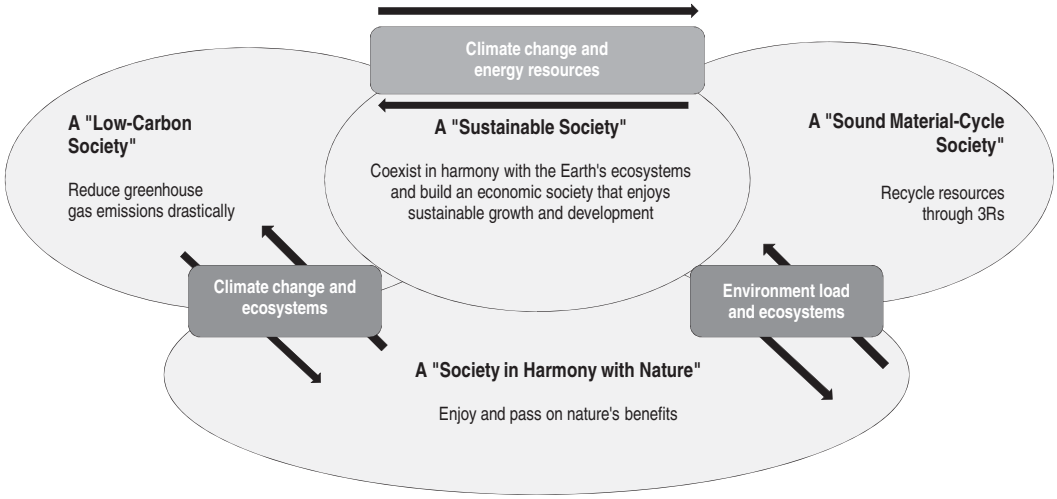
There is no specific institution that co-ordinates governmental policy on sustainable development. Nonetheless, *mechanisms are in place to ensure policy co-ordination* among ministries and consultations with stakeholders. For instance, the Cabinet co-ordinates key strategic policies, such as climate change and ocean policy, with the establishment of *ad hoc* "headquarters". The Central Environment Council, composed of non-governmental experts, remains the major advisory body to MOE (OECD, 2002). The expert councils under the aegis of other ministries also take account of environmental issues. However, the independence of these advisory bodies from the government needs to be reinforced.

3.2. Strategic and planning framework

"Sustainable development" is well-rooted in Japan's strategic policy design. Japan's Strategy for a Sustainable Society in the 21st Century was approved by the Cabinet in 2007. It outlined *Japan's model of a sustainable society*, based on three pillars: low-carbon economy, sound material-cycle and harmony with nature (Figure 1.2).[9] The strategy calls for further co-ordination among institutions, larger participation of all economic and social actors, and enhanced international co-operation. Eco-innovation is at the core of the strategy, and seen as a tool to tackle environmental problems and contribute to economic growth and social progress. Eco-innovation is also a building block of the 2009 New Growth Strategy (Chapter 2).

The *multi-annual basic environment plans*, required by the Basic Environment Law (Chapter 3), are the main components of environmental policy and address the integration of environmental considerations into sectoral policies (OECD, 2002). These plans, which result from inter-ministerial consultations, are approved by the Cabinet and guide government budget allocation. They are implemented through sectoral plans and local plans. According to a 2006 survey, almost all prefectures and larger cities, as well as nearly half of the minor cities, had implemented their basic environmental plans (Ogata, 2006). Some local authorities (*e.g.* the Osaka prefecture) have promoted advanced environmental plans, anticipating measures defined at national level (Box 1.2).

Figure 1.2. **Pillars of a sustainable society**



Source: Government of Japan (2007).

Box 1.2. **Environmental policy at local level: the Osaka experience**

The *Prefecture of Osaka*, in the Kansai region, has a population of nearly 9 million inhabitants. It includes the municipalities of Osaka (2.6 million inhabitants) and of Sakai (840 000 inhabitants). Osaka's economy grew significantly during the review period, although it was severely affected by the 2008-09 economic crisis.

Building on pioneering pollution control efforts, the prefecture has launched and implemented a *comprehensive environmental plan for 2002-10*. The Osaka prefecture is committed to reducing its own GHG emissions by 9% in 2010 compared to the 1990 level; it is on track to achieve this target, having reached a 5.5% reduction in 2007. The local authorities have negotiated GHG emissions reductions with large emitters, introduced carbon offsets, and promoted R&D on fuel cell vehicles and the use of transport fuels containing 3% bio-ethanol. Freight vehicles and buses entering designated areas in Osaka must have a sticker showing compatibility with specific emission requirements, which are more demanding than nation-wide requirements. The prefecture has met its air quality standards for nitrogen oxides and suspended particulate matter. The prefecture has also promoted the 3Rs (reduce, reuse, recycle) and reached high recycling rates of home appliances.

With the 2008-09 economic crisis, more emphasis has been placed on green growth. This concept is central in the *2025 vision* for the development of Osaka prefecture (December 2008). Significant public financial support was injected into the local economy, focusing *inter alia* on energy savings, solar power, fuel cells, low carbon industrial facilities, and research and development. Enterprises are promoting greater Osaka and Kansai as an "Eco-Business Centre of Asia".

As recommended by the 2002 *OECD Environmental Performance Review*, Japan has taken action to improve co-ordination among the basic environment plans and their associated sectoral plans, as well as to better integrate environmental considerations into sectoral policies (Table 1.2). Compared to the previous plans, the 2006 *Third Basic Environment Plan* highlights more explicitly the linkages between environmental protection, economic growth and social change. However, this plan is part of a *complex planning system*, with a

Table 1.2. **Actions taken on the 2002 OECD Review recommendations for sustainable development**

Recommendations	Actions taken
Ensure that co-ordinated and *integrated sectoral plans*, associated with the Second Basic Environment Plan, are developed through close co-operation among the ministries concerned, and assure accountability for implementation of the plans.	The basic environmental plans and the major associated sectoral plans, namely those concerning biodiversity, the material-cycle society, and the achievement of the Kyoto target on climate change, were approved by the Cabinet, thereby committing ministries concerned. MOE and the Central Environment Council annually review the implementation of the basic environmental plans and of the major associated plans. Related information is made available to the public.
Better *integrate* environmental concerns in physical planning, transport, agriculture, energy and urban policies.	Each ministry involved in the implementation of the Third Basic Environment Plan has formulated specific policies to integrate environmental considerations into its institutional activities (namely METI, MLIT and MAFF).

Source: OECD, Environment Directorate.

multiplicity of sectoral strategies and basic plans at both national and local levels. The priorities and the linkages between the plans formulated by each ministry and the Third Basic Environment Plan remain unclear. The national government does not oversee local environmental policies. Despite being approved at cabinet level, the Third Basic Environment Plan does not provide a coherent framework for action for all ministries and local authorities.

MOE and the Central Environment Council systematically *review the implementation of the basic environmental plans*, disclose related information to the public, and conduct public hearings and opinion polls. Local governments also assess their plans. However, there is no evidence that these reviews influence the annual planning and budgeting processes. Further, they do not sufficiently assess the *cost-effectiveness of the policy mix* and, in many cases, considerations other than effectiveness and efficiency guide policy making.

4. Key environmental and sustainable development initiatives

During the review period, *Japan's environmental policy*, at both national and international levels, had a strong focus on climate change and energy efficiency, sound waste and materials management and, more recently, biodiversity conservation. In 2007, Japan recognised these areas as the three building blocks of its sustainability model (Figure 1.2).

In 2005, Japan launched the *Kyoto Protocol Target Achievement Plan* as its road map to attain the committed 6% reduction in GHG emissions by 2008-12 from the 1990 level (Chapter 5). The Plan consists of a mix of regulation, governmental spending, voluntary measures, and economic incentives addressing key economic sectors. A CO_2 emissions trading scheme has been implemented on a trial and voluntary basis. The 2008 *Action Plan for Achieving a Low-carbon Society* set a long-term goal of a 60% to 80% reduction in emissions by 2050. In 2009, Japan announced a target of cutting its GHG emissions by 25% compared to the 1990 level by 2020, which is "premised on the establishment of a fair and effective international framework in which all major economies participate and on agreement by those economies on ambitious targets". In March 2010 the Cabinet approved and submitted to the Diet the bill of the Basic Act on Global Warming Countermeasures, which foresees the introduction of emissions trading and taxation measures.

Since 2000, Japan has been promoting an *integrated sound waste management and the 3Rs (reduce, reuse, recycle) approach* (Chapter 6). The Fundamental Plan for Establishing a Sound Material-Cycle (SMC) Society (2003) has specified measures and targets to minimise consumption of natural resources and generation of environmental loads. In 2004, G8 countries endorsed the Japanese 3Rs initiative to encourage more efficient use of resources and materials. More recently the Japanese policy has put more emphasis on worldwide resource limitation. The Fundamental Plan was revised in 2008 with a view to promote synergies between the 3Rs and climate change measures, and to develop a sound material-cycle in East Asia.

In 2007, Japan released the *3rd National Biodiversity Strategy*, which outlined four "biodiversity crises": species and habitat degradation, degradation of biodiversity in the countryside (*satochi-satoyama*), ecosystem disturbances caused by alien species, and threats to species and ecosystem generated by global warming. The *2008 Basic Act on Biodiversity* is intended to guide the review and revision of all nature-related pieces of legislation, some of them dating back to the early 1900s. In May 2008, Japan launched the *Satoyama Initiative*, aiming at developing a model for resource management and land use that strikes the balance between economic production and conservation of biodiversity and ecosystem services. Japan released a new biodiversity strategy in March 2010 and has agreed to host the 10th meeting of the Conference of the Parties to the Convention on Biological Diversity in October 2010, reflecting the country's growing political focus on biodiversity issues (Chapter 7).

The policy framework to tackle traditional environmental management issues, such as *air pollution and water management*, has been in place for decades. Major novelties include regulatory measures to reduce pollution from particulate matter and volatile organic compounds in urban areas, and to increase the coverage and efficiency of water supply and sanitation infrastructure. Japan has adopted a water management policy based on a sound hydrological cycle linking various areas, such as forestry, agriculture, river basin and quality management, and water supply and sanitation (Chapter 3).

In the area of *chemicals management*, the Chemical Substances Control Law was amended to provide a common legal framework for all industrial chemicals – new and existing – and extend the risk-based approach to evaluation and regulation. A well developed Pollutant Release and Transfer Register (PRTR) has been in place since the early 2000s (Chapter 3).

Environmental policy implementation was supported by initiatives to enhance the scope and policy relevance of *environmental data systems*, including through the requirement for corporate reporting (introduced in 2005) and the adoption of the Environmental Information Strategy in 2009. Japan enacted a legal framework to promote *environmental education* in 2003 (Chapter 3).

In recent years, Japan has been giving *increasing attention to the linkages between environment, economy and society*. The Japanese government responded to the 2008-09 economic recession by adopting fiscal measures to support energy efficiency and eco-innovation, thereby contributing to developing a low-carbon society. The 2009 New Growth Strategy sees the environment, health and tourism sectors as the main drivers of future growth and job creation. In its effort to enlarge the market of environment-friendly products, Japan expanded the scope of the Top Runner Programme, launched incentive

schemes to encourage purchases of energy efficient equipment, reformed its vehicle related taxes to link them to the environmental performance of vehicles, and reinforced its green public procurement policy (Chapter 2).

In a changing international economic and political context, Japan has been giving more importance to *economic and environmental co-operation in Asia*. Japan launched a number of partnership initiatives, including the Tripartite Environment Ministerial Meetings between Japan, China and Korea, which have become more action-oriented in recent years. Japan has also contributed to maintain a high-level political focus on water and sanitation, and in 2006 it launched the Water and Sanitation Broad Partnership Initiative (Chapter 4). In 2009, the government launched the Hatoyama Initiative to support developing countries in addressing climate change problems.

Notes

1. In terms of nominal GDP.
2. With high- and medium-high-technology industries accounting for some 80% of its exports in 2007, Japan was second only to Ireland (OECD, 2009b).
3. The number of households was 49.1 million in 2005, with 2.55 persons per household, down from 2.67 in 2000.
4. Non-regular workers do not have lifetime employment and have lower salaries than regular workers; they represented 34% of the labour force in 2007.
5. DMC is the total amount of materials directly used by the economy in a given year. DMC equals domestic extraction of resources plus imports minus exports, including processed products for imports and exports. Domestic extraction is the flow of raw materials extracted or harvested from the environment and used by the economy as material factor inputs.
6. These include: the National Institute of Environmental Studies, the National Environmental Research and Training Institute, the National Institute for Minamata Disease, the Biodiversity Centre of Japan, and the Global Environment Information Centre.
7. Japan's territory is divided into 47 prefectures, which are themselves divided into numerous municipalities.
8. Hokkaido, Tohoku, Kanto, Chubu, Kinki, Chukoku-Shikoku and Kyushu.
9. The strategy builds on the integrated implementation of eight sectoral and cross-sectoral strategies: 1) international leadership to overcome the climate change problem; 2) conservation of biodiversity for the sustainable use of nature's benefits for the current generation and generations to come; 3) creation of sustainable material-cycles through the 3Rs (reduce, reuse, recycle); 4) international co-operation using experience and knowledge derived from having overcome pollution; 5) economic growth centred on environmental and energy technologies; 6) creation of dynamic local communities that use the benefits of nature; 7) educating people to value the environment, think for the environment, and act for the environment; and 8) creating a system to support a "leading environmental nation".

Selected sources

The government documents, OECD documents and other documents used as sources for this chapter include the following. Also, see list of websites at the end of this report.

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