

A Review of Japan's Environmental Policies for *Satoyama* and *Satoumi* Landscape Restoration

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Abstract

The present paper reviews the current state and related issues of Japan's *satoyama* and *satoumi*, and provides a summary of how relevant environmental policies have been established and changed throughout the years. An analysis of related case studies nurtures the discussion on how the topic may be dealt with in the future.

In recent years, Japan's environmental policy-making has been strongly impacted by heightened public interest in the conservation of nature, and by the ongoing international discussion on biodiversity. During the last 50 years, Japan's *satoyama* and *satoumi* landscapes have dwindled, and the tendency continues today. The paper analyzes the process of the gradual establishment of a legal framework in Japan for the conservation and restoration of *satoyama* and *satoumi* landscapes. We discuss results achieved up to now, and make proposals for the future. We conclude that in the future, a grand design for *satoyama* and *satoumi* landscapes must be established on the national level; the wisdom and traditional techniques of rural areas must be brought to good use; and "new value" of the *satoyama* and *satoumi* for today's society must be created through a "new system" of co-management by various stakeholders.

Keywords: biodiversity, ecosystem services, landscape, restoration, *satoumi*, *satoyama*

1. Introduction

In Japan, administrative bodies concerned with the natural environment have gradually changed over time and have expanded their role, thereby reflecting the needs and interests of society. Back in 1931, the country established a national park system with the goal of conserving and making use of grand landscapes representing natural scenery of outstanding beauty in mountainous and coastal areas. By the early 1970s, environmental destruction triggered by the rapid development of mountainous and other areas drew attention to the importance of conserving precious fauna, flora and ecosystems. In 1972, Japan began implementing a legal framework aimed at the systematic conservation of the natural environment covering all of Japan's territory, including mountains, coastal areas and secondary natural environments such as secondary forests, farmland and greenery in urban areas.

In 2001, the country established the Ministry of the

Environment as a result of reorganization of ministries and agencies. The new ministry announced the 2nd National Biodiversity Strategy in the year 2002 in close cooperation with other ministries. The strategy highlighted the need to establish policies to conserve *satoyama* landscapes between large urban areas and remote mountains, indicated that the abandonment of the *satoyama* was due to decreased human activity and changes in lifestyle, and designated this abandonment the "Second Crisis" among the three crises that had led to biodiversity loss (see 3.2). For the first time, a national policy shed light on these matters. The announcement of the strategy was a turning point in the nation's environmental policy-making regarding *satoyama* landscapes.

Finally, the tenth meeting of the Conference of the Parties to the Convention on Biological Diversity (COP10) held in 2010 in Nagoya, Aichi Prefecture, designated the phrase "Living in Harmony with Nature" as its long-term vision, and adopted new global targets known as the Aichi Targets. In view of the realization of

these targets, the Japanese government and the United Nations University submitted the “*Satoyama* Initiative,” which sheds light on natural environments such as the *satoyama* and *satoumi* that have been shaped and maintained by human activity. The initiative has been acknowledged by the international community as a useful tool to better understand and support human-influenced natural environments for the benefit of biodiversity and human well-being. It particularly proposes to gather knowledge on living in harmony with nature from areas worldwide, and to promote sustainable use of land and other natural resources globally.

The present review is an attempt to cover the various issues that have come up regarding the *satoyama* and *satoumi* during recent decades, and to provide an outline of how these issues have been dealt with in Japan’s environmental policies thus far. In addition, an analysis of related case studies will clarify some of these issues and nurture a discussion on how the topic could be dealt with in the future.

In this paper, “*satoyama*” and “*satoumi*” are defined as unique human-influenced natural environments that have been shaped and sustained over a long period by diverse human activity. The *satoyama* consists of a mosaic of ecosystems including forest, grassland, farmland, abandoned land, irrigation ponds, canals, rivers, lakes and marshes; with land-based, water ecosystems comprising an important part of it. The *satoumi*, on the other hand, consists of a mosaic of ecosystems in the sea and on coastal land and includes areas such as sandy or rocky seashores, tidal flats, coral reefs and seaweed beds. When we speak of an area comprising many of these elements, particularly with regard to conservation, restoration or management, we often use the term “*satoyama* landscape” or “*satoumi* landscape.” In administrative language use, there is a further distinction between “*satoyama*” and “*satochi*.” “*Satoyama*” is defined as forest or grassland used by humans to obtain natural resources. *Satochi* is defined as farmland for agricultural use, including irrigation ponds. These terms often appear together as “*satochi-satoyama*.” The latter term will be used in this paper whenever it appears in the context of governmental projects or policies.

2. The Current State of the *Satoyama* and *Satoumi* and Related Issues

This section reviews surveys and assessments that have been carried out in Japan on the national level with regard to the *satoyama* and *satoumi*.

2.1 The National Survey on the Natural Environment

Since 1973, Japan has been conducting surveys on the country’s vegetation, coastal areas and other natural environments in the framework of The National Survey on the Natural Environment, which was initiated after the enactment of the 1972 Nature Conservation Law.

According to the survey conducted between 1994 and 1998, only 17.9% of Japan’s territory was covered by natural forest vegetation (primary forest vegetation), while the total of all kinds of forests comprised 66.6% of the national land. More than three quarters of the country’s territory, 75.2%, was covered by secondary vegetation including secondary forests, forest plantations, secondary grasslands and farmlands (Table 1; Environment Agency, 1999).

The total forested area in Japan was more or less maintained during the period from the early 1850s to the mid-1980s (Himiyama, 1995). However, statistics of the Forestry Agency show that in the period between the end of World War II and the 1980s, large areas of natural regeneration forest (primary forest and secondary forest) were clear-cut and replaced by large-scale monoculture plantations of trees for timber production, such as *sugi* (Japanese cedar, *Cryptomeria japonica*) or *hinoki* (Japanese cypress, *Chamaecyparis obtusa*). While in 1943, the area of natural regeneration forest among all forested areas still amounted to 66.6%, that percentage had decreased to 53.3% by the year 2007.

In coastal areas, the survey covered investigations of coastlines, tidal flats, seaweed beds and coral reefs. During the approximately 17 years between fiscal year 1978-1979 and fiscal year 1995-1996, the natural coastline decreased by 1,303 km, while artificial coastline, including coastlines around reclaimed land and other developed areas had increased by 2,564 km (Table 2).

Table 1 Frequency of appearance of actual vegetation in Japan according to category (survey 1994-1998).

Actual Vegetation	1km mesh count	Percentage
Natural vegetation of grasslands and moorlands	3,993	1.1
Natural vegetation of forests	65,824	17.9
Substitutional vegetation close to natural vegetation of forests	19,598	5.3
Substitutional vegetation of secondary forests	68,540	18.6
Planted forests	91,414	24.8
Substitutional vegetation of high profile grasslands	5,568	1.5
Substitutional vegetation of low profile grasslands	7,591	2.1
Fruit orchards, mulberry plantations, tea gardens, and other horticultural areas	6,788	1.8
Paddies, fields, and other arable land	77,695	21.1
Urban land, development tracts, and other zones where plant life is virtually nonexistent	15,999	4.3
Natural bare land	1,420	0.4
Open water	4,227	1.1
Data not available	70	0.0
Total	368,727	100.0

Source: The 5th National Survey on the Natural Environment (Vegetation), Analysis Report with Mesh Data (Environment Agency, Nature Conservation Bureau, 1999).

Along the natural coastline, the decrease in sandy seashores was particularly significant at 872 km (Environment Agency, 1998).

Tidal flats, seaweed beds and coral reefs along coasts lost 3,857 ha (7.0%), 6,403 ha (3.1%) and 1,507 ha (1.5%) respectively between fiscal year 1978 and 1989-1992 (Table 3). Especially in the Okinawa Island region, over 4% area of coral reefs disappeared mainly due to landfill operations in this period. Furthermore, while the total area of tidal flats is estimated at 82,621 ha for the year 1945 based on aerial photos and other documents, that area had decreased to 51,443 ha by 1989-1992 survey, which amounts to a loss of approximately 40% (Environment Agency, 1994).

2.2 Monitoring Sites 1000

Monitoring Sites 1000, a nationwide project for monitoring ecosystems and biodiversity in Japan, was started in 2003 by the Biodiversity Center of Japan, which is part of the Nature Conservation Bureau of the Ministry of the Environment. By 2008, approximately 1,000 monitoring sites had been established. As of July 1, 2011, 194 of the sites were located in the *satochi*, and 224 were located in coastal areas (*satoumi*).

The project relies on the participation of a large number of scientists, NGOs and other parties who monitor sites across the country; survey vegetation cover, indicator species and other elements; and publish their results in reports or newsletters or on websites, thus contributing to the assessment of qualitative changes in the *satochi-satoyama* and *satoumi*. While not enough time has passed since the beginning of the project to establish clear trends,

Table 2 National assessment of changes in shoreline extension according to category.

Period of survey	Shoreline (km)		Change (km)
	1978-1979	1995-1996	
Natural shoreline	18,717	17,414	-1,303
Semi-natural shoreline	4,202	4,253	51
Artificial shoreline	8,258	10,822	2,564
River mouth shoreline	258	311	53
Total	31,436	32,800	1,364

Source: The 5th National Survey on the Natural Environment (Coastal Areas), A Comprehensive Report (Environment Agency, Nature Conservation Bureau, 1998).

Table 3 Actual surface of tidal flats, seaweed beds, and coral reefs, and loss of surface over time (ha).

Marine environment	Actual surface ^{*1}	Lost surface ^{*2}	Ratio of loss (%)
Tidal flats	51,443	3,857	7.0
Seaweed beds	201,212	6,403	3.1
Coral reefs	96,479	1,507	1.5

*1 Surface at the time of the 1989-1992 survey

*2 Surface lost in the period between 1978 and the 1989-1992 survey

Source: Biodiversity Center of Japan, Inventory of the Survey on the Natural Environment (Biodiversity Center of Japan, Ministry of the Environment, 2008).

some tendencies have recently appeared. For example, an increase of an invasive alien species, the common raccoon, *Procyon lotor*, was observed, and one quarter of all *satochi* sites had an extremely low number of brown frogs (*Ranidae* species) and firefly species.

The survey is currently also continuing in *satoumi* areas struck by the Great East Japan Earthquake and Tsunami. In these areas of intensive coastal fishing and seaweed farming, the influence of the tsunami is being assessed, and the resilience of the coastal ecosystem is being surveyed. In particular, the survey examines shorebird species, tidal flats and seaweed and seagrass beds. In the disaster zone, the applied value of the survey has become evident.

2.3 Surveys and analyses of the *satochi-satoyama* by the Ministry of the Environment

Prior to the announcement of the 2nd National Biodiversity Strategy in 2002, the Nature Conservation Bureau of the Ministry of the Environment conducted a survey and analysis of Japan's *satochi-satoyama* between 1999 and 2001 (Ministry of the Environment, 2001). The results showed that areas that could be defined as *satochi-satoyama* amounted to approximately 43% of the national land. Furthermore, it became clear that 49% of habitats with high concentrations of endangered animal species, and 55% of habitats with high concentrations of endangered plant species were located in such areas. Non-endangered species were also widely distributed in the *satochi-satoyama*, e.g., the *tonosamagaeru* frog (black-spotted pond frog, *Rana nigromaculata*), (62%), the *nokogiri kuwagata* stag beetle, *Prosopocoilus inclinatus*, (53%) and the *sashiba* (gray-faced buzzard, *Butastur indicus*)(65%).

The survey found information on about 1,000 *satochi-satoyama*-related community or field work activities from across the country, 34% of which were conducted in areas within a distance of 50 km from the three large cities, Tokyo, Osaka and Nagoya. These areas amount to about 5% of the national land.

Based on questionnaires and other reports, the survey identified factors leading to the deterioration of the *satochi-satoyama*. These included road, housing and other development (quantitative loss); uncontrolled spread of *sasa* bamboo due to undermanagement in secondary forests or forest plantations, and deterioration due to invasion of other bamboo species (qualitative deterioration); abandonment of trash and industrial waste; and increased abandonment of rice fields. The survey also identified the need to respond to heightened demand by urban citizens to conserve authentic natural environments such as the *satochi-satoyama* instead of constructing artificial green areas.

Along with the survey, a conservation system for secondary forests, the core element of the *satochi-satoyama*, was discussed. Secondary forests in Japan can be roughly separated into five categories: *mizumara* forests (Japanese oak, *Quercus crispula*, 1,800,000 ha), *konara* oak forests (*Quercus serrata*, 2,300,000 ha),

akamatsu forests (Japanese red pine, *Pinus densiflora*) (2,300,000 ha), *shii* (*Castanopsis* species) and *kashi* (*Quercus* species) evergreen oak coppice forests (800,000 ha), and other secondary forests not included in the above categories (500,000 ha), including *shirakanba* forests (white birch, *Betula platyphylla*) in Hokkaido and hornbeam forests (*Carpinus* species) in western Japan. Undermanagement and abandonment have proved particularly damaging to biodiversity in *konara* oak forest and *akamatsu* Japanese red pine forest, since these tend not to easily convert back to natural regeneration forest. In terminology used in case studies and surveys, Japan's *satochi-satoyama* secondary forests are divided into six blocks. The six blocks are (1) the Hokkaido *shirakanba* white birch forest block in the north; (2) the *mizunara* Japanese oak block further south, (3) the eastern Japan block and (4) the western Japan block of *konara* oak, (5) the *akamatsu* Japanese red pine block, and (6) the *shii* and *kashi* evergreen oak coppice block (Fig. 1).

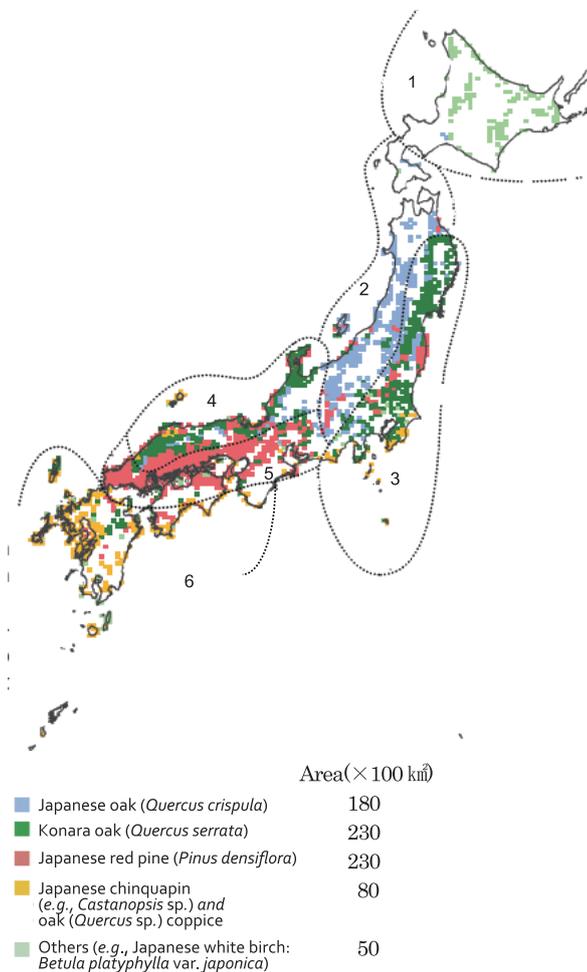


Fig. 1 Division of secondary forest into five categories and six blocks.

Source: Action plan for the conservation and sustainable use of socio-ecological production landscapes (*Satochi-Satoyama*), Overview Pamphlet (Ministry of the Environment, Nature Conservation Bureau, 2010).

2.4 Japan Biodiversity Outlook (JBO)

Based on the results of the Millennium Ecosystem Assessment (MA) and the Global Biodiversity Outlook (GBO), and in view of the 2010 target for biological diversity, Japan Biodiversity Outlook Science Committee (established by the Ministry of the Environment) conducted the Japan Biodiversity Outlook (JBO) from 2008 to 2010. The committee investigated both the reasons for the loss of biodiversity, and the status of the loss of ecosystems. In addition to the results obtained by the National Survey on the Natural Environment, the JBO found conspicuous changes, for example, in the production of charcoal (a rapid decrease during the 1970s, from about 2 million tons in the 1950s to 25,000 tons today), in abandoned farmland (a more than three-fold increase from 1,300 km² in 1985 to approx. 4,000 km² in 2005), and in grasslands (a decrease from an estimated 25,000-45,000 km² in the early twentieth century to approx. 4,000 km² in the 1980s).

The JBO also reported an increasing loss of *satochi-satoyama* ecosystems due to a decrease in use and management (the “Second Crisis”; see 3.2) with especially high losses in farmland ecosystems, and an increasing loss of coastal and marine ecosystems due to long-term deterioration as a result of development, modification, direct use and water pollution.

2.5 The Japan *Satoyama-Satoumi* Assessment (JSSA)

The Japan *Satoyama-Satoumi* Assessment (JSSA) was conducted between 2007 and 2010, applying the Sub-Global Assessment (SGA) of the Millennium Ecosystem Assessment (MA). It was conducted by a large number of experts from Japan and abroad under the auspices of the United Nations University. The assessment aimed to scientifically assess the mutual workings of man and nature in *satoyama* and *satoumi* landscapes, to identify and show the importance of ecosystem services provided by these landscapes, and to provide information that could lead to meaningful policies.

The assessment focused on changes during the fifty years after World War II. Five clusters (Hokkaido, Tohoku, Hokushin’etsu, Kanto-Chubu and western Japan) were established. The results included the following: (1) one of the most important characteristics of *satoyama* or *satoumi* landscapes is their mosaic-like structure, which consists of a number of diverse human-managed ecosystems; (2) the *satoyama* and *satoumi* have seriously deteriorated over the last 50 years, resulting in reduced resilience of integrated socio-ecological production systems that provide ecosystem services in a sustainable way; (3) future *satoyama* and *satoumi* services must be researched for the well-being of the people dwelling in them. (United Nations University, 2010)

3. Changes in Environmental Policies Regarding the *Satoyama* and *Satoumi*

3.1 The beginning of systematic conservation of Japan's natural environment

In the early 1970s, destruction of the environment and alienation of ordinary people's life from nature due to Japan's rapid post-war economic growth became serious issues. In 1971, the Environment Agency was established through a merger of sections that had formerly been part of other ministries. Among these were the section for national parks, previously part of the Ministry of Health and Welfare, and the section for the protection of wildlife, formerly part of the Forestry Agency. In 1972, the Nature Conservation Law was established with the goal of promoting nature conservation based on an integrated approach. Based on that law, the Basic Policies for Nature Conservation were adopted in the following year. These stipulated that additionally to the conservation of outstanding natural environments, there was a need to assess and promote the conservation potential of areas with agriculture and fisheries, and to foster the conservation and restoration of green urban areas, grasslands, riversides, shorelines and other environments. Based on the same law, the National Survey on the Natural Environment was started in 1973 with the goal of understanding the state and changes of the natural environment in the whole Japanese territory. As a result, the vegetation and coastal environment of the whole country was assessed.

The Long-Term Plan on Environmental Conservation, a policy adopted by the Environment Agency in 1977, pointed out that the role of secondary nature such as secondary forests or farmland consisted not only of the production of produce, but also of the conservation of the national land and nature, and emphasized the need to conserve such areas. The Third Comprehensive National Development Plan, a policy adopted in the same year, shed light on continued environmental destruction and loss, and warned of serious consequences for the natural environment if rural districts were undermanaged due to depopulation. It underlined the need for systematic conservation of nature not only in mountains and pristine environments, but also in cities, on farmland and in nearby forests, and drew attention to serious problems such as water pollution and natural environment loss in coastal areas, particularly in inland seas or enclosed coastal sea areas, thus pointing out the need to take measures for the prevention of water quality degradation and for the conservation and restoration of the seashore and tidal flats.

In 1981, the Society for Research on the Natural Environment, a group established by volunteers from the Environment Agency, published a report under the name "Beetles Plan" with the theme of "Aiming at a city with dancing butterflies and fireflies and singing birds."

Inspired by the slogan, in the same year the Environment Agency initiated the "Survey for a Legal Framework for the Conservation and Use of Natural Environ-

ments in the Vicinity of Residential Areas," and, in 1984, put the theory into practice by launching the "Nature Observation Forest Project" as part of the policy. Ever since, projects for the restoration, creation and creative use of natural environments rich in diverse wildlife in the vicinity of residential areas have been promoted and conducted.

3.2 Development of domestic policies for *satoyama* and *satoumi* landscape restoration

The Convention on Biological Diversity, opened for signature at the 1992 Rio Earth Summit and enacted in 1993, asked each country to re-create a better balance between man and nature all over the world, with special regard to the diversity of ecosystems, species and genes. It strongly influenced domestic policy implementation in Japan. Before the summit, Japan published the 1991 Red Data Book. In it were selected and listed as endangered species not only species from habitats in remote areas such as high mountains or islands, but a large number of species that had in the past existed in great numbers in *satoyama* environments, such as the *gifucho* butterfly (*Luehdorfia*, *Luehdorfia japonica*) or *tagame* (giant water bug, *Lethocerus deyrollei*). In 1992, the Law for the Conservation of Endangered Species of Wild Fauna and Flora was enacted in an attempt to prevent the extinction of endangered species. The law called for controlled animal hunting and plant gathering, for the protection of habitats and for projects for the rehabilitation of natural habitats and the maintenance of viable populations. After the Rio Earth Summit, the Basic Environment Law was enacted in 1993 and served as the legal base for all administrative bodies concerned with the environment. The first project initiated after the enactment of this law was the 1994 Basic Environment Plan, based on a cabinet decision. It emphasized "living in harmony with nature and taking into account the natural and social characteristics of the national space." It led to specific policies for four categories: mountains, *satochi*, flatlands and coastal areas.

In the years that followed, there were several cases of citizen opposition to coastal development, land reclamation, dike construction or forest development which led to the reconsideration of development projects and to the conservation of *satoyama* and *satoumi* areas. In 1997, for example, a plan to build a sea dike for land reclamation in Isahaya Bay in Nagasaki increased the recognition by citizens of the importance of conserving tidal land. Afterward, development plans in Fujimae Tidal Flat in Aichi and Sanbanze Shoal in Chiba had to be reconsidered. This led to conservation measures, and in 2000, the strong wish of local citizens of Seto in Aichi to conserve the local Kaisho no Mori community forest led to significant changes in the national plans made for the construction site of EXPO 2005 Aichi Japan.

As these examples show, in the 1990s Japan gradually changed from a rapidly growing to a more stable and mature country. This process encompassed a significant increase in citizen awareness regarding natural environ-

ments such as the *satoyama* and *satoumi*. As a result, the role of rural public entities and NGOs in the conservation of these landscapes increased conspicuously. Environmental policies were subsequently created in great numbers by each respective ministry. These included the revised River Act in 1997 and the Basic Law on Food, Agriculture and Rural Areas in 1999.

The next step was the establishment of the Ministry of the Environment in 2001 based on a reorganization of ministries and agencies, and the announcement of the 2nd National Biodiversity Strategy in 2002 in connection with the Convention on Biodiversity. The strategy highlighted three crises leading to loss of biodiversity: (1) extinction and loss of species and destruction of ecosystems as a result of overdevelopment and overuse (First Crisis), (2) loss of biodiversity due to abandonment of *satoyama* areas as a result of a decrease in human activity and changes in lifestyle (Second Crisis), and (3) deterioration of ecosystems due to invasive alien species (Third Crisis).

The Second Crisis closely deals with secondary forests and grasslands that have been abandoned after having been carefully maintained and made good use of for centuries, and with the continuing loss of species that used to have their habitats in these landscapes. It also sheds light on the rapid increase of mammals such as *inoshishi* (wild boar, *Sus scrofa*) and *shika* deer, *Cervus nippon* which seriously damage abandoned farmlands and ecosystems in depopulated rural mountainous areas. Given the need for comprehensive conservation of these secondary environments, the policy "Conservation and Use of *Satochi-Satoyama* Model Projects" was launched in 2004 with the collaboration of several ministries and agencies, including the Ministry of Agriculture, Forestry and Fisheries, and the Ministry of Land, Infrastructure, Transport and Tourism. The goal of this policy was to encourage various entities to start activities under a system of mutual agreement for the conservation and use of *satoyama* landscapes located in typical *satoyama* ecosystems, and to find practical approaches and methods.

A further result of the 2nd National Strategy was the revision of the Natural Parks Law in 2002 which led to the enactment of the Scenic Landscape Protection Agreement. The goal of this policy was to seek the cooperation of NPOs and other entities in the management and use of *satoyama* forests and grasslands within national and quasi-national parks, which had deteriorated due to undermanagement resulting from social and economic changes. Furthermore, the Law for the Promotion of Nature Restoration was enacted in the same year. It established a system to promote the cooperation and participation of diverse ministries and entities in the conservation, restoration, creation, maintenance and management of diverse ecosystems including *satoyama* and *satoumi* landscapes.

3.3 COP 10 and the mutual influence of domestic and international environmental policies

The Strategy for an Environmental Nation in the 21st

Century was approved in 2007 in view of the G8 Summit that was to be held in Japan in 2008. The strategy highlighted the need to pursue the following goals in an integrated manner: low-carbon society, recycling society, and society in harmony with nature. Furthermore, in view of COP10, a cabinet decision for the implementation of the 3rd National Biodiversity Strategy was made in 2007. This strategy added a "Fourth Crisis" regarding biodiversity loss to the previous three: global warming. It drew up a 100-year grand plan based on four main strategies: (1) mainstreaming biodiversity in citizens' daily life, (2) rebuilding a sound relationship between man and nature in local communities, (3) securing linkages among forest, countryside, river and the sea, and (4) taking action with a global perspective.

Based on these strategies, Japan then drew up the *Satoyama* Initiative and proposed it to the world. The initiative aims to gather knowledge on living in harmony with nature from areas worldwide, to re-create and develop these, and to find practical uses for them. Moreover, it proposes globally to promote sustainable land use and use of natural resources.

Today, in Japan's *satochi-satoyama* efforts are being made to use and recycle natural resources sustainably for the creation of new value, for example, by using biomass or by promoting ecotourism activities. In these efforts, the active cooperation and participation of not only rural citizens, but urban citizens, private businesses, NGOs and other parties is sought in the spirit of mutual assistance in the common use and management of the *satochi-satoyama*, with the goal of establishing what can be called a "New Commons." As for *satoumi*, the need to link land and sea, and to promote sustainable use and management in fishing communities while integrating biodiversity conservation is emphasized in the 3rd National Biodiversity Strategy.

In 2008, the Basic Act on Biodiversity was enacted, followed by a cabinet decision to implement the 1st legally binding national strategy for biodiversity in 2010. The strategy comprised proposals of the Japanese government on how to set up and put into practice new international biodiversity targets. Based on the strategy, the Ministry of the Environment and related ministries set up the Action Plan for the Conservation and Sustainable Use of Socio-Ecological Production Landscapes (*satochi-satoyama*). In the same year, *satochi-satoyama* and *satoumi* areas were highlighted as outstanding natural scenery in the frame of a general evaluation of nature in national and quasi-national parks. Also in 2010, the Law for the Promotion of Regional Cooperation for Biological Diversity was enacted with the goal of promoting cooperative activities by various stakeholders for the conservation of biodiversity in the *satoyama*, *satoumi* and other environments.

At COP10 in 2010, the phrase "Living in Harmony with Nature" was proposed by the Japanese government and adopted as its long-term vision through the year 2050. Among the twenty targets (Aichi Targets) adopted at the meeting, many dealt with the topic of sustainable use of

natural resources and with the conservation and restoration of *satoyama* and *satoumi* landscapes, with the goal of making the best use of ecosystem services and values.

At the meeting, the Japanese government and United Nations University officially submitted the above-mentioned *Satoyama* Initiative to the participants of COP10 with the goal of putting into practice the Aichi Targets. It was particularly supported by developing countries. The *Satoyama* Initiative sheds light on human-influenced landscapes such as the *satoyama* and *satoumi* (Socio-Ecological Production Landscapes), and proposes the sustainable use of ecosystem services around the world as a global goal. The proposed three approaches for achieving the goal are: (1) consolidating wisdom on securing diverse ecosystem services and values, (2) integrating traditional ecological knowledge and modern science, and (3) exploring new forms of co-management systems (a "New Commons"). To promote these goals further, the International Partnership for the *Satoyama* Initiative (IPSI) was established at COP10. The system is composed of members from national and local governments, NGOs, research institutions, businesses, international institutions and other parties. It serves as an institution for information exchange, investigation and research, practical activity and support. As of March 2012, 117 partners were registered. The United Nations University-Institute of Advanced Studies (UNU-IAS) in Japan serves as the secretariat (UNU-IAS, 2012).

4. Discussion of Case Studies

As mentioned above, by the early 1990s, public interest in the *satoyama* and *satoumi* had grown, and attempts across Japan to restore such landscapes were being made. This chapter introduces some specific case studies and discusses the results and their significance.

First, to be discussed are two sites which, along with two other areas, were selected in 2004 for the Conservation and Use of *Satochi-Satoyama* Model Projects by the Ministry of the Environment. The first was in Hadano City, Kanagawa Prefecture, and the second, in Miyazu City, Kyoto Prefecture.

In Hadano, conservation and restoration activities were conducted with the goal of restoring original local scenery which had been a symbol of rural culture with its well-managed *satoyama* and surrounding farmlands in the mid-1950s, a time when cultivation of leaf tobacco was popular in the area. In the model project, existing networks in the village and among local nature conservation groups were used to conduct activities for the conservation of the local *satochi-satoyama*. Activities included finding ways to conserve biodiversity, water resources and ground water, and tackling issues such as abandoned farmland, undermanagement in forest and wild animal damage with the goal of re-creating more productive lifestyles. A "field leader registration system" and "field lists" were created, and a research and information distribution system was established. As the number of people and locations involved in conservation

activities increased, a network to coordinate these was set up with the cooperation of the local administration.

The second site was in the Seya area, a mountainous district of Miyazu City. In this model project, the following three goals were pursued: (1) biodiversity and cultural scenery conservation by means of an effective cycle of biological resources, (2) rebuilding of a vital community through exchanges between rural and urban areas, and (3) preservation of the environment. The involvement of stakeholders from outside the community such as NPOs was crucial in this area where rapid depopulation and an aging population had led to underuse of the *satochi-satoyama*. Activities included conservation, restoration and use of terraced rice fields and the management of local *satoyama* forests in such a way that local traditional practices could be continued or re-created, including thatching roofs with *sasa* bamboo grass (Fig. 2) and weaving baskets with Japanese wisteria vines. The project in Seya is a model case of community restoration: the use of *satochi-satoyama* natural resources leading to an actual occupation for the local people, the role of local resource use and traditional practices for the conservation of the local cultural landscape being carefully researched, and practices that led to efficient restoration being selected and actively pursued.

Next, three sites are examined that are not included in the country's model projects plan, but are nevertheless examples providing important insights into restoration work of *satoyama* and *satoumi* landscapes: the Aso Grassland, the western shore area of Lake Biwa and the Noto Peninsula.

For the conservation and restoration of the Aso Grassland, a range of measures was taken. These included (1) the involvement of volunteers in traditional field burning and the introduction of firebreak mowing techniques with reduced workloads, (2) the restoration of the traditional late autumn scenery of stacks of grass, which is important for the local tourism industry, and (3) the promotion of using grassland biomass. In addition, a project was launched in which city residents could assist local cattle farmers in the "akaushi (red cow) ownership



Fig. 2 Thatching roofs with *sasa* bamboo grass in Seya, Miyazu City.

system,” in which urban citizens could become owners of cows and thus help increase the presence of cattle, which are important for maintaining the grassland in Aso through grazing, and which support the local economy thanks to the production of cattle-related local specialty goods. Finally, the area has been promoted as a green tourism destination, which offers agricultural experiences and farmhouse stays, a program that has become popular for school trips. More than 20,000 people took part in such activities between 2003 and 2011, resulting in a lively exchange between urban and rural areas, and a closer relationship between people’s life and the natural environment.

The next case study is in a suburban area on the western shore of Lake Biwa that has seen a rapid increase of newcomers in recent years. Many of the newcomers moved to the area to be closer to the natural environment. Woodstoves have been popular with these residents. They created a local “Woodstove Society,” which is involved in sustaining forest resource use and management in a common effort (Fig. 3). Forest resources such as brushwood or fallen leaves are used for outdoor cooking activities or as organic fertilizer in fields. Vegetables harvested in these fields are prepared during management or recreation events held in the local forests, and help to provide energy to the *satoyama* management workers. This mini-cycle of local natural resources has value as a tool for environmental education and nature awareness of the local population. In addition, local NGOs and NPOs have been conducting Lake Biwa reed restoration projects by using logs and brushwood thinned from the local *satoyama* forests in the construction of breakwaters that dissipate waves for the protection of the reeds. The project has drawn attention as a combined lakeshore/forest environment restoration model with citizen participation, and has received support from local governments.

On the Noto Peninsula on the Japan Sea, a cooperative project by universities, companies and other stakeholders aims to revitalize local communities based on environmentally friendly agricultural and fishery activities that take into account the need to conserve and restore *satoyama* and *satoumi* landscapes. A local



Fig. 3 Sustaining forest resource use and management by the local “Woodstove Society” in Otsu City.

Satoyama and *Satoumi* Nature Education School promotes these efforts. The school educates people who will be in charge of the local *satoyama* and *satoumi* landscapes in the future. The courses cover subjects such as the interconnections among forests, villages and the sea, or how to start a food business based on seaweed products. Furthermore, a Noto Peninsula survey on the current state of plant and animal habitats in the local *satoumi*, and a plan to introduce a foster parent system for the protection and conservation of seashore plant communities are raising interest in *satoumi* biodiversity in the local community. The “Nanao Bay *Satoumi* Creation Project” and similar groups seek to establish a network for the sustainable use and restoration of *satoumi* elements such as salterns (Fig. 4) and seaweed beds, while also aiming to revitalize the local community through the promotion of sea and seashore recreation activities.

The above-described case studies illustrate core elements that are common to recent efforts in the field. First, the importance of considering *satoyama* or *satoumi* landscapes as a whole, and of interconnecting parts and elements. Second, the need to establish new values and new systems based on which diverse agents and entities can work together and mutually assist each other. Third, the importance of the role of citizen activity not only in existing networks for *satoyama* or *satoumi* landscape restoration, but also in the creation of new systems. The fact that citizens can participate in shaping the future of their local *satoyama* and *satoumi* landscapes by proactively reviving characteristic local natural and cultural features provides a powerful motivation for action. In any future efforts, a bilateral approach will be necessary: Reviving the history and traditions unique to each locality for use in the present (from the viewpoint of time), and revitalizing *satoyama* and *satoumi* landscapes based on a deep understanding of their structure and interconnection (from the viewpoint of space).

On the other hand, several difficulties must be overcome. First, activities conducted for the restoration of *satoyama* and *satoumi* landscapes tend to be concentrated in the vicinity of large cities or in areas with environment-related institutions. Activities are still scarce if



Fig. 4 Agehama-style salt making in Satoumi, Suzu City.

considered on the national scale. Second, not enough has been yet undertaken to understand the link between biodiversity and cultural features in *satoyama* or *satoumi* landscapes. Third, rural residents have often shown a passive or even negative attitude regarding conservation activities. Next, there is no clear image of how future *satoyama* and *satoumi* landscapes should look, and no universal solution supported by society as a whole. Stakeholders must work toward social solutions by gradually creating a system of mutual consent in which the opinions and values of local residents, NPOs, local governments and other stakeholders are given due respect. The establishment of a system for mutual consent and for the above-mentioned "New Commons" needs to be further discussed and promoted. Finally, there is an increase in *satoyama* or *satoumi* that is abandoned or whose ownership or borders are unknown. A legal framework must be created so that these lands can be brought to good use again.

5. Considerations for the Future

Environmental policies enacted for the conservation and restoration of *satoyama* and *satoumi* landscapes in Japan have led to field work in numerous locations, and positive effects have started to be visible. On the other hand, the deterioration of *satoyama* and *satoumi* landscapes continues nationwide, and many problems must be resolved.

First, there is a need to design a 50- or 100-year plan for environmental restoration and biodiversity conservation across the nation's territory, taking into account factors such as the decreasing and aging rural population, the dynamics of production and consumption, and changes in lifestyle, industry and energy use. Policies regarding *satoyama* and *satoumi* landscapes should be made on the national level. It is assumed that non-inhabited areas in remote rural areas will increase in the near future. Measures must be taken regarding secondary forests in these areas. They will have to be separated into two types: those that will be converted back to natural forest, and those that will become the subject of the creation of "new value" by means of a "new system" for management and resource use.

Studies must be undertaken on how to position *satoyama* and *satoumi* landscapes in ecosystem networks, and how to manage *satoyama* and *satoumi* landscapes in such a way that the balance between the needs of man and nature can be restored, in particular in regard to damage to forests and farmland caused by wild animals.

The damage caused by the Great East Japan Earthquake in particular led to the important insight that measures taken to lower the impact of natural disasters on the national territory must go hand in hand with measures taken for the conservation of biodiversity. It will be necessary to strengthen the resilience of ecosystems by conducting ecological management of the national land while efficiently using ecosystem services. *Satoyama* and *satoumi* landscapes occupy a large area of the national

land, and their restoration plays an important role in preventing ecosystems from reaching tipping points.

Second, they are also instrumental in ensuring that diverse ecosystem services can be sustainably obtained, and are highly diverse spaces in which the values and rights of various parties are entangled in a complex way. They are impacted by local lifestyles, industries, culture and other factors. Any attempt to resolve problems regarding these landscapes must consider all factors, and be comprehensive. This is especially true for the administrative approach, which must be undertaken cooperatively by laterally connecting all ministries and agencies concerned with agriculture, forestry, fisheries, the national land, urban planning and cultural scenery. At the same time, an agreement on a vision for the future of these landscapes must be reached in each region. Based on each Regional Biodiversity Strategy and on the Law for the Promotion of Regional Cooperation for Biological Diversity, it can be expected that each region will establish a vision that will be put into practice through bottom-up approaches that take into account regional characteristics. In this process, preparing and sharing scientific data and indicators are crucial.

Third, in the regional approach, it is essential to create "new values" of the *satoyama* and *satoumi* by linking regional traditional ecological knowledge with modern lifestyles. Creating added value in today's society means producing certified or brand products that take into account the changing awareness of consumers who seek goods that are safe, locally produced, and environmentally friendly. For example, reintroduction projects are ongoing in Japan for the crested ibis, *Nipponia nippon* on Sado Island, Niigata Prefecture, and for the oriental white stork, *Ciconia boyciana* in Toyooka city, Hyogo Prefecture. Under the projects, certification systems for rice produced using farming methods which take into account the habitats of those birds promote restoration of the *satoyama* landscapes in which they live. Furthermore, the use of biomass needs to be promoted as an example of energy recycling, and environmental education and ecotourism need to be supported since they provide spaces where sustainable use can take place. Financial incentives for environmentally friendly agriculture, forestry and fishery activities such as environmental stewardship schemes must be examined.

In upstream-downstream areas that contain both *satoyama* and *satoumi* with rural villages, cities and fishing villages, a "new system" is needed in which urban citizens and companies participate in the sustainable use and management of the whole area. It has been recognized that *satoyama* and *satoumi* landscapes are key elements for the conservation and use of national and quasi-national parks, and that the cooperation of cities and companies is needed to create model landscapes of the *satoyama* and *satoumi* in these parks. To this end, it is effective to create connections between farmlands and residential areas in the vicinity of parks with protected areas in an environmentally friendly and efficient way such as in the UNESCO Man and Biosphere Programme,

in which Biosphere Reserves (core areas, buffer areas and transition areas) are established.

Finally, it is important for Japan to share its experiences of restoring *satoyama* and *satoumi* landscapes with international society through the above-mentioned International Partnership for the *Satoyama* Initiative (IPSI).

6. Conclusion

The Ministry of the Environment decided to reorganize the Sanriku Coast's natural parks which were badly damaged by the tsunami in March 2011, and to combine them into one national park, tentatively named the Sanriku Reconstruction National Park (Fig. 5). In March 2012, a report by the Central Environment Council underlined the main idea for reconstruction as undertaking "green reconstruction with the creation of a national park at the core." According to the plan, not only outstanding coastal scenery and biodiversity, but also culture in each community and activities from the area's primary sector such as fisheries will be targets of the conservation and sustainable use of the national park. The report underlined the intent to seek the cooperation of the local area in linking the *satoyama* with the *satoumi* while creating the park in a way that is beneficial to the area's

revitalization. It is essential that the Sanriku Reconstruction National Park serve as an example of the new role that national parks can play as spaces where living in harmony with nature is demonstrated in a model scape that features the restoration of the *satoyama* and *satoumi*.

After COP10 and the adoption of the Aichi targets in 2010, and after the Great East Japan Earthquake in 2011, the Japanese government has been revising the National Biodiversity Strategy. The revised text will be announced to an international audience at COP11 to be held in India in October 2012. Two main meaningful topics will be presented to the world: finding a way of living in harmony with nature which bestows rich blessings upon us, while on the other hand sometimes can become a huge threat; and presenting a roadmap for the restoration of *satoyama* and *satoumi* landscapes.

Acknowledgments

We thank Prof. Akio Shimomura of the Graduate School of Agricultural and Life Sciences of the University of Tokyo, and the staff of the Biodiversity Policy Division and the National Park Division of the Nature Conservation Bureau of the Ministry of the Environment for their advice and for related documents.



Fig. 5 Areas under consideration for the Sanriku Reconstruction National Park.

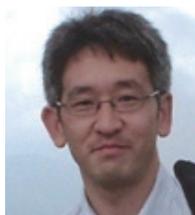
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(Received 2 May 2012, Accepted 31 July 2012)