

Ecology and Sustainable Development in Japan

5

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Abstract

This chapter fits Goal 15 of the SDGs and analyzes the protection and sustainable use of territorial ecosystems in Japan, focusing on sustainable agriculture and forestry. The beautiful natural landscape and pristine nature in Japan are protected in nature parks. After the Earth Summit in 1992, the government committed to protecting socio-ecological landscapes referred to as “satoyama.” They include farmland, pastureland, and forests for logging. They are deteriorating because the population of farmers and forestry workers is declining and aging. The Natural Parks Act introduced a scheme to ensure that environmental NGOs maintain these areas on behalf of the farmers and forest workers. Modernization of agriculture has caused the loss of biodiversity in farmlands. Restoration projects have been implemented to restore biodiversity in rural areas. To reduce farmland abandonment, the government grants subsidies to help encourage eco-friendly agriculture. The government is encouraging active farmers to scale-up agricultural management to be competitive in the marketplace. Solar sharing is one way to help farmers. Ecologically sus-

tainable development is thus interwoven with social and economic factors.

Keywords

SDGs · Satoyama · Nature park · Ecosystems

5.1 Introduction

This chapter explores legal schemes that protect the biodiversity and ecosystems of Japan. In other words, this chapter considers the legal mechanisms that “protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.” (Goal 15 of SDGs). The protection of ecosystems in Japan depends on the sustainable development of agriculture and forestry. Therefore, this topic relates to Goal 11. Sustainable management of farmlands and forests sometimes incorporates renewable energy and therefore relates to Goals 7 and 13.

Nature parks play an important role in nature protection schemes. The nature parks concept was originally established to protect areas of natural scenic beauty and pristine nature. But people in Japan realized that ecosystems and biodiversity need to be protected, and people became aware of the conservation of ecosystems

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in socio-ecological production landscapes such as farmlands.

Socio-ecological production landscapes are degraded through the abandonment of rural farmland and forest management. The socio-ecological production landscapes, which are called “satoyama”¹ in Japanese, are dominant rural landscapes with high-level ecosystems and biodiversity values. Therefore, legal schemes to protect the agricultural and forestry industries are important aspects of nature protection laws. In this way, protecting nature concerns “various fields, such as law, economics, and sociology, as well as ecology, because the problems are extremely widespread, as they are intricately interlinked, and arise directly from our civilization and way of life” (Murasawa 2020, p9).

Socio-ecological landscapes such as the satoyama areas are not unique to Japan and are found in many countries worldwide. Traditional rural landscapes in other part of Asia are similar to the satoyama of Japan. Outside Asia, traditional agricultural fields and pastures are partially artificial and natural areas that have been conserved for a long time. Therefore, the Japanese government and United Nations University jointly initiated the Satoyama Initiative. The International Partnership for the Satoyama Initiative (IPSI) was established in 2010 to facilitate its implementation. (IPSI 2021).

Previously, legal schemes to protect nature were not cognizant of the ecosystems and biodiversity. Even the Nature Parks Act was implemented to protect areas of scenic beauty and pristine nature. But, after the Earth Summit of 1992, protecting ecosystems and biodiversity became an important aspect of environmental law. The Environmental Policy Act of 1993 §14 requires governments “to protect biodiversity,

such as the diversity of ecosystems and wildlife species, and to systematically conserve various features of the natural environment, such as those in forests, farmlands, and riverside areas, in accordance with the natural and social conditions of the area.”

Satoyama landscapes have been formed and maintained alongside agricultural activities or forestry activities over centuries. These industrial activities have disturbed the vegetation transition and kept the landscapes under specific conditions, such as those in paddy fields. These are partially artificial and natural environments, and people depend on them to obtain food, fuel, timber, and other materials necessary for their livelihoods. However, economic development and urbanization after World War II changed the situation in rural areas.

Now, the population of farmers and forestry workers has declined, and they have become too old to continue farming and logging. The disturbance caused by agricultural and forestry activities is not sufficient to maintain the satoyama landscapes, and they are at stake. This crisis relates to Goal 15 of the SDGs which states that it is important to “protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.” Sustainable use of territorial ecosystems and sustainable management of forests are essential to maintain a socio-ecologically productive environment that dominates the natural environment in Japan.

This chapter starts by analyzing the nature park initiative and demonstrates that the satoyama landscapes are included in these. The Nature Parks Act has employed a new scheme, in which environmental NGOs help farmers manage their farmlands and pastures. This section then analyzes why agriculture in Japan was not competitive in the world market and reveals the policy that encourages active farmers to be competitive. In this context, the reintroduction of the storks and crested ibis that were once extinct in the wild in Japan is described in detail. In this regard, the protection of migratory birds is discussed too. Domestic and international protection

¹ “Satoyama is a Japanese term for a mosaic of different ecosystem types—secondary forests, farmlands, irrigation ponds, and grasslands—along with human settlements, which has been managed to produce bundles of ecosystem services for human well-being. Satoyama found largely in rural and peri-urban areas of Japan is a way of life; in other words, a classical illustration of the symbiotic interaction between ecosystems and humans. This concept has been recently extended to satoumi, which constitutes marine and coastal ecosystems.” (JSSA 2010, p4).

schemes are also mentioned. Finally, I will discuss the trend of policy and legislation that requires the government to include environmental factors in their decision-making processes. In addition to agricultural legislation and forestry legislation, legislation concerning roads, rivers, and urban planning is now part of environmental law.

5.2 Nature Protection Schemes in Japan

5.2.1 Nature Reserves

5.2.1.1 Nature Parks and Natural Scenic Beauty

The nature park initiative is at the center of nature protection in Japan with nature parks occupying approximately 15% of the land. There are 34 national parks (2,194,931 ha), 57 quasi-national parks (1,445,150 ha), and 311 prefectural nature parks (1,948,730 ha). Among them, national parks are the most important, accounting for 5.8% of the land. The nature park initiative was established by the National Parks Act of 1931. The Nature Parks Act replaced the 1931 Act and made the initiative sophisticated. The nature park initiative was introduced to protect places of natural scenic beauty so that people could visit and enjoy them. Nature parks were expected to contribute to the health, recreation, and culture of citizens by promoting their utilization. The Ministry of Environment has been promoting the “Project to Fully Enjoy National Parks” and has enhanced “the branding of the national parks to attract more domestic and international visitors by implementing measures to facilitate the utilization of national parks while protecting what needs to be protected and conserved.” (MoE 2021b, p12).

The National Parks Act defines national parks as “places of the greatest natural scenic beauty, representing the exemplary scenic beauty of our country”(§2). The Act did not have the words ‘ecosystems’ and ‘biodiversity’ before the 2003 Amendment Act introduced them. The 2010 Amendment Act added “the contribution to the

conservation and sustainable use of biological diversity” to the purpose of the Act. However, the Nature Parks Act had already been protecting ecosystems in Japan. As beautiful scenery reflects the vegetation and ecosystems of a land, protecting it leads to the protection of the vegetation and ecosystems.

The turning point was the Earth Summit (United Nations Conference on Environment and Development) of 1992, which was held in Rio de Janeiro. The Convention on Biodiversity was agreed upon. It allows people in Japan to realize the importance of biodiversity and ecosystems and helps them to understand that ordinary nature is important and should be protected as is beautiful and pristine nature. The concept of ecosystems and biodiversity provided reasons why productive landscapes such as paddy fields, pastures, and forests for logging should be protected in nature parks. The Biodiversity Policy Act was legislated in 2008, the preamble of which stipulated, “biodiversity is facing serious crises, including the extinction of species and destruction of ecosystems due to development and other activities by human beings, deterioration of satoyama (managed woodlands or grasslands near human settlements), etc., due to reduced human activities along with changes in socio-economic conditions.”

5.2.1.2 Protection and Utilization of Natural Environment in Nature Parks

Historically, the recreational mission of nature parks has become important. Nature parks have played an important role as places where people interact with nature and enjoy outdoor activities. They have provided recreational facilities constructed within them, such as park visitor centers, trails, and campgrounds, to help people access and enjoy nature. This has encouraged local tourism in park areas.

Personal income and leisure time increased from the 1960s to the 1970s in Japan. Consequently, the number of visitors to nature parks also increased. The designation of land for nature parks was accelerated to meet this demand. In addition, new roads and accommodation

facilities were constructed to help visitors access natural parks. However, the number of visitors increased beyond the holding capacity of the parks, which has damaged the ecosystems with compaction of the ground, increased waste, increased wastewater discharge, and so on. To help solve the problem of overuse, the 2002 Amendment Act introduced the Regulated Utilization Area to restrict the number and behavior of visitors. The contradiction between the protection of nature and its overuse for recreational purposes is a flaw of the nature park scheme. Therefore, the Natural Environment Conservation Act which focuses on protecting pristine natural areas was legislated in 1972. However, the areas protected by this legislation are minor, accounting for less than 0.3% of the land in Japan.

Japan has five natural heritage sites: The Yakushima, the Shirakami-Sanchi, the Shiretoko, the Ogasawara Islands, and recently listed southwest islands, including Amami-Oshima Island, Tokunoshima Island, the northern part of Okinawa Island, and Iriomote Island. These World Natural Heritage sites are pristine in nature and ecosystems and are protected by the Nature Parks Act and the Nature Conservation Act.

5.2.1.3 Nature Park as Regional Park

Nature parks in Japan are nature reserves but are not necessarily public properties. They are regional parks designated as nature parks through zoning. Privately owned land is included in nature park areas, in addition to publicly owned land. This scheme differs from national parks in the United States and Australia which had vast pristine territories that were suitable for nature parks. Japan has a small surface area which is densely populated. Japan also has a long history of private land ownership, and therefore, areas with valuable ecosystems are sometimes already utilized as paddy fields, pastures for grazing, forests for logging, and so on. These valuable ecosystems were protected by law from disruption caused by excessive development activities. Natural areas are designated by the government

as nature parks consisting of public and private land. “Many people live in areas belonging to national parks, which are home to several industries including agriculture and forestry” (MoE 2021a). The government designates the natural areas that it wants to protect as parks.

The government can designate areas of land as natural parks without obtaining ownership. It then imposes regulations on landowners. Around a quarter of the land in national parks belongs to private entities. Many people live inside natural parks. They cultivate farmland, use grassland for grazing, or use forest for logging. For example, in the Ise-Shima National Park, privately owned land accounts for over 90% of the park land. In the Oze National Park, the most valuable wetland area, which is a Ramsar site, is owned by an electric power company. The company possesses 40% of the Oze National Park area and has taken care of the wetland for a long time as a corporate social responsibility (CSR) activity. Most land in nature parks owned by the government is managed by the Forestry Agency of the government, which engages in logging.

The positive aspect of the regional park scheme is that the government does not need to obtain land ownership to make the land a part of a nature park. Therefore, natural areas that should be protected can be included in nature parks without any monetary exchange. The negative aspect of the regional park scheme is that it is necessary to reconcile the protection of nature with protection of the property rights of landowners, which are well protected by the Constitution.

The areas in national parks are divided into subcategories. The most beautiful places in the parks are designated as exceptional zones. These zones are further classified into four categories: special protection and special zones of class I, class II, and class III. Other areas are classified as ordinary zones that work as buffers against the influences of the areas surrounding the parks. In the special zone, development activities such as building construction, land formation, and logging need permission from the government and the special protection has the most stringent

restrictions. In the special protection, the behaviors such as tree cutting, plant cultivation, campfires, or gathering materials are prohibited without the permission of the government. These activities are permitted only if the natural environments are not threatened. In ordinary zones, large-scale construction of facilities, extraction of minerals, or setting up advertising displays is regulated and needs to be reported to the government beforehand.

5.2.1.4 Socio-Ecological Production Landscapes in Nature Parks

Nature parks include a variety of socio-ecological landscapes. Among them, the landscape of grasslands on the lower slopes of Mt. Aso in Aso-Kuju National Park is well known. The beautiful grassland scenery was created and is maintained by dairy farmers who graze cattle and horses there. They practice controlled burning of the grasslands every spring to renew them as the cattle and horses prefer the soft grass that grows from under the ash. It takes physical strength and energy to burn large grasslands. As the livestock farmers got older, it becomes harder for them to burn the grasslands every spring. Therefore, the areas burnt become smaller year by year. Bamboo and trees have regrown in some of the former grasslands and destroyed the beautiful landscapes and grassland ecosystems. To overcome these problems in socio-ecological landscapes, a landscape protection agreement scheme was introduced into the Nature Parks Act. Landscape protection agreements can be made between landowners (e.g., farmers) and park management organizations. Usually, environmental NGOs become park management organizations and manage land in parks on behalf of landowners. The grassland for grazing on the lower slopes of Mt. Aso is protected by the local environmental NGOs through the landscape protection agreement. The members of the NGO help farmers burn the grasslands every spring, and, as a result, the grasslands have almost recovered. Place-based solutions for the conservation and restoration of social-ecological production landscapes are often attempted in Asia (Kozar et al. 2020).

As mentioned above, there are two types of problems in nature parks, one being overuse and the other underuse. To deal with the overuse problem, a regulated utilization zone scheme was established as well as the no-enter zones. The intention is to balance the conservation of ecosystems and their sustainable use by restricting entry into the sensitive area without permission. A landscape protection agreement scheme was established to deal with the underuse problem. Environmental NGOs are meant to help farmers manage farmland and maintain the natural beauty and ecosystems in socio-ecological production areas.

5.2.2 Other Legal Schemes Protecting Species and Ecosystems

5.2.2.1 Protection of Animals and Birds

The Nature Parks Act and the Natural Environment Conservation Act protect the natural habitats of wild fauna and flora, and, in addition to these nature reserve legislations, Japan has several statutes that protect species and ecosystems. Among them, the Act on the Control of Animal Hunting and Protection of Animals is important. The statute was first legislated as a hunting law in 1895, but gradually changed its format to protect birds and animals in their habitats. To keep the population of birds and animals hunted was inevitable for hunters to enjoy hunting.

Currently, statutes prohibit the capture and killing of wild birds and wild mammals, and only 28 species of birds and 20 species of mammals are listed as game birds and mammals that can be legally hunted according to the law. Hunters must obtain hunting licenses from the prefectural governor and register themselves as hunters. The hunting period, areas, and methods are restricted, and the number of captures is restricted. In addition, this statute has established wildlife protection areas and special wildlife protection areas. Conservation projects have been conducted in these areas, and the capture and hunting of birds and animals are strictly prohibited.

5.2.2.2 Protection of Migratory Birds

Migratory birds are protected internationally. Japan is party to the Ramsar Convention (Convention on Wetlands of International Importance, especially as Waterfowl Habitat) and now has 53 Ramsar sites (155,174 ha). In addition, Japan has bilateral conventions for the protection of migratory birds with the United States and Russia. Japan has bilateral agreements for the protection of migratory birds with China and Australia. To protect migratory birds, it is necessary to protect them both in breeding and wintering grounds. Protecting habitats such as wetlands is especially important.

The example of Latham's snipe protection shows that protecting migratory birds at all landing grounds, including relay points, is important. Latham's snipe is protected by the Japan-Australia Migratory Bird Agreement and is ardently protected in Australia and Japan. However, the bird population did not recover. It was reported that many snipe that left Japan for Australia were captured on the Melanesian islands. Japan is an active member of the East Asian-Australian Flyway Partnership (EAAFP). The EAAFP was launched in 2006 to protect migratory waterbirds, their habitats, and the livelihoods of people depending upon them and is expected to work effectively. Currently, there are 39 partners including 18 national governments, 6 international agencies, 13 international NGOs, and so on (EAAFP 2021).

5.2.2.3 Conservation of Endangered Species

The Conservation of Endangered Species of Wild Fauna and Flora Act of 1992 has protected the species in danger of extinction. The statute prohibits the capture and killing of listed species. The Red List (2020) includes 3176 threatened (critically endangered, endangered, vulnerable) species. The hunting, taking, killing, or injuring of living endangered species is prohibited unless a governmental permit is granted. In addition, the transfer of endangered species, dead or alive, for commercial or non-commercial use is prohibited. However, the implementation of this legislation

has been criticized as being too moderate (Takahashi 2009, pp 1958–1959).

The government rehabilitates the habitats of endangered species and implements conservation projects, such as captive breeding. The breeding of the crested ibis on Sado Island is a well-known example. Many endangered species are protected as natural instances under the Protection of Cultural Properties Act of 1950.

5.2.2.4 Regulation of Alien Species and Genetically Modified Organisms

Alien species are regulated by the Invasive Alien Species Act of 2004 as they disturb the original ecosystem in Japan. For example, racoons have reproduced rapidly in Japan. In many areas, they have replaced the racoon dogs which are one of the major native animals in Japan. Racoon dogs often appear in folk tales and therefore are important animals not only ecologically but also culturally. Racoons were originally imported as pets but were later abandoned by their owners and reproduced in the wild. Another famous invasive alien species is black bass, which prevails in rivers and lakes across the country.

The Invasive Alien Species Act was legislated to prevent the proliferation of foreign species that threatened the habitats of native species. This statute prohibits the cultivation, transfer, and import of invasive non-native species. This statute, however, covers only plants and animals that are imported and does not regulate the transfer of plants and animals within the country. Based on this statute, the government is implementing an extermination project for alien species.

The Act on the Conservation and Sustainable Use of Biological Diversity through Regulations on the Use of Living Modified Organisms regulates living genetically modified organisms (LGMOs). The government is afraid that native species in the ecosystem could be replaced by genetically modified ones. The GMO species could mate with native species, and the offspring might replace untainted native ones. Therefore, the government does its best to regulate LGMOs.

5.3 Restoring Lost Habitats

5.3.1 Agriculture Modernization and Loss of Habitats

In the process of modernizing agriculture, wild-life habitats have been lost in agricultural areas. Previously, many paddy fields in Japan were flooded in winter due to poor drainage. These areas were previously wetlands with a rich biodiversity, and many insects, frogs, and fish were present, even in winter providing rich feeding grounds for many birds. However, it was not easy to use agricultural machinery on this land as it sank into the mud. Therefore, farmers improved the conditions of wet paddy fields to increase rice yield by piling up soil, raising the paddy fields, and improving drainage. They drained the paddy fields in winter to enable them to use their machinery. The irrigation and drainage facilities were covered with concrete. In addition, they used many insecticides and herbicides to help improve their yields. The production of rice increased, but the paddy fields lost their biodiversity. Many small creatures, such as insects and frogs, lost their habitats and disappeared leading to the loss of winter-feeding grounds for many species of birds, such as storks and ibis. Watercourses were also improved to prevent flood damage and riverbeds and banks were covered with concrete, thus depriving the storks and ibis of these feeding grounds too.

The last wild stork (oriental white stork) in Japan was captured in 1971 and transferred to a captive breeding facility. This was the extinction of storks in the wild in Japan. In addition, the last wild crested ibises were captured in 1981 in Japan. Previously, they were common birds found across Japan until the beginning of the twentieth century.

5.3.2 Reintroduction of Endangered Creatures (Stork and Ibis)

Stork and crested ibis became endangered in Japan during the agricultural modernization

process. However, people in Toyooka, which was the last wild stork habitat in Japan, wanted storks to return to their landscape. The captive breeding program for storks was finally successful using young individuals gifted by Russia and China in the 1980s. In 2005, five storks were successfully released into the wild in Toyooka. As the population of the storks increased, they expanded their habitats across Japan. In 2021, more than 200 storks were found to exist in the wild.

The reintroduction project was successful because farmers in Toyooka engaged in alternative farming practices to conserve the paddy ecosystems, which recreated the winter-feeding grounds for the storks (Naito et al. 2014). A group of farmers kept their paddy fields flooded in winter to create habitats for fish, insects, and other small creatures. Another group of farmers restored abandoned paddy fields into wetlands. There were many abandoned paddy fields in Toyooka due to the aging population and the low productivity of small-scale farming. Some paddy fields damaged by typhoons were also abandoned and restored into wetlands to recreate habitats for storks. The farmers reduced the use of insecticides and herbicides to encourage the return of small creatures into the fields. Finally, they stopped using insecticides and herbicides altogether.

It was not easy for farmers in Toyooka to abandon modern agricultural practices and implement alternative practices. However, they remembered spending time with storks when they were children, which encouraged them to accept the innovation of agricultural practices to help reintroduce storks to the areas. River ecosystems were also restored to encourage their original biotope statuses. The Maruyama River Basin, which flows through Toyooka, has plenty of wetlands with a rich biodiversity. These wetlands, including paddy fields, contributed to adding the Maruyama River Basin as a listed Ramsar site in 2012.

The stork-friendly farming method implemented in Toyooka requires more labor than in ordinary agricultural practices with the yield per

unit area also being lower. But “the rice raised with storks” has become valued as eco-friendly rice and it has become more competitive on the market, resulting in enough income for the farmers. This increase in income has motivated them to continue farming. The stork-friendly farming led to the reform of rural agricultural practices and contributed to the conservation of the socio-ecological production landscapes.

A similar case can be found on Sado Island, where crested ibises have returned to the wild environment. Even though the crested ibis in Japan was endangered, the Japanese government successfully bred those gifted by China and released them onto the island. To prepare for the reintroduction of crested ibises into the wild, a group of farmers kept sections of their paddy fields flooded in winter to provide feeding grounds for the crested ibises. The rice produced in these paddy fields sells under the brand “the crested ibis-friendly rice.”

5.4 Protecting Landscapes and Ecosystems in Rural Areas

5.4.1 Abandonment of Farmland

The abandonment of farmland in rural areas is an ongoing process in Japan, which has caused the degradation of ecosystems. The change in the structure of industry that followed economic growth and the associated rural–urban migration were the leading causes of farmland abandonment in rural areas. Therefore, it is necessary to halt the abandonment and its negative impact on conserving ecosystems in the countryside. The ecologically sustainable development in rural areas is connected to social and economic sustainable development. As the 2030 Agenda for Sustainable Development declared, “we are committed to achieving sustainable development in its three dimensions—economic, social, and environmental—in a balanced and integrated manner.”

The productivity of the agricultural sector is lower than that of the industrial and commercial sectors. Therefore, children of farmers are

reluctant to inherit the family business. In the high economic development era of the 1960s and the 1970s, many of them went to cities and worked in factories and other businesses. Others became part-time farmers, who worked as city employees on weekdays and on their farmlands on the weekend. Gradually, part-time farmers quit these companies due to retirement. However, they continued to be farmers and later stopped farming when they got too old to cultivate their farmlands. Unless their children inherited the agricultural family business, there was no one to cultivate these farmlands, which led to their abandonment. Paddy field ecosystems were no longer flooded and thus were lost. Farmland abandonment has led to the degradation of the countryside and the loss of biodiversity. Therefore, farmland policy is now a part of the environmental policy.

5.4.2 Farmland Reform After WW II and Smallholder Farming

5.4.2.1 Smallholder Farming

Agriculture in Japan has been low in productivity and uncompetitive for a long time. This is because the amount of farmland per farmer is minimal. Therefore, the government has introduced a policy of encouraging large-scale, motivated farmers to increase their productivity. The government encourages motivated farmers to take over farmland that is no longer utilized and cultivate it on a large scale.

Looking back in history, one realizes that smallholder farming appeared after the farmland reform, which was implemented after World War II. This reform was implemented as a part of the democratization process in Japan, during which the government forced landowners who lived in cities and did not cultivate their farmland to sell it to the government. The government then sold the acquired land to tenant farmers. These previous tenant farmers could purchase around one hectare of farmland, which they cultivated with their families. Farmland reform improved their living conditions which contributed to the access of democracy in rural areas. Each farmer

thus became a landowner with an average of one hectare of farmland, but in many cases, these farmers could not profit from agriculture later. However, they still held onto the land as important property for their families. They were reluctant to sell or rent the farmland to other farmers. As a result, the farmland reform has prevented the development of large-scale agriculture in Japan.

The Farmland Act of 1952 supported the continuation of smallholder farming. (Ito J. et al. 2016) This legislation placed the sale and purchase of farmlands under governmental control, and any transaction of farmland needed to be approved by regulatory authorities. In principle, only farmers can purchase farmland. Businesses were not eligible for their own farmland, and, even now, to be a “corporation qualified to own cropland” (Farmland Act §3), the company needs to show that its main business is agriculture, and most of the main members are farmers. This scheme has prevented land from being sold to companies and from being converted to residential or industrial land for use by them. In this context, the statute protected farmland. However, it prevented farmlands from being acquired by large-scale farmers who are motivated and have sufficient capital to farm efficiently. Ironically, this scheme, which was intended to protect farmlands, became an obstacle to the development of productive agricultural practices, making Japanese agriculture less competitive on the international market.

5.4.2.2 Scale-Up of Agricultural Management for Sustainability of Farmland

The government is now prompting the scale-up of agricultural management to make the agricultural sector competitive. In addition, the government has come to recognize that farmlands should also be protected as ecosystems, as they are the habitats of a variety of species, and that farmlands supply a variety of ecosystem services. This recognition and associated farmland policy was enhanced during the negotiation process of the Trans-Pacific Partnership (TPP). MA (2003, p3) defined ecosystem

services, “ecosystem services are the benefits people obtain from ecosystems. These include provisioning services such as food and water; regulating services such as regulation of floods, drought, land degradation, and disease; supporting services such as soil formation and nutrient cycling; and cultural services such as recreational, spiritual, religious and other nonmaterial benefit.”

Even the Agriculture Policy Act of 1961 recommended that farmers expand their scale of farming through the purchase of farmland from ex-farmers and part-time farmers working in cities to increase the efficiency of farm work and income from farming. However, the areas farmed in large scale did not increase so much because weekend part-time farmers and those who quit farming seldom sold or rented their farmland as they wanted to hold onto it. As a result, the average area of cultivated farmland remains small in Japan.

The aging and declining farm population increased significantly around 2000, and the government strongly encouraged active farmers to collect farmland and helped them to incorporate the land. As a result, the government expected them to perform efficient and stable agricultural practices and to be competitive enough to survive in the international market. They were also expected to employ people who were not born into farming families, but who wanted to start farming. The Act on Promotion of Improvement of Agricultural Management Foundation has accelerated the collection by active farmers of farmlands that were no longer farmed by landowners. In addition, the Farmland Act Amendment of 2009 admitted that companies became farming entities and participated in farming businesses. Community-based farm cooperatives (voluntary organizations) are now transitioning to corporate firms.

Historically, efficient and large-scale production systems have often resulted in environmental degradation and loss of biodiversity. Therefore, it is important to develop methods that can conserve ecosystems and biodiversity in large-scale production.

Foreign technical training interns in agriculture play an important role in filling the labor

shortage in farming. However, the operation of foreign technical training interns is different from the original purpose of this scheme and there are many problems that need to be solved, such as improving the working conditions of trainees.

5.5 Sustainability with Sufficient Income

5.5.1 Direct Payments for Environmentally Friendly Agriculture

The government of Japan now recognizes farmland not only as food production sites but also as ecosystems that have many functions. The government's intention is to sustain farmland ecosystems with subsidies. The government has granted subsidies to farmers who cultivate rice terraces in mountainous areas. This type of subsidy is called a direct payment to farmers. It was offered to those engaged in environmentally friendly agriculture. These subsidies are justified as payments for ecosystem services. The Act on Promoting the Introduction of Sustainable Agricultural Production Methods of 1999 declared this policy direction, and the Act on Promotion of Multi-functionality of Agriculture of 2015 created a legal framework for direct payments.

5.5.2 Solar Sharing

It is not easy to continue farming with a small income. Therefore, many farms have been abandoned. As a result, the government has encouraged the installation of solar power generation facilities, such as photovoltaic systems, on farms. The feed-in tariff scheme of renewable electricity guarantees stable income to farmers who have installed it. If the sales of agricultural products and electricity sales are combined, the farmer gains sufficient income to continue cultivating. Some farmers have recommenced cultivation with the introduction of solar panels. This practice is called solar sharing, and it is being practiced across Japan.

To begin solar sharing, the landowner needs to obtain permission for farmland conversion from the local agriculture committee. This permission scheme has been an obstacle to the expansion of solar sharing. It is true that strict regulation of farmlands to prevent them from being used for other purposes has protected them. However, the government, especially the Ministry of Agriculture, Forestry, and Fisheries, is willing to expand solar sharing to protect agriculture and farmlands. Solar sharing will contribute to mitigating climate change by reducing CO₂ emissions and maintaining ecosystems and biodiversity in rural areas.

5.5.3 Forest Management

5.5.3.1 Unprofitable Forestry

Forestry management is currently difficult to achieve as the timber produced in domestic forests is not priced competitively because transporting it from the sawmills to the marketplace is costly in Japan. Therefore, forestry workers stopped logging in many forests to avoid losses occurring when they logged and sold the timber. They also stopped taking care of the trees to reduce expenditure. The situation of national forestry, which is owned and managed by the government, is like that of privately owned forests. Previously, the national forestry was financially independent and returned its profit to the national treasury. Previously, the forestry office was blamed for felling too many trees. However, national forestry became unprofitable and was forced to cease the self-supporting accounting system. Currently, the National Forestry Agency manages its forests for public interest with the expenditure of national treasury. National forests are divided into five categories based on their features. The expected functions to be enhanced are disaster prevention, ecosystem protection, recreational usage, formation of comfortable living surroundings, and watershed protection.

5.5.3.2 Matured Forests

The forests in Japan have reached maturity and are therefore ready to be cut down. However, cutting

trees and transporting the timber to markets is costly. Therefore, encouraging the use of domestic wood is an important forest management policy in Japan. Without logging, the old forests will not rejuvenate and will no longer absorb CO₂. The government encourages building wooden houses to increase the demand for timber.

Biomass power generation using wood chips is enhanced to generate income for thinning the planted forests. Wood chips are made from this wood. Biomass power generation contributes to the mitigation of climate change as a renewable energy source. In addition, it is becoming popular to make chopsticks and other articles from thinned wood to help support forest management. These wooden items are supported by green consumers as eco-friendly.

5.6 Consolidation of Development and Environment

5.6.1 Harmonization Between Economic Development and Environment

In the era of economic development and serious pollution of the 1960s, people criticized so-called harmonization clauses which required the regulatory agencies to consider “harmonization between economic development and the environment.” These clauses existed within the Pollution Prevention Policy Act and other pollution control statutes and were deleted from these statutes in 1970. People thought that the clause authorized factories to operate while polluting the environment. However, the consolidation of development with environmental protection returned with the enactment of the Environmental Policy Act of 1993 after the Earth Summit, where the concept of sustainable development played an important role. The statute made sustainable development the fundamental principle of environmental law in Japan and recognized that sustainable development meant ecologically sustainable development and that generational ethics between the present and future generations were to be realized. A variety of statutes that

promote development have now included environmental protection in their goals to reflect the sustainable development goal in legal schemes. Therefore, many statutes now form part of the environmental law systems. For example, the River Act, the Coast Act, the Road Act, and so on are important parts of environmental law.

5.6.2 Environmental Impact Assessment

The environmental impact assessment (EIA) scheme is an important tool for considering environmental factors in the design of development. At the national level, the Environmental Impact Assessment Act of 1997 was legislated, and Japan had a legal scheme for EIAs. Strategic environmental assessment (SEA) was introduced in 2011. The EIA Act requires the government to consider environmental factors when issuing licenses or permission for development.

The EIA is a scheme of information disclosure and public involvement. Therefore, Japan needed to wait for EIA Act legislation until 1997, because the transparency of Japanese society and the government had not matured. With the Administrative Procedure Act of 1993 and the Freedom of Information Act of 1999, Japan was prepared to legislate the EIA Act.

5.7 Concluding Remarks

After serious pollution cases have disappeared due to strict pollution regulations, climate change and the protection of ecosystems are now important environmental issues in Japan. Previously, the nature protection policy focused on the prevention of development that damaged the natural environment. The Nature Parks Act has played an important role in the protection of beautiful natural scenery and pristine nature. Birds and other animals have been protected by the Control of Animal Hunting and Protection of Animals Act. These have been very successful. However, people have realized that it is important to protect ecosystems and biodiversity rather

than natural beauty. Therefore, the government focuses on the protection of socio-ecological landscapes, such as farmland and forest, that hold valuable ecosystems within them. People are aware that they depend on the ecosystem services to survive. The degradation of ecosystems and biodiversity in socio-ecological productive landscapes has been caused by a decline in the agricultural and forestry industries.

Protecting ecosystems on land is within the scope of Goal 15 of the SDGs. Maintaining farmland, pastures, and logging forests requires sustainable agriculture, livestock farming, and logging. Thus, it involves the social and economic developments covered by other goals of the SDGs concerning people and prosperity. The consolidation of the environment, society, and economy is an indispensable factor in protecting ecosystems in Japan.

References

- East Asian-Australasian Flyway Partnership (EAAFP) (2021) About EAAFP. Accessed on 31 December 2021. <https://www.eaaflyway.net/about-us/>
- International Partnership for the Satoyama Initiative (IPSI) (2021) What is IPSI ? Accessed on 31 December 2021. <https://satoyama-initiative.org/about/>
- Ito J, Nishikori M, Toyoshi M, Feuer HN (2016) The contribution of land exchange institutions and markets in countering farmland abandonment in Japan. *Land Use Policy* 57:582–593. <https://doi.org/10.1016/j.landusepol.2016.06.020>
- Japan Satoyama Satoumi Assessment (JSSA) (2010) Satoyama-Satoumi ecosystems and human wellbeing: socio-ecological production landscapes of Japan—summary for decision makers, United Nations University. https://collections.unu.edu/eserv/UNU:6300/JSSA_English_Executive_Summary.pdf. Accessed on 31 December 2021
- Kozar R, Galang E, Sedhain J, Suneetha AA, Subramanian M, Saito O (2020) Place-based solutions for conservation and restoration of social-ecological production landscapes and seascapes in Asia. In: Saito O, Subramanian SM, Hashimoto S, Takeuchi K (eds) *Managing socio-ecological production landscapes and seascapes for sustainable communities in Asia: mapping and navigating stakeholders*, Policy and Action, Springer Open, pp 117–146. <http://library.oapen.org/handle/20.500.12657/39578>. Accessed on 31 December 2021. <https://doi.org/10.1007/978-981-15-1133-2>
- Millennium Ecosystem Assessment (MA) (2003) *Ecosystems and human well-being: a framework for assessment*, Island Press. https://wedocs.unep.org/bitstream/handle/20.500.11822/8768/Ecosystem_and_human_well_being_a_framework_for_assessment.pdf?sequence=3&isAllowed=y
- Ministry of the Environment (MoE) (2021a) Characteristics of Japan's national parks in national parks of Japan. Accessed on 31 December 2021a. <https://www.env.go.jp/en/nature/nps/park/about/index.html>
- Ministry of the Environment (MoE) (2021b) Annual report on the environment in Japan 2021b. Accessed on 31 December 2021b. https://www.env.go.jp/en/wpaper/2021b/pdf/2021b_all.pdf
- Murasawa M (2020) Preface. In: Murasawa M (ed) *Satoyama studies: socio-ecological considerations on cultural nature*, Union Press, pp 1–18
- Naito K, Kikuchi N, Ohsako Y (2014) Role of the oriental white stork in maintaining the cultural landscape in the Toyooka Basin, Japan. In: Sun-Kee HS, Bogaert J, Min Q (eds) *Biocultural landscapes: diversity, functions and values*, Springer, pp 33–44. <https://doi.org/10.1007/978-94-017-8941-7>. <https://link.springer.com/content/pdf/10.1007%2F978-94-017-8941-7.pdf>. Accessed on 31 December 2021
- Takahashi MA (2009) Overview of the structure and the challenges of Japanese wildlife law and policy. *Biol Cons* 142:1958–1964. <https://doi.org/10.1016/j.biocon.2009.05.009>

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