

## Chapter 3

# Agro-environmental Policies in Japan and Attendant Challenges: Countermeasures for the Agricultural Sector

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### 1. Introduction

It was in the New Policy for Food, Agriculture and Rural Areas (New Policy) issued by the Ministry of Agriculture, Forestry and Fisheries (MAFF) in 1992 that agriculture-related environmental issues were formally addressed in agricultural policy for the first time in Japan. Based on the concept of the New Policy, Food, Agriculture and Rural Areas Basic Act (New Basic Act) stressed the importance of consideration for the environment in the agricultural sector. Japanese agriculture is characterized by rice cultivation in paddy fields, in contrast to the combination of livestock farming and dry land cultivation in Western countries. Rice growing in Japan was conducted for a long time using a sustainable farming system that was well harmonized with nature. As a result, until recent years, the recognition that agriculture can be harmful to the environment was not widespread in Japan.<sup>1</sup>

There is some social and political background behind the first appearance of agro-environmental issues in national agricultural law. Firstly, domestic environmental pollution occurred due to intensive farming, and it became a public concern under passage of the old Basic Act; secondly, agriculture became a priority issue at the GATT Uruguay Round from 1986 to 1993, where member countries discussed domestic agricultural policies with regard to subsidies and international trade, with the objective of constructing a global system for free trade of agricultural products. As a member country, Japan was also obliged to grasp the positive and negative impacts of its own agriculture on the environment and to integrate this understanding in its agricultural policies.

Political measures targeting agro-environmental issues in developed countries are a

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<sup>1</sup> The negative effect of pesticides was recognized as early as the 1950s in Japan. Kawamura (2005) reports that Japan experienced many serious health accidents due to pesticides, including cases of dead producers, which led to stricter regulations on pesticide use. However, to the best of the author's knowledge, the harm of pesticides was mainly discussed in the context of food safety, not in the context of environmental problems or producers' health problems.

mixture of regulations and economic measures, including various kinds of subsidies or income supports. In Japan under the new Basic Act, the political framework is gradually being prepared for agro-environmental issues, for example through the establishment of the so-called Three Agro-environmental Laws, i.e., the Act on Promotion of Introduction of Sustainable Agricultural Production Practices, Revised Fertilizers Regulation Act and Act on the Appropriate Treatment and Promotion of Utilization of Livestock Manure, and introductions of economic measures such as direct payments to farmers. In Japan, as the number of farmers has dramatically decreased in the past decades, most of the residents in rural areas are non-farmers, which causes new problems regarding the role of farmers as providers of environmental goods and non-farmers as beneficiaries of rural resource management and also regarding their sharing of environmental social costs. What is more, as Japan is a rare country among developed countries in that it belongs to the Asian Monsoon climate region, it faces special problems caused by its unique farming conditions in paddy rice cultivation. Considering the uniqueness of water management and water conservation which use reservoir units that require collective, intensive water management, it is necessary to involve rural stakeholders, including members of the local community, in water management for the entire reservoir. The Japanese government is endeavoring to seek a new and appropriate design for agro-environmental policy which reflects the current socioeconomic situation in rural Japan, while referring to policy measures from other experienced developed countries such as the European Union (EU). This paper aims to review agro-environmental policy in Japan, mainly focusing on the agricultural sector, and will attempt to primarily analyze this policy from the viewpoint of stakeholders' involvement.

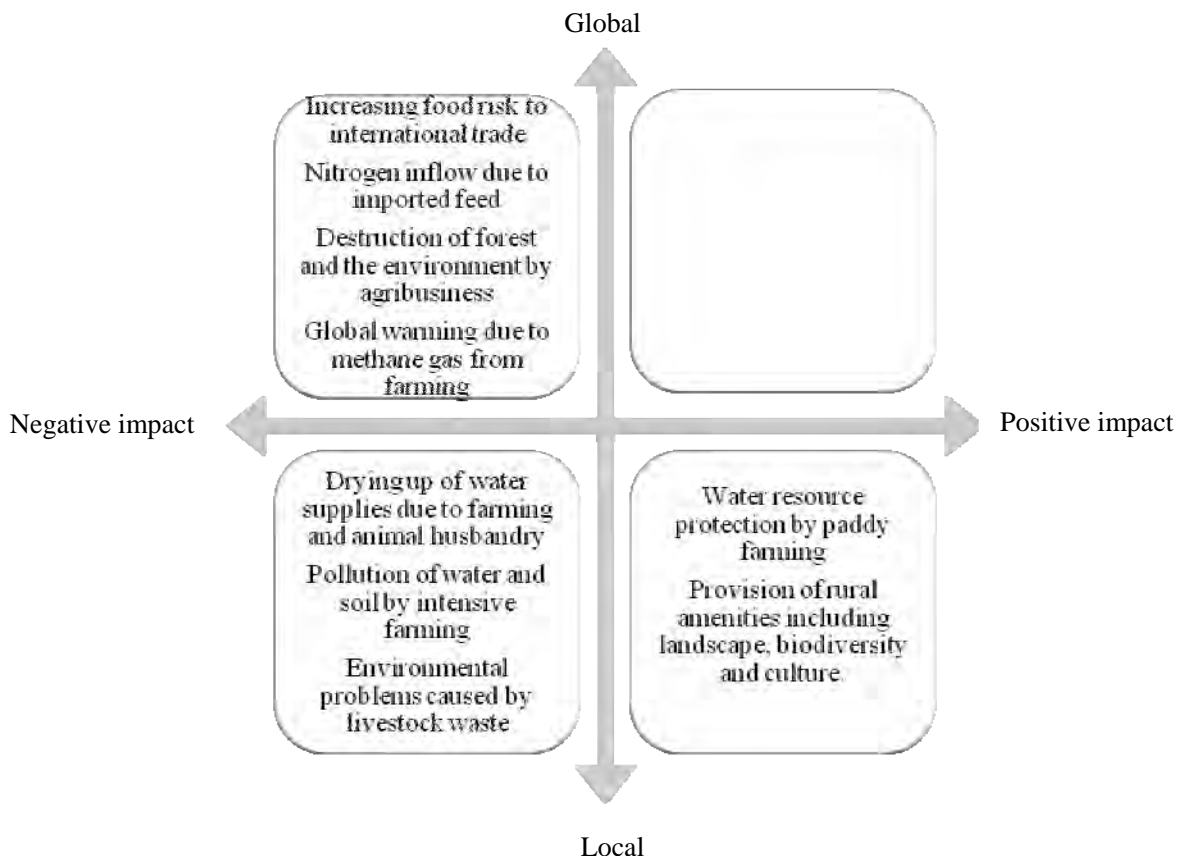
The outline of this chapter is as follows. Section Two briefly reviews agro-environmental policies in developed countries and their concepts, followed by the introduction of major policy options, including economic and non-economic measures. Section Three highlights the agro-environmental issues by presenting statistics and previous studies. Section Four describes the agro-environmental policy reform in Japan, mainly from the standpoint of the agricultural sector. The fifth section concerns two recent types of environmental direct payments to farmers and other stakeholders in Japan, which the author will attempt to analyze using the concept of each stakeholder's cost sharing and involvement, taking the policy of Shiga Prefecture as a case study. In conclusion, some challenges for Japanese agro-environmental policy are pointed out.

## **2. Agro-environmental Policies in Developed Countries**

### **2.1 Basic Recognition of Agricultural and Environmental Issues in OECD Countries**

Since World War II, the common primary objective of agricultural policy around the world has been to provide a sufficient amount of food, and most of the current developed countries and regions including the United States, Europe and Japan have followed protectionist price-supporting agricultural policies. As a result, after entering the 1980s, protective agricultural policies led to excess production, and a huge budgetary burden as caused by price supports and management of excessive food stocks in many countries. At the same time, various problems caused by intensive modern farming, such as water, soil and air pollution, and destruction of biodiversity, appeared. At the GATT Uruguay round, agricultural trade and its impact on the environment were discussed, so each member country needed to grasp the impact of its domestic agriculture on the environment and to address agro-environmental issues in domestic agricultural policy.

To begin, let us examine the relationship between agriculture and the environment (Figure1). The environmental impact of agriculture is divided into global/local impact and positive/negative impact, respectively. As we are going to discuss domestic agricultural policies, local problems should be elaborated here. Among local problems, environmental pollution is caused by chemical fertilizers, pesticides, and livestock waste, while water shortages and desertification are caused by over-cultivation and over-grazing and loss of wetlands, etc. On the other hand, positive impact results from the so-called 'multifunctionality of agriculture', which includes cultivation of groundwater resources by paddy field operation, production of rural amenities such as rural landscape, protection of biodiversity and so on. Global issues include, for example, problems in food safety including post-harvest pesticide problems caused by increasing international trade in agricultural products, which has been in the spotlight in the global media in recent years; forest destruction and environmental pollution in developing countries caused by plantation farming methods by agribusiness; global warming caused by methane gas from livestock and farmlands; and excessive accumulation of nitrogen caused by intensive livestock farming, often relying upon imported feeds at low prices, which occurs in Japan and the Netherlands, etc.



**Figure 1. The Relationship between Agriculture and the Environment**

When the both the positive and negative environmental impacts of agriculture are recognized, then a policy to internalize the externality of agricultural activity will be required. OECD (1993) was a remarkable report which advocated the integration of agricultural policy and environmental policy and a transformation from productivity-oriented agriculture to sustainable agriculture. In this report, the OECD insisted that the integration of agriculture and the environment is important from three perspectives, 1) enhancement of the positive role of agriculture, 2) pollution prevention and control and 3) adaption of agricultural support policies, and should be considered at the stage of policy planning (OECD, 1993). Among these three points, the first and second are approaches to current problems, and the third is meant to put environmental considerations into agricultural policy in order to remedy the structural causes of problems. Each country/region has tackled its domestic issues on the basis of OECD's common platform.

As Shyobayashi (2009) points out, when policy makers plan and evaluate agro-environment policy, the first thing they need to ascertain is if there are any

overlaps or contradictions between agricultural policy and agro-environmental policy. While agriculture could be a polluter which causes negative externality on the environment as a kind of public goods, it could also produce positive externality, such as rural amenities. What makes it complicated is that both positive and negative effects are produced concomitantly with agricultural production. These kinds of goods are called 'joint products' since they cannot be separated from farming activities. Suppose decoupled payment was provided to farmers who implement eco-friendly farming methods, and though the degree to which it will stimulate farmers' incentive to increase production could be lower than in the case of a price-support policy, it will have the effect of increasing production to some extent. The EU's Common Agricultural Policy (CAP) to which Japanese policy makers refer maintains its consistency by implementing complementary administration of cross-compliance and the direct payments to farmers.

The second point to be discussed is the method of determining cost sharing and decision making on environmental externality which occurs through farming activities. Agro-environmental policy often enforces the prevention of pollution by regulatory measures such as Good Agricultural Practice (GAP) or Good Farming Practices (GFP) and other regulations. The degree of the publicness of the benefit from a given pollution reduction, or the decision on how much non-farmers are willing to pay for the additional cost, may rely upon the character of the domestic society.<sup>2</sup> The policy makers of each country should estimate the farmers' Reference Level (RL) on environmental protection and then realize the relation between the target environmental level and the RL, based on which they can finally decide the policy mix. If the social target level is higher than the RL, the farmers are responsible for the improvement of the environment through transforming current farming methods into eco-friendly ones, once they achieve the RL, and then society is responsible for lifting the level up to the target level by supporting farmers with additional payments. More specifically, the part between the current level and RL is covered by cross compliance and regulations, and the latter part should be covered by environmental payments from the public budget (Shyobayashi, 2006). By setting a proper RL, the relationship between agriculture and the environment becomes open to public, and it acquires the nature of a social agreement and transparency as

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<sup>2</sup> Good Agricultural Practices are a bundle of principles that apply to on-farm production and post-production processes with consideration for the environment and for the welfare of producers, resulting in safe agricultural products and environmental sustainability. GLOBALGAP (formerly EUREPGAP) is virtually the world standard, and more and more countries and regions are rushing to obtain GLOBALGAP certification to expand international food exports. For example, in Asia, China and Japan have acquired equivalent certification with GLOBALGAP.

policy as well.

## 2.2 Policy Options

Table 1 shows major agro-environmental issues and the countermeasures for each problem. These policies mainly target protection of water, soil, biodiversity, rural landscape and food safety. As agro-environmental problems range across various issues, it should be mentioned that one policy can have plural objectives.

**Table 1. Major Agro-environmental Issues and Relevant Policies**

Agro-environmental Issues	Policies
Water protection	Environmental regulations concerning water including setting water quality standards, Implementing environmentally-friendly farming practices, Payments for agricultural production conditional upon reduced use of pesticides and fertilizers (cross-compliance), R&D for environmentally-friendly farming methods
Soil protection	Environmental regulations concerning soils including set-aside, rotation farming, Implementing environmentally-friendly farming practices, R&D for environmentally-friendly farming methods
Biodiversity	Protection of wetlands and farmlands, Conservation plans for wildlife
Landscape	Management of abandoned farmland in less favoured area, Subsidize the conservation program of rural landscape, Environment conservation stewardship
Food safety	Regulations on pesticides, Implementing environmentally-friendly farming practices, Setting standards for organic products and its eco-labelling

*Source: Prepared by the author with reference to Kada (1999) and Hattori (1992).*

The countermeasures for reducing environmental loads from chemical fertilizers, pesticides and animal waste consist of levying a monetary penalty on the polluter or paying them a subsidy to implement conversion to eco-friendly farming methods. The content of eco-friendly farming methods covers not only the regulations and guidelines on pesticide and chemical fertilizer usage and animal waste treatment, but also covers safety standards related to agricultural production and harvest such as GAP prepared. One of the most remarkable policy measures is cross-compliance, which makes the observance of environmental regulations conditional on the receipt of various kinds of subsidies by farmers.

As it is generally believed that protection of agriculture will stimulate farmers to

produce more products and will make farming more intensive, some measures have been taken to decouple production and payment. These include reducing the amount of agricultural input by payments to farmers which are decoupled from production and reducing the density of livestock animals per unit of land area by introducing a production quota system like the Milk Quota in the EU. Under the Milk Quota farmers are given their own production quota to achieve smaller production, and once one has achieved his or her quota, then one is allowed to buy and sell his or her surplus quota. To encourage the spread of more extensive farming methods, reform of current agricultural institutions is also effective.

In some arid areas where the risk of soil erosion is high, the set-aside program and rotation farming are effective. Soil erosion not only lowers the productivity of arable land, but the inflow of soil is also harmful to the water quality of nearby rivers and lakes.

In some unfavoured areas, direct income support to farmers who switch to eco-friendly farming methods and who implement set-aside is effective for increasing the provision of agro-environmental goods such as biodiversity and rural landscape. In some cases, tourists are charged an entrance fee for conservation of rural amenities to share the social cost of rural amenities. There are some measures to increase rural amenities other than economic measures, and the non-economic measures include education, public campaigns, development of technology to evaluate rural amenities and management by stewardship, etc.

In addition to the regulations on agricultural inputs and the observance of agricultural practices as mentioned above, the typical countermeasure for food safety is signaling by eco-labeling of organic products to induce consumer behavior that is more eco-friendly.

### **3 Agro-environmental Problems in Japan**

#### **3.1 Environmental Pollution due to Farming**

##### **3.1.1 Overview of non-point source pollution**

The pollution of the environment typically appears in water quality. Pollution from broad flatlands, such as the surface of arable land, cities and woods, is called non-point source pollution. Compared to point source pollution such as drainage from industrial

factories, non-point source pollution is difficult to identify, and the impact on the environment is not very obvious because the system of causation is so complicated that the relation between the activity which may cause pollution and the pollution loads per unit of drainage is vague and difficult to measure. Although Japan's Ministry of Environment issued The Guidelines for Countermeasures to Reduce Non-point Pollution in Lakes in 2000, it is said that the national policy for non-point pollution made a slow start.

### Surface water pollution

Table 2 shows the COD inflow into major lakes, which reveals the non-point source water pollution in Japan based on evaluation reports on the water quality of major Japanese lakes prepared by the Ministry of Internal Affairs and Communication. In water reservoirs, especially in closed water systems where pollutants will easily accumulate, the nitrogen from non-point sources is one of the leading causes of pollution. According to the table, the percentage of COD from agriculture is around 10% in all the lakes. If added to the inflow from livestock and fisheries, COD amounts to 14.9% in Lake Biwa and 14.7% in Lake Suwa, respectively, and is near 30% in the other two lakes (Ministry of Internal Affairs and Communication, 2004).

**Table 2. Sources of Pollution in Major Lakes and Reservoirs in Japan (COD)**

Lake	Lake Kasumigaura		Lake Inbanuma		Lake Biwa		Lake Suwa	
Year	2000		2000		2000		2001	
Source of COD	Amount (kg/day)	%	Amount (kg/day)	%	Amount (kg/day)	%	Amount (kg/day)	%
Drainage	7,915	28.5%	1,174	40.8%	4,188	24.3%	160,345	10.5%
Industry	1,319	4.8%	134	4.7%	2,609	15.1%	81,687	5.3%
Livestock and Fishery	4,727	17.0%	44	1.5%	600	3.5%	23,397	1.5%
Agriculture	3,237	11.7%	486	16.9%	1,961	11.4%	201,955	13.2%
City	4,691	16.9%	857	29.8%	2,110	12.2%	308,024	20.2%
Mountains and Pastures	5,874	21.2%	181	6.3%	5,765	33.5%	751,535	49.2%
Total	27,763	100.0%	2,876	100.0%	17,233	100.0%	1,526,943	100.0%

*Source: Ministry of Internal Affairs and Communications (2004).*

Since the establishment of the Act on Special Measures concerning Conservation of Lake Water Quality in 1984, most of the lakes have never achieved the water quality goal. Nishio (2004) summarized the evaluation report above, saying that, in the past twenty years, the water quality in lakes in Japan has remained the same for the most part because the majority of the project budget has been spent on wastewater treatment facilities, while only a small part of it was spent on countermeasures for non-point



source pollution, which is the dominant source of pollution in many closed water systems. The reason why no effective measures have been taken is the lack of recognition among policy makers, small budgets, and lack of effective measures worth taking domestically. The report entreats those involved to quickly grasp the mechanism of non-point pollution in lakes, to establish appropriate goals and action plans immediately and to consider economic measures, including emission trade policy.

### **Groundwater pollution**

In many parts of the world, although groundwater is available for drinking, it is often polluted by nitrate from fertilizers and animal waste, which causes health problems. The nitrogen in the soil will usually change into nitrate, but if the amount of nitrate in the soil exceeds the necessary level for crops, then the excess amount will cause pollution. If water highly contaminated by nitrate is drunk, it will result in a decrease in the oxygen carrying capacity of hemoglobin in babies, leading to death; this is what is called Blue Baby Syndrome.

According to an investigation on water quality conducted by prefectures in Japan based on the Water Pollution Control Act, environmental nitrate standards have been exceeded at the comparatively higher level of 5% to 6% in recent years, while other pollutants have exceeded the standards by less than 1%. In 2002, 247 samples out of 4,207 samples, or 5.9% in total, showed that nitrogen exceeded the national standard of 10ml/L (Ministry of the Environment, Environment Management Department, Water Environment Management Division, 2004).<sup>3</sup>

The Ministry of the Environment banned the use of the polluted wells and other groundwater facilities and implemented further surveys on the neighboring wells to grasp the source and scale of pollution. Together with the report by the Ministry of the Environment are attached the guidelines for countermeasures to prevent non-point pollution, and these guidelines include typical case studies from some prefectures in Japan. For example, the case studies introduce the fertilizer input reduction policy in tea growing areas and nitrate mapping in livestock farming areas, etc.

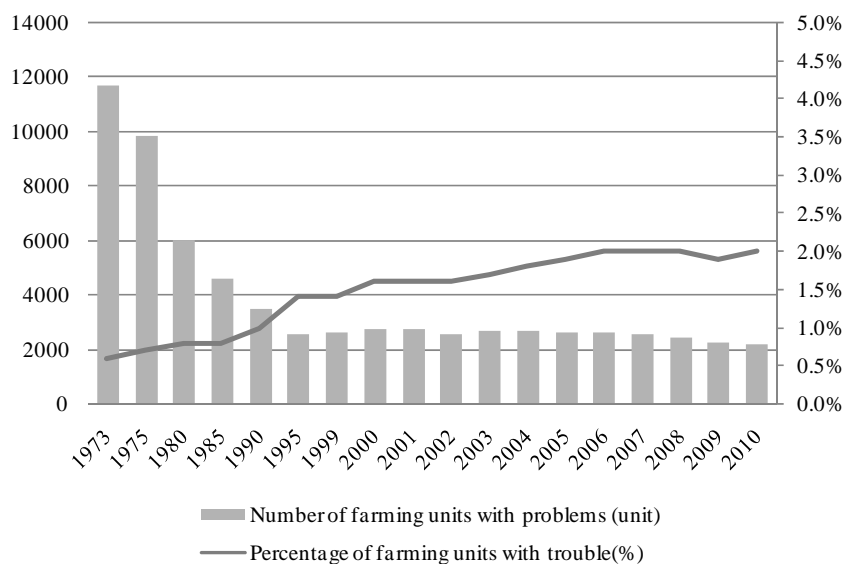
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<sup>3</sup> This investigation was implemented in a selected area where local residents depend mainly upon groundwater. In 1997 the environmental standards for groundwater covered 23 substances, including heavy metals like cadmium and other volatile organic compounds like trichloroethylene.

## Environmental impact of livestock waste<sup>4</sup>

A characteristic of livestock waste is that it entails unique problems other than water pollution such as stink and noise. Figure 2 shows the number of problems due to livestock waste and the percentage of farms with trouble out of total livestock farms from 1973 to 2010, based on data from MAFF. From 1973 to 1990, the number of cases of trouble decreased to one-third, or around 2,000 cases, and the number of cases has remained essentially stable since then. The reason why the total number declined rapidly during the 20 years starting in 1973 is attributable to the decrease in the number of farm. On the other hand, the rate of occurrence has gradually increased since the 1990s, reaching more than 2% in the mid-2000s, and this is because urbanization and the decline in the number of farmers led to an increase in the percentage of non-farmers in rural areas who are more sensitive to rural environmental problems.

Let us look at the composition of the problems that occurred in 2010 (Table 3). ‘Stink’ is the problem with the largest number of cases, at more than 60%, followed by ‘water pollution’ (28.1%), ‘pests’ (6.6%), and ‘others’ (multiple responses). The table also shows that the most numerous type of livestock, cattle, is most likely to cause problems because the amount of waste per head is the largest. Cattle and pigs cause water pollution more frequently than do other animals.



**Figure 2. Number of Problems due to Livestock Farming in Japan**

*Source: MAFF, Department of Production, Livestock Bureau (2010).*

<sup>4</sup> For a more detailed explanation on the environmental issues related to livestock husbandry in Japan, see Yamada (2005) (in Japanese).

**Table 3. Environmental Problems due to Livestock Farming in Japan (2010)**

	<b>Stink</b>	<b>Water pollution</b>	<b>Pest</b>	<b>Others</b>	<b>Total</b>
<b>Dairy cattle</b>	390	199	24	151	685
<b>Beef cattle</b>	220	114	22	70	394
<b>Hog</b>	466	246	8	50	663
<b>Poultry</b>	254	44	87	33	399
<b>Others</b>	27	11	4	7	44
<b>Total</b>	1,357	614	145	311	2,185
<b>Percentage</b>	62.1%	28.1%	6.6%	14.2%	100.0%

*Source: MAFF, Department of Production (2010).*

*Notes: 1) The number of problems indicates the number of local residents' complaints on environmental problems to local government in the given year.*

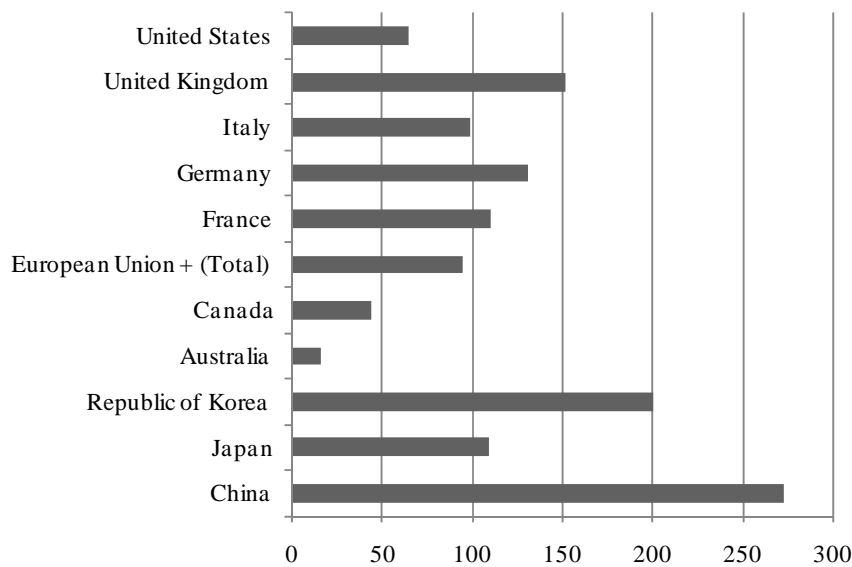
*2) The percentage is the rate of livestock farmers in trouble out of the total number of livestock farmers*

*3) 'Others' includes noise and inflow of animal waste.*

### **3.1.2 Background of Non-point Source Pollution**

#### **Pollution caused by cultivation**

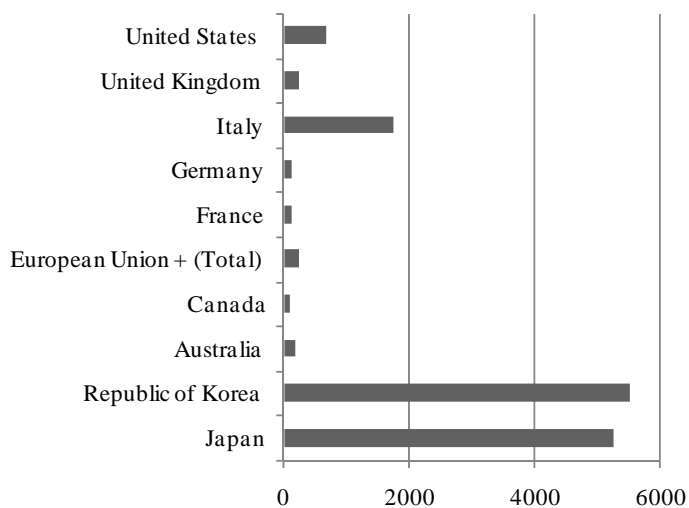
The amount of nitrogen input and pesticides per hectare in selected OECD countries is shown in Figure 3 and Figure 4. The countries shown in the figure are divided into two groups according to the intensiveness of their farming methods; the first group is characterized by sufficient land resources and large-scale farming and includes the US, Canada, and Australia; the second group comprises intensive agricultural regions which include most of the European and Asian countries. The nitrogen input of Japan, Korea and China is remarkably high, and some European countries such as the UK and Germany, which exceed the EU's average, are next. Pesticide input per hectare also follows the same pattern, and that of Japan and Korea is much higher than other countries.



**Figure3. Consumption of Nitrogen Nutrients per Hectare in Selected Countries (2008)**

*Source: FAOSTAT.*

*Notes: Shown by kg per hectare.*



**Figure4. Consumption of Pesticide per Hectare in Selected Countries (2008)**

*Source: FAOSTAT.*

*Notes: Shown by kg per hectare. Data for the EU, UK, and Italy is as of 2006; date for the US is as of 1997; data for Canada is as of 1994; and data for Australia is as of 1992.*

## **Pollution caused by livestock**

According to related statistics, the amount of livestock waste produced in Japan in 2010 reached 86.95 million tons, of which that from cattle occupied 58.9% and that from pigs and poultry occupied 26.3% and 14.7%, respectively. Although the waste should be returned to arable land after being processed into compost, in Japan where arable land is in short supply, the amount of land and livestock waste is unbalanced in many places, and the waste exceeds the environmental capacity in such places.<sup>5</sup> MAFF, Department of Production, Livestock Bureau (2011) shows a map on the prefectural distribution of livestock waste production per one hectare of arable land, the figures on the map represent the amount of nitrogen. Though the average amount is 102 kg per hectare, in some locations where there are many livestock farmers as in Kagoshima, Miyazaki and Gunma prefectures, the amount is more than 200 kg, which even exceeds the EU standard of 170 kg per hectare. On the other hand, in Hokkaido and northeastern Japan where there are many livestock farms as well as abundant land resources, the nutrient level is comparatively low, but in cases in which the waste is not properly treated, there is a possibility for problems to occur.

In 1999, approximately 90 million tons of livestock waste was produced, and 10% of it was abandoned in the environment without any treatment (MAFF, 2011).<sup>6</sup> The reason why the waste was not treated properly is that an increasing number of farmers used intensive methods like free-stall cowsheds to seek the merits of scale, since the management of a large livestock herd often leads to shortfalls of domestic labor. Moreover, the feed used in Japanese animal husbandry depend on the inexpensive imported concentrated feeds. Livestock which is fed with concentrated feed produces more nitrate than those fed with roughage, and in addition, the waste contains more water which makes it harder to process into compost. What is more, even if made into compost, the compost is unlikely to be used on farmland in a sound way because large-scale livestock farms are often isolated from crop farms.

In 1999, the Japanese government established the ‘Act on the Appropriate Treatment and Promotion of Utilization of Livestock Manure’ to prevent improper treatment of livestock waste, which can cause pollution of groundwater and closed reservoirs. The law obliged farmers above a certain scale to equip their farms with treatment facilities,

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<sup>5</sup> According to MAFF (2011), if all livestock waste were spread on all the farmland equally, the input would not exceed the environmental capacity. However in reality, the distribution of livestock farms and farmland is concentrated in specific parts of Japan, and environmental problems will occur in areas with less land.

<sup>6</sup> Out of the remainder, 83.3% was made into manure or slurry and 6.7% was burnt.

observe proper management of waste, and record the amount of waste they produced and treated<sup>7</sup>. In the five-year transition period, the government prepared a menu of subsidies for farmers to prepare for the date when the law took effect in 2004. As of March 2003, the number of targeted farms was 66,000, out of which the percentage of those who passed the standards was only 51%; in December 2009, the targeted number declined to 56,184 households and 99.96% of them had completed the preparation, though there are still some problems regarding compost production and manure recycling.

As stated above, the nitrogen added to arable land in Japan is comparatively high. The average amount of land per household in Japan is very small, which has led to labor-intensive farming practices.<sup>8</sup> As the economy has grown since the 1960s, productivity of agriculture in Japan has successfully been improved by introducing labor-saving techniques such as increasing input or using agricultural machines. This is partly because the population engaged in agriculture decreased rapidly all through the rapid economic growth era. At the same time, government supported modernization of agriculture by investment in agricultural land improvement as a public project. Some data from the FAO database state that the productivity of Japanese agriculture in 1980 was 1.4 times higher than that in 1960 (Yamada, 2005). From a technical perspective, the large input of chemicals is explained by the Japanese climate with its high temperatures and precipitation, which is conducive to weeds and pests.

Even though negative impact from agriculture in Japan is so large, the social recognition that 'agriculture has a negative impact on the environment' has not penetrated as deeply as in Western countries. This is primarily because of the differences in the ways of farming, as seen in Japanese rice cultivation and Western dry field farming and livestock raising. The rice paddy displays higher performance in nitrogen fixation, water purification and soil conservation than dry fields, so apparent environmental problems caused by agriculture such as severe water pollution or large-scale soil erosion are seldom seen in Japan. Secondly the percentage of farmland in Japan is only 14%, which is much smaller than that of the EU, at around 50%, and the population is highly concentrated in large cities in Japan. This means that the population which suffers from agro-environmental problems is relatively small. Thirdly, in Japan, dependence on groundwater as drinking water is low, for Japan has a large

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<sup>7</sup> The targeted scale is as follows: farms with more than 10 cows, 100 pigs, 2,000 broilers, or 10 horses.

<sup>8</sup> After World War II, the tenancy system was abolished by land reform and the farmland was allocated equally to individual farmers. Concerning the historical changes in Japanese agriculture, see Yamada (2005).

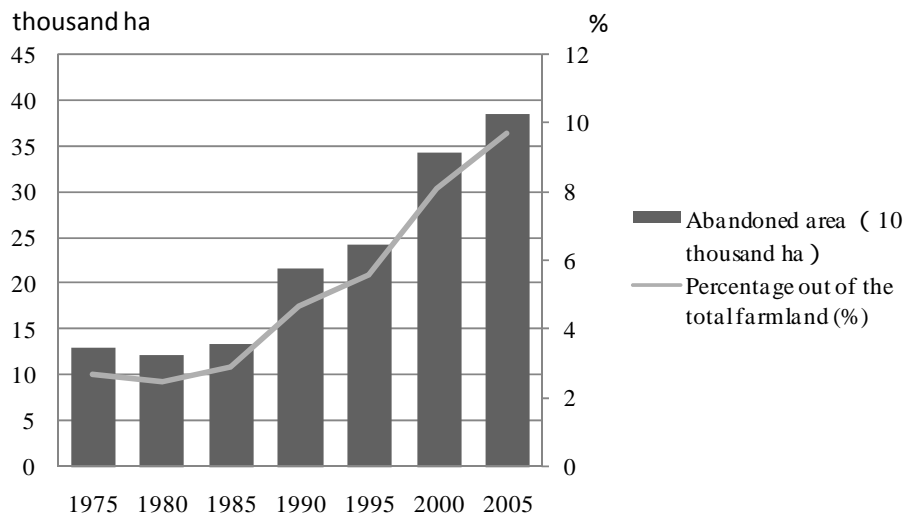
amount of rainfall and is rich in surface water resources. Furthermore, as public concern over food safety grows, the discussion on agro-environmental issues with regard to food safety has increased. As the Japanese food self-sufficiency rate is around 40%, the lowest among developed countries, consumers are more sensitive to the safety of imported agricultural products, and as a result it is widely believed that the domestic food is safer than the imported food.

### **3.2 The Decline of the Stock Management Capacity in Rural Resources**

Rural stock resources like farmland and water canals are not only useful for agricultural production, but also provide public value in terms of landscape, water resource protection, maintenance of biodiversity and acceptance of domestic drainage. So, proper rural stock management potentially has many beneficiaries, ranging from urban to rural dwellers. At present, many Japanese villages are encountering the problem of the ruin of stock like an increase in abandoned farmland and a decrease in water management due to aging and labor shortage. The problem is especially acute for water canals because water management in paddy fields requires collective action on the part of water users in terms of labor and cash for maintenance.

From 1962 to 2008, the land area diminished from about 6.09 million hectare to 4.61 million hectare, and in these 48 years, about 1.05 million hectare of arable land was newly developed; on the other hand, 2.53 million hectare was transferred into other uses (MAFF website). At the same time, the food self-sufficiency rate declined from 73% to 41%, and so one of the main current objectives of agricultural policies in Japan is to strengthen food security.

The main reason for the decline of arable land in Japan is the increase in abandoned farmland due to aging and the transition of land use. According to 2009 data on total loss of farmland, the percentage of land abandoned because of aging is 51% and that abandoned because of the transition of land use is 48%. Figure 5 shows the change in abandoned farmland area and its percentage out of total farmland. Since the 1990s, the abandoned area has rapidly increased, and in 2005, it amounted to 10% of total farmland. Some policy to prevent a decline is needed other than the regulation on farmland diversion to other usages.



**Figure 5. Changes in the Amount of Abandoned Farmland in Japan**

*Source: MAFF (various years).*

The likeliness of farmland abandoned by the form of land tenure is as follows. Of farmers who abandoned farmland in 2005, 27.1% owned the farmland but did not cultivate it by themselves and 32.8% cultivated their land for self-consumption. In contrast, the farmers who had a higher reliance on agriculture tended to manage their land better, and the land abandonment rates for part-time farmers and full-time farmers are only 7.2% and 1.5%, respectively. To focus on the relation between land type and the occurrence rate of land abandonment, the rates in mountainous areas, hill areas, flat areas and urban areas are 14.6%, 12.9%, 5.4% and 12.7%, respectively (MAFF, 2005). Unfavored areas like mountainous and hill areas suffer from labor shortages in land management, while in urban areas, most of the cultivators are part-time farmers who have limited time to devote to farming. On the other hand, the flat areas are endowed with good conditions for mechanization, which make land trading and labor contracting easy.

In interviews at the county level concerning farmland abandonment conducted by MAFF the reasons were as follow: aging and labor shortage in the household (20%), depopulation in the area (10%), and retired from farming (6%), etc. Based on the agricultural census, the percentage of the population over 65 years of age in rural areas was 61.6% in 2010, and so the shortage of successors is a serious problem. The percentage of non-farmers in rural areas in 1960 was 54%, and it increased to 89% in 2000. The operation and maintenance (O&M) of rural capital cannot function without



non-farmers participation.

The O&M of irrigation canals, which is an integral part of Japanese rice cultivation, also faces similar problems as farm land management. More than 4,400,000 kilometers of water canals form an outstanding minute irrigation system which enables close supervision of irrigation water in Japan (MAFF website). The water canals, which range from trunk level to the terminal level, should be managed comprehensively in order to ensure that the water flows in the canals without stopping. The trunk canals are operated by a farmers' cooperative called Land Improvement District, and the detailed canals around the individual paddies, small ponds and roads are maintained by rural communities through regular voluntary activities including cleaning up and weed removal, but depopulation makes it difficult to continue these kinds of activities in many parts of Japan.

Rural resource stocks such as farmland and water facilities not only enable farmers to produce food efficiently but also result in the multifunctionality of agriculture. As the value of rural amenities became a matter of social concern, it became necessary to design special policies to realize these amenities as a kind of social capital and to evaluate them economically and support them through public agreement. The Japanese government regards the ruination of the capacity of rural resource stock management with a sense of crisis because it will lead to a lower rate of food self-sufficiency.

The following section will discuss how the Japanese government has tackled the agro-environmental problems since the 1990s.

#### **4. The History of Agro-environmental Policy in Japan<sup>9</sup>**

It was in the New Policy by MAFF in 1992 that consideration for environment was formally stated in agricultural policy as one of the main policy objectives. In the subsequent New Basic Act in 1999, eco-friendly agriculture was written as a policy target, and in addition, the so-called Three Laws on Agro-environment were established to diminish the environmental loads caused by agriculture.

The New Basic Act caused a large change in the agricultural policy in Japan, which had been based on the former Basic Act. The former Basic Act can be said to have been a kind of industrial policy, and its main objective was the reduction of the income gap

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<sup>9</sup> This section is partly based on Yamada (2010) (in Chinese).

between urban and rural areas through technical modernization of agriculture and price supports for agricultural products. In the intervening 30 years, the situation surrounding Japanese agriculture had changed, and new problems had appeared which old law did not address. One of these problems was the agro-environmental problem, including environmental pollution caused by the modern agriculture and the ruin of rural stock management system. This section reviews the history of the policies and the policy measures taken.

#### **4.1 New Policy for Food, Agriculture and Rural Areas (New Policy) of 1992**

In the New Policy, the extension of eco-friendly agriculture and the realization of multifunctionality were two main issues. The concept of the Japanese style of eco-friendly agriculture was defined in the Basic Concept on Eco-friendly Agriculture announced by MAFF in April 1994, in which it was defined as ‘a sustainable method of farming to lower the environmental load by decreasing the chemical fertilizers and pesticides through improving soil quality, while taking advantage of agriculture’s inherent material recycling power, with consideration for harmonization with productivity’. The concept indicates that the three main ways to extend eco-friendly agriculture are diminishing the load from agriculture by changing farming practices, the establishment of treatment and recycling systems for animal waste, and support for organic farming.

The New Policy provided the basis for eco-friendly agriculture, and its concept was continued in current agricultural policy. However, the New Policy only defined the concept and direction for eco-friendly agriculture, and it lacked concreteness for implementation. What is more, the idea of supporting farmers’ income was not mentioned, and the policy aimed to solve the problems with technical improvements and education. The definition given for multifunctionality of agriculture is also slightly ambiguous; it only said it regards agriculture’s environmental conservation function and rural amenities as important. For full policy reform including other institutions, we have to wait until the establishment of the New Basic Act.

#### **4.2 New Agricultural Basic Act of 1999**

The New Agricultural Basic Act of 1999 addressed the agro-environmental issues more comprehensively based on the ideas of the New Policy. The basic concept of

environmental consideration by the agricultural sector in this act is stated as ‘the sustainable development of agriculture by strengthening the natural recycling functions and the realization of the multifunctionality of agriculture’. The first half of this implies sustainable production by spreading eco-friendly farming practice and by recycling of animal waste, while the latter half of this is related to the management of rural resource stock.

Compared with the former policy, this law was epoch-making in that it emphasized the new role of agriculture — multifunctionality — in addition to food production. One of the main objectives of the new law was the support for agriculture in unfavored areas where the population has decreased, and this meant that the agricultural policy switched from a price support policy to the combination of the income support for targeted farmers and a policy for the revitalization of rural economies. The income support to unfavored areas is deeply connected to the discussion on multifunctionality, and the new law stipulated environmental direct payments to targeted farmers in unfavored areas, which mainly aims to encourage farmers to continue cultivation to maintain food production for the unfavored areas which amount to 40% of the total arable land in Japan; so, the provision of rural amenities was the secondary objective. The actual environmental direct payments at the national level appeared in the Measures to Conserve and Improve Land, Water and Environment (MCILWE) in 2007.

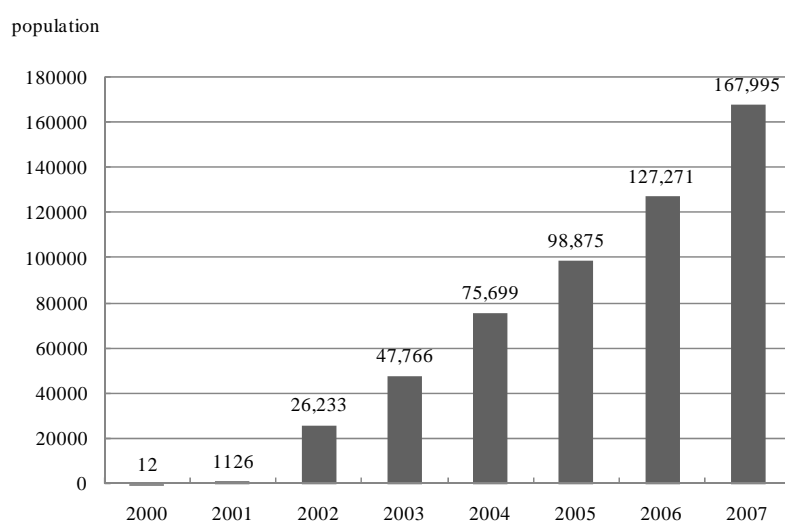
Under the new law, policies and rules on agro-environmental issues are prepared. Policies regarding agricultural production and those regarding rural stock management are explained separately below.

### **Policies regarding agricultural production**

Three important laws were established regarding agro-environmental issues in July 1997, namely, the Act on Promotion of Introduction of Sustainable Agricultural Production Practices, the Revised Fertilizers Regulation Act and the Livestock Waste Treatment Law. The Act on Promotion of Introduction of Sustainable Agricultural Production Practices aims at spreading eco-friendly farming practices. It states that each prefecture is allowed to work out eco-friendly farming practice standards and to designate those who follow the fixed standards as ‘eco-farmers’. ‘Eco-farmers’ are given favorable financial treatment in various forms. The number of farmers designated had grown to 168,000 in 2007, during the seven years from the beginning (Figure 6).

The Revised Fertilizers Regulation Act requires farms to have equipment for

measuring the quality of special fertilizers including manure so as to encourage more efficient usage of livestock waste at the farm level by indicating the quality and contents of manure. The objective of the Livestock Waste Treatment Law is the standardization of animal waste treatment and the encouragement of the efficient usage of manure. The law requires prefecture- and county-level governments to provide information and technical extension services for farmers to let them record the flow of animal waste. Besides this, the law provides for financial support and subsidies for treatment facilities.



**Figure 6. Change in the Population of Eco-farmers**

*Source: MAFF website.*

*Notes: 1) The data for each year is as of the end of March.*

*2) The figures represent the number of certified farmers, not including the farmers whose certification has expired.*

### **Policies on rural stock management**

As the New Basic Act mentioned the realization of multifunctionality, the Land Improvement Law was partly revised in 2001 to add an article on environmental consideration in public land improvement projects. The Land Improvement Law established in 1949 is the law which states the procedure for Land Improvement Projects which involve the construction and management of farmland, irrigation

facilities and rural roads.<sup>10</sup> Most of the contents of the projects relate to the rural environment. The objectives for the environmental consideration in this law are recreation and landscape, conservation of biodiversity, and creation of pasture, etc.

The New Basic Act not only prepared the policy framework to reduce the negative environmental impact of agriculture which is the subject of the three laws, but also covers broader issues such as multifunctionalities. However, from the perspective of integration of agricultural and environmental policy, the achievements under the New Basic Act are still not satisfactory.

### **4.3 The Basic Plan for Food, Agriculture and Rural Areas (The Basic Plan) of 2005**

The Basic Plan which was approved at a Cabinet meeting in 2005 is characterized by its inclusion of concrete economic policy measures to tackle agro-environmental issues. Primarily, it addressed the practices — GAP — which farmers should observe, and a farmer can receive financial support for agriculture only if she or he follows the guidelines. This policy measure which makes the receipt of various subsidies conditional on the observance of GAP is called cross-compliance.<sup>11</sup> Secondly, the plan states that exemplary farmers who reduce environmental loads drastically should receive additional support.<sup>12</sup>

These two concepts of the plan were put into effect in the MCILWE in 2007. MCILWE's mission is rural revitalization and environmental protection, which forms a pair with an industrial policy called New Program to Stabilize Farmers' Income that declared a policy shift from price supports to income supports for individual farmers. MCILWE is the first scheme that focuses on environmental protection in rural areas using newly developed policy measures. It will be mentioned again in the next section.

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<sup>10</sup> The Land Improvement Projects are implemented by a farmers' organization called Land Improvement District, which is responsible for the O&M of the facilities constructed by the projects. A project should be based on an application from farmers, and the application for a project has to be supported by the agreement of more than two-thirds of the concerned beneficiary farmers. The leadership of the organization is selected democratically by election.

<sup>11</sup> For example, the Enhancement of Resource Recycling in Dairy Farming Project from 2006 to 2010 required dairy farmers to observe the dairy GAP and the standards for the balance of cow and land area and to write records on waste management in order to receive direct payments. The subsidy is divided into two parts, the basic part is for those who passed the basic standards and the second part is paid to those who tackle advanced activities such as creating buffer zones between livestock barns and the nearby water.

<sup>12</sup> Other than the policies stated here, the Basic Plan contained policies for the use and recycling of biomass resources, which is influenced by the international discussions on global warming, etc. In December 2002, the 'Biomass Japan Framework' was approved at a Cabinet meeting, and it is a long-term strategy aimed at the construction of a recycling-oriented society through the active use of biomass.

As reviewed in section three, the agro-environmental policy in Japan has expanded its realm since the New Policy of 1992. At first, the main objective was to spread the concept of eco-friendly farming through education. In 1999, the New Basic Act advocated consideration for the environment by the agricultural sector and the relevant three laws to diminish environmental loads from agriculture were prepared, which provided the policy foundation for sustainable development of agriculture and villages. In the New Basic Act, direct payment for the farmers in unfavored areas was one of the main focuses, while this law also established the policy foundations for the promotion of the value, other than food production, derived from agriculture. After 2005, the Basic Plan introduced a new economic countermeasure called cross-compliance by which agricultural policy is linked to environmental policy more closely than ever, though the extent is still not sufficient to motivate stakeholders.

In the following section, we will examine the new policy scheme called MCILWE which started in 2007 to look at how the scheme was designed so as to induce each rural stakeholder to participate in and to share the cost for solving agro-environmental problems.

## **5 Public Involvement in Agro-environmental Policy in Japan**

### **5.1 Measures to Conserve and Improve Land, Water, and Environment (MCILWE)**

MCILWE is a five-year plan launched in 2007 which is divided into two parts. One is called Collective Activity Support which includes financial support for O&M activities for irrigation canals, ponds and rural roads by the local community. The other is Agricultural Activity Support which supports eco-friendly agriculture.

To apply for the Collective Activity Support, the local participants need to be organized into a group. The scheme requires the participant group to involve a variety of stakeholders like farmers, non-farmer residents, agricultural organizations including agricultural cooperatives and the Land Improvement Districts, local schools and PTAs, NPOs and other local community-based groups. Then, the organized group should decide its objectives and its plan for a council system, rules, scale of operations, contents of activities, and the draft budget, etc., which make it possible for the group to

have a contract with the local county or village. The group regularly reports its activities, and if it passes examination, the group can receive a subsidy. The subsidy per hectare is fixed as follows: JPY4,400 for paddies, JPY2,800 for dry fields, and JPY400 for pasture.

Those who want to receive the Agricultural Activity Support first have to join a Collective Activity Support group where 80% of the farmers in the area covered by the plan participate in reducing environmental loads, and moreover, they have to reduce the input amount of chemical fertilizers and pesticides by 50% of the original level on 80% of the arable land in the concerned area. The character of the Agricultural Activity Support scheme is that the participants have to take part in it as a group, not as individuals. The participant farmers are required to submit a GAP checklist. The subsidy from the Agricultural Activity Support is divided into two parts, one is for the group, the other is for individual cultivator; the first is 200,000 yen per hectare, the latter is paid according to the area and the kind of crop cultivated. The amount of the subsidy reflects the additional cost of producing eco-friendly products, which is calculated based on interviews with the farmers conducted by local prefectural officers or agricultural technique extension staff. Table 4 shows the basic contents of the MCILWE.

According to the intermediate evaluation report on MCILWE by MAFF, Collective Activity Support has succeeded so far, while Agricultural Activity Support has not spread as broadly as intended.<sup>13</sup> In March 2010, 19,514 groups in 1,251 counties and villages implemented conservation activities under the Collective Activity Support scheme, and the activities cover 1.43 million hectare of farmland (35% of total farmland), 240,000 irrigation canals and 160,000 rural roads.<sup>14</sup> On the other hand, 2,858 groups use Agricultural Activity Support on 750,000 hectare of farmland, which has led to an increase in eco-farmers to some extent, but the area amounts to only 5% of the land area covered by Agricultural Activity Support, or 2% of total gross crop acreage.

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<sup>13</sup> One of the reasons for this is that the requirement for participation excludes the individual farmers (Shogenji, 2008). This point will be discussed in detail later in the Conclusion.

<sup>14</sup> The reasons why the project is popular in rice-growing areas are that, in comparison with dry land, rice-growing in paddy fields inherently requires collective water management. As Nishio (2006) points out, the policy design puts stress on rice and the subsidy for paddies is the highest among the land types listed. He also expressed doubt regarding the effect of the policy to reduce nitrate loads because even though the nitrate load from dry land is higher than that from paddies, the subsidy for dry land is less than that for paddies.

**Table 4. Contents of the Measures to Conserve and Improve Land, Water, and Environment**

Requirement for participation	<ol style="list-style-type: none"> <li>1. The Collective Activities must support the project.</li> <li>2. 80% of the local farmers will try to reduce the environmental loads by using manure or some eco-friendly methods.</li> <li>3. Local farmers in the group will have their use of chemical fertilizers and pesticides</li> <li>4 Observance of GAP.</li> </ol>
Support	<ol style="list-style-type: none"> <li>1. JPY200,000 per activity will be paid the by central and prefectural governments.</li> <li>2. Subsidies will be paid to individual farmers by crop acreage. The support price varies depending on the variety of crop.</li> </ol>
Method for deciding the support level	According to interviews with farmers, the support level will be decided by comparing the cost gap between conventional farming methods and eco-friendly methods, adding some additional labor cost for farmers.

Source: MAFF website.

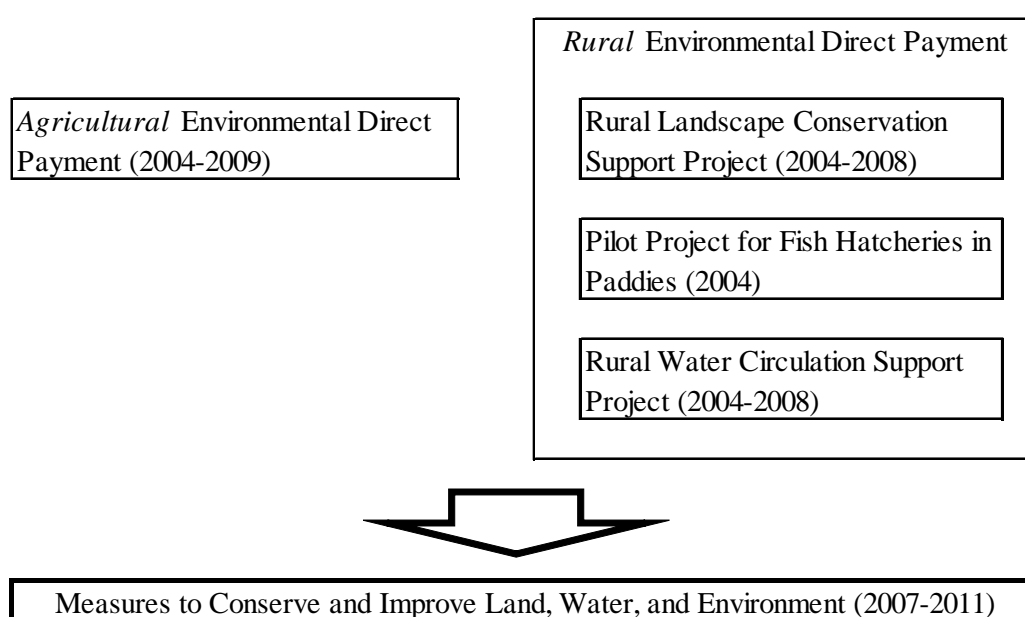
## 5.2 Case Study: Agro-environmental Direct Payment for Farmers in Shiga Prefecture

Shiga Prefecture, located in western Japan, is known for Lake Biwa, the largest lake in the country. The agro-environmental policy in Shiga is one of the most advanced in Japan and is so unique that one of the policy objectives is the conservation of Lake Biwa, which occupies one-sixth of the entire prefecture area. Shiga Prefecture, as early as 2002, began its unique eco-friendly farming certification policy and an environmental direct payment to farmers based on a prefectural agreement on eco-farming. It should be noted that, at that time, there was no direct payment for farmers in the eco-farmer policy of the central government, which only provided farmers with financial advantage. Under this policy scheme, Shiga Prefecture has implemented projects to spread eco-farming practices among local farmers and to protect the environment by engaging multiple stakeholders including farmers, consumers and citizen organizations under the slogan of *Kodawari* farming for Lake Biwa conservation and eco-farming . Shiga Prefecture's five-year plan from 2006 has five basic objectives: the extension of eco-friendly farming practices, cultivation of branded local rice by farmers, improvement of rural social capital, biodiversity conservation in the rehabilitation of traditional fisheries in Lake Biwa, and food safety and food education (Shiga Prefecture website).

The agro-environmental direct payment policy in Shiga Prefecture has two parts, the so-called *agricultural* environmental direct payment and the *rural* environmental direct



payment, respectively (Figure 7). *Rural* environmental direct payment has three parts, the Rural Landscape Conservation Support Project, the Pilot Project for Fish Hatchery in Paddies and the Irrigation Drainage Circulation Support Project. These unique policies by Shiga Prefecture were adopted at the national level by MCILWE after 2007, but basically the contents of the policy did not change. The *rural* environmental direct payment is covered by national MCILWE's Collective Activity Support, while the *agricultural* environmental direct payment is covered by the Eco-farming Support. The author will discuss Shiga Prefecture's policy scheme in more detail, focusing on its characteristics and its method of sharing responsibilities and costs among stakeholders.



**Figure 7. Structure of the Agro-environmental Policy in Shiga Prefecture**

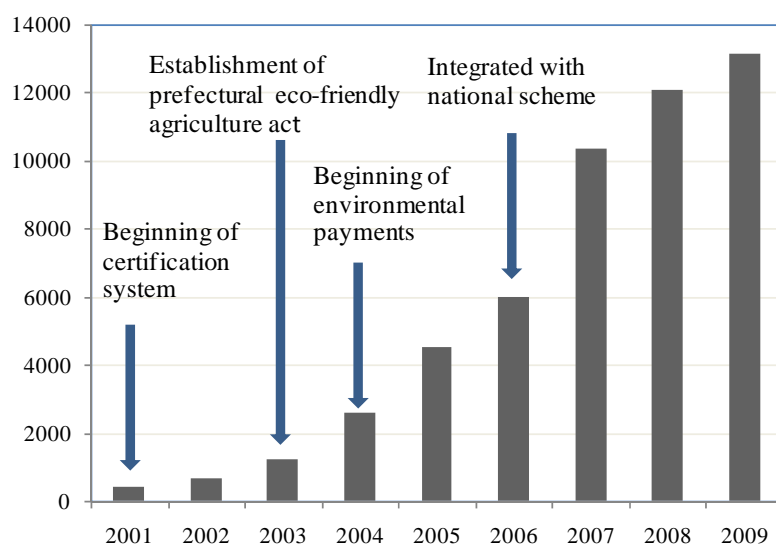
Source: Shiga Prefecture (2010).

### ***Agricultural* environmental direct payment in Shiga**

Shiga Prefecture started *agricultural* environmental direct payments as early as 2004. This policy is based on a prefectural agreement, and the participating farmers receive a subsidy based on the contract with the prefectural governor. This policy represents a case of cross-compliance because the eco-friendly food certification system and direct payments to farmers are combined in this policy scheme. The approval of eco labeling is conditional on the observance of conditions related to consideration for water environment of Lake Biwa, including proper fertilizer and drainage management.

Consideration for the water environment of Lake Biwa is written in Shiga Prefecture's original version of GAP. The farmers are allowed to use the Shiga Prefecture brand for their products if they enter into a contract with the prefecture and observe the contingent conditions. Retailers can also use the eco label.<sup>15</sup>

In the prefectural contract, the share of responsibility for eco-farming is distributed among local stakeholders, including farmers, consumers, retailers, and the prefecture, which shows that the prefecture's strategic attitude is to spread eco-agriculture by requiring the involvement of all related parties.<sup>16</sup> In this point, the policy in Shiga Prefecture stands in strong contrast to the national eco-farmer policy, which is only open to producers and has no policy intention related to marketing. In 2009, 566 groups were conducting eco-farming on 11,352 hectare of farmland, and the project area in Shiga Prefecture is the largest of all the prefectures in Japan (Shiga Prefecture, 2010). Figure 8 shows the spread of eco-farming in Shiga Prefecture.



**Figure 8. Changes in Eco-friendly Agricultural Projects in Shiga Prefecture**

*Source: Shiga Prefecture (2010).*

<sup>15</sup> According to Fujie (2008), agricultural products produced under this scheme were sold at prices higher than ordinary products by about 5%, while by conducting eco-farming in Shiga Prefecture the production decreased 4% on average. To compensate the income loss, the prefecture paid a subsidy based on data collected by local agricultural extension centers through face-to-face interviews with farmers. The national version of agricultural environmental direct payment also adopts the same methods. However, the author wonders how the national version of the direct payment scheme changed the Shiga version after integration in 2007 because the Shiga version had its own GAP which required farmers to observe special considerations for water conservation, which surely incurs additional labor costs for farmers. The author still has no information on this point.

<sup>16</sup> For the detailed content of this policy, see Song (2006).

## ***Rural* environmental direct payment in Shiga Prefecture**

Before 2006, Shiga Prefecture had already launched several unique policies to protect the water quality of Lake Biwa. Beginning with the support scheme for irrigation drainage circulation facilities to reduce the load on Lake Biwa in 1978, the prefecture has established several water conservation projects with its own budget. In 1996, it created a water conservation plan called the Water Purifying Plan (or *Mizusumashi Plan* in Japanese), the purpose of which was to encourage eco-farming and water conservation for Lake Biwa. In this plan, a *Mizusumashi* Committee organized by local stakeholders in twelve districts in the prefecture was to establish its own participatory action plan to involve local stakeholders in the conservation of biodiversity and the control of the irrigation drainage flow into Lake Biwa. This plan consists of three main projects, as shown in Figure 7, i.e., the Rural Landscape Conservation Support Project, the Pilot Project for Fish Hatchery in Paddies and the Rural Water Circulation Support Project.

Among these three projects, the Irrigation Drainage Circulation Support Project most focuses on motivating the stakeholders to prevent environmental loads from being produced by agriculture. This project provides support for water facilities to pump up drainage from lower paddies to the upstream before it flows into Lake Biwa in order to prevent water pollution. The goal shown to farmers is that all the drainage from paddies, which is estimated at 30% of all the intake to paddies, should be circulated. Half of the initial investment for the circulation facility and the additional labor cost incurred according to the amount of drainage were paid as a subsidy.

This project is said to be very original compared with other policies in the world in that the support is paid to Land Improvement District, not to individuals. This made it easy for policy makers to achieve consensus among farmers regarding the change in water use after introducing a new water circulation system, since the Land Improvement District was designed with an autonomous and democratic system for decision making. The amount of recycled water grew to 6.34 million cubic meters in 2004 in six districts, about nine times the amount of the previous year.<sup>17</sup>

In 2009, under the *Rural* Environmental Direct Payment scheme, 792 groups from 847 villages out of 1,400 total villages in Shiga Prefecture were established in the prefecture, which covers 33,000 hectare of farmland, which is equivalent to the

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<sup>17</sup> See Shyobayashi (2006) for details.

two-thirds of the total farmland. In addition, the 792 groups manage 7,166 kilometers of water canals, 1,090 kilometers of pipelines, 513 ponds and 3,801 kilometers of rural roads in total under the contract with the prefecture. The composition of the participants in the project is shown in Table 5. As for the total number of participants, the number of participating farmers is more than 32,000, or 2.4 times as many as the total non-farmer participants, most of whom are individuals. The percentage of non-farmer group participants is comparatively large and includes various rural groups like neighborhood community associations, educational organizations and agricultural cooperatives, etc. Judging from the interim report of the *rural* environmental direct payment project of Shiga Prefecture, it may be inferred that this project succeeded in involving various stakeholders in the rural community to some extent, but the project started only a couple of years ago, and so further comprehensive evaluation of this project will be left to future studies.

**Table 5. Composition of Participants in the Cooperative Activity Project in Shiga Prefecture in 2009**

Farmers			Non-farmers									
	Individual	Group	Individual	Group								
				Neighborhood community association	Women's association	Children's association	Land Improvement District	JA	School and PTA	NPO	Others	
32,463	31,550	913	13,368	8,081	880	592	737	234	110	153	5	2,576

*Source: Shiga Prefecture (2010).*

## 6. Conclusion: Challenges for Agro-environmental Policy in Japan

In this chapter, we have reviewed the situation and the character of Japanese agro-environmental problems and countermeasures at the national and prefectural levels as compared to other developed countries. The features of the problems originate from the nature of the farming conditions in Japan, namely the small-size family farms characterized by intensive farming practices, rice production in paddy fields which requires careful management of irrigation facilities, and a smaller percentage of the population engaged in the agricultural sector and the aging of that population, etc. As mentioned in the previous sections, the Japanese government has attempted to design an appropriate policy to resolve these unique agro-environmental problems in Japan since early 1990s, but it still has not been successful in achieving its goal.

Here, in place of a conclusion, the author will point out three challenges for Japanese agro-environmental policy that require resolution. These challenges are the low attention paid to agro-environmental policy schemes by producers, the weak effect of nitrogen reduction efforts and the problem of policy targeting.

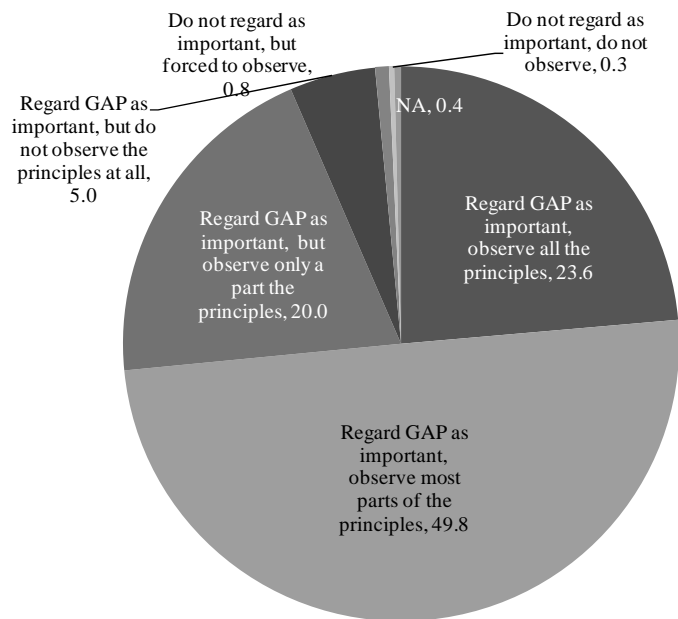
### **The low attention paid to agro-environmental policy schemes by producers**

MAFF conducted a national interview of farmers, retailers and consumers on eco-friendly agriculture in 2007, and the results of the interviews indicated that a low amount of attention is paid to agro-environmental policies by producers.<sup>18</sup> The answers from farmers on recognition and implementation of GAP are shown in Figure 9. According to the figure, 98.5% of producers responded that eco-friendly farming is important, and the producers who responded that they basically observe GAP guidelines reached 73.4%. However, according to the same survey, it appeared that only 27.0% of the interviewees conduct self-checking using the GAP checklist, and what is more, half of the producers who do not conduct self-checking responded that the reason why they do not is 'ignorance about GAP' (Figure 10). Other reasons which they cited as to why they do not use the GAP checklist are that it is time-consuming, it has no merits, and it is not necessary because the practices written in GAP are too basic, etc.

In addition, the population of national eco-farmers amount to only 3% of all farmers who practice eco-friendly agriculture, which implies that farmers pay little attention to agro-environmental policy schemes. The reason why the producers' interest in the agro-environmental policy is low is, for one thing, the insufficient publicity. Secondly, the policy has very limited merits for farmers because of the improper policy design in which the linkage of economic and regulatory measures is so weak that it does not motivate farmers to observe eco-farming practices.

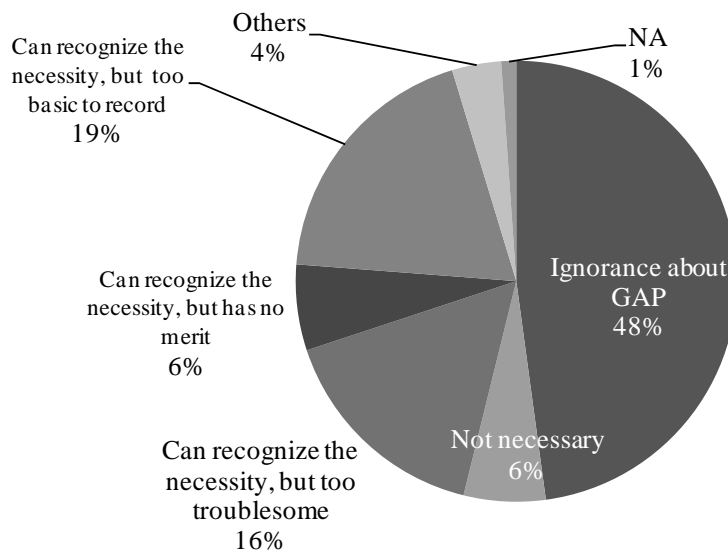
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<sup>18</sup> The interviewees included 2,500 of farmers, 1,381 of retailers and 1,500 of consumers.



**Figure 9. Attitude of Farmers towards GAP**

Source: MAFF (2007).



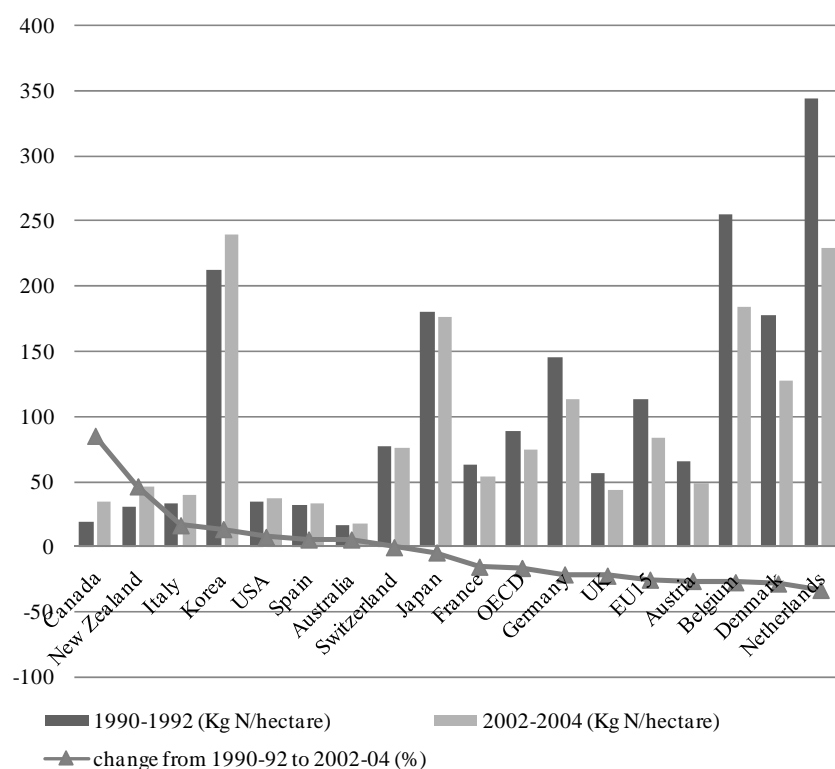
**Figure 10. Reasons for Not Using the Self-check Sheet of GAP**

Source: MAFF (2007).

### The weak effect of nitrogen reduction

From a technical point of view, Nishio (2010) pointed out that the regulation on

nitrogen input on farmland in Japan is much slacker than in other developed countries. For example, the Japanese version of the national GAP has fewer checkpoints than those in Western countries, and in addition, as it is used for self-checking, it has only an enlightenment effect on the reduction of agricultural input. As for the treatment and recycling of livestock waste, there are no regulations that apply to the farmland; farmers are only obliged to prepare waste treatment facilities themselves. The standards for eco-farming used in certification in national projects like Eco-farmers require the reduction of input of chemical fertilizers and pesticides but have no regulation on other kinds of fertilizers like compost. Thus, Japanese policy is not able to control the total nitrogen input on farmland.



**Figure 11. Gross Nitrogen Balance Estimates in Selected OECD Countries**

*Source: OECD (2008).*

An OECD report attempts to compare the amount of nitrogen content in the soil in each member country, once in the 1990s and again ten years later (OECD, 2008, Figure 11). While Belgium, Denmark, the Netherlands and Germany originally had a high content of nitrogen, they succeeded in reducing the nitrogen by 20% to 30%; the average reduction rate in the EU overall is 26%, while Japan recorded only a 5% reduction in

the same ten years. Some EU countries' nitrogen content level is still as high as Japan's and Korea's, but the difference in the reduction rate in the EU countries and Japan in a decade reflects the difference of the effect of agro-environmental policies. In the EU, the nitrogen input is strictly controlled under the EU CAP's Nitrate Act, while the Netherlands, which is known for its highly intensive farming, has tried to reduce total nitrogen input by some unique policy measures such as the Mineral Input Accounting system (MINAs) and emission trading by farm unit (see Box). Japan still has much to learn from the EU's experiences.

### **The Problems in policy targeting**

The *agricultural* environmental direct payment in Japan requires the participants to be organized on community basis, so an individual farmer will be excluded from joining the project. In other words, if someone is willing to receive the support for eco-farming, her or his farmland should be located in a *rural* environmental direct payment project site, as mentioned above. Since not all areas will be covered by MCILWE because of budget constraints, a highly motivated farmer loses her or his chance to receive support from the outset if her or his piece of farmland is not in a project site. As Shogenji (2008) pointed out, different policies should be prepared for these two issues, but the policy mix has led to the narrowing of the bundle of choices for producers.

### **Box: Measures Addressing Environmental Issues in Agriculture in OECD Countries**

Vojtech (2010) reviewed the major agro-environmental policy measures in OECD countries.<sup>19</sup> The options can be divided into non-economic measures and economic measures. All of the countries weighed heavily on the regulation and command-and-control approach, though naturally the content and intensity of regulation depends on the kinds of problems and the level of environmental loads.

On the other hand, the economic measures vary from country to country, which reflects the attitudes toward agro-environmental issues in each country. European countries and the US support producers who practice eco-farming, while countries that

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<sup>19</sup> For detail, see Vojtech (2010)'s Table 1 titled 'Measures addressing environmental issues in agriculture in OECD countries' on page 17.



are liberal on food trading such as Australia and New Zealand stand at the opposite end of the spectrum in terms of protection of producers. As for East Asian countries including Japan and Korea, they have a short history of agro-environmental policy and still have only a small investment in this policy since new policy measures like direct payments to farmers and cross-compliance have just started.

The international standards for agro-environmental policy measures are designed in light of the experiences in the EU and the US since the 1980s. The agro-environmental policy in the EU is characterized by two features; one is the rural revitalization policy with direct payments to farmers; the other is the complementary use of cross-compliance to reduce the nitrogen input.<sup>20</sup> EU member countries design each domestic policy based on CAP. In 1985, the EU designated Environmental Sensitive Areas (ESAs) and introduced a payment policy for eco-friendly farmers, which was followed by the decision that the EU will shoulder a part of the cost of the agro-environmental policies (Hattori, 1992). The Nitrate Act agreed upon at a European Committee cabinet meeting in 1981 constrains all member countries, whose producers are obliged to follow the Polluter Pays Principle (PPP). The Nitrate Act requires member countries to submit their schedule for implementation, monitoring of the density of nitrate, designation of ESA, establishment of GAP and education programs for producers, and designation of action plans for environmental improvement in ESAs. The act on livestock waste was established in the integrated emission regulation scheme in 1996, which applies considerations for the environment to livestock farms above a certain scale. These regulations contain environmental impact evaluations and regulations on other minerals.

The US has suffered from serious soil erosion historically. As early as the 1930s, the US government designated soil and water conservation districts in the southwestern part of the US and launched countermeasures for soil conservation by providing subsidies to farmers who selected and set aside land under the Conservation Reserve Program (CRP). The food crisis and the subsequent rise in international food prices in the 1970s urged American farmers to expand farmland rapidly to meet the increased demand for food exports, which led to serious soil erosion because the newly cultivated land contained much land that was unsuitable for farming, including pasture and hilly land.

When American agriculture faced the recession in the 1980s, the government had to

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<sup>20</sup> Except for the water pollution due to the nitrogen and phosphorus originating from fertilizers, the intensive livestock farming areas, namely, the Netherlands, Belgium and northwestern Germany, suffer from water pollution due to livestock waste.

rethink its agricultural policy to strengthen the competing interests in the international food market. The government decided to lessen governmental intervention in the agricultural sector and to switch its agricultural policy from protectionism to a more liberal one. In 1985, the most powerful concept in agricultural law was Low Input Sustainable Agriculture (LISA), which pertains to sustainable farming practices aimed at the recycling of rural resources, realization of profitability and productivity in farming by reducing the input cost and the provision of safe food.<sup>21</sup> Specifically, it discusses rotation farming, Integrated Pest Management (IMP), recycling of animal waste, and the connection between livestock farming and cultivation, etc. As the US government regards the R&D and the extension service system for LISA as important, it established a huge budget for related technology development. The research institutes, universities, agricultural technology extension organizations and farmers work together on the spreading of LISA technology.

Initiatives to introduce emission trading or surcharges are rare. Among EU members, only the Netherlands has such policy, called MINAs. The farming in the Netherlands is very intensive and has suffered from water pollution due to the minerals in farming input and animal waste. In 1986, it established an animal waste emission rights system to stabilize or reduce the total amount of animal waste in the country. After 1990, the Netherlands set standards for mineral loads in the environment, which would gradually be lowered to be harmonized with the standard of the CAP Nitrate Act. In MINAs, the sector — whether crop cultivation or livestock farming — is irrelevant, and only the net amount of minerals put into the land by a farm unit matters. The standard of mineral input will be gradually reduced, and if exceeded, a fine will be levied on the farm. The strong point of MINAs is that it relies on the farmers' own efforts to achieve the goal by letting them choose the distribution of their own resources, considering their endowments and other economic conditions (Nousangyogyo Bunka Kyokai, 2006) . Aside from the Netherlands, some of the states in the US have an emission trading system for non-point source pollution, while Australia has a water rights trading system.

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<sup>21</sup> As American biologist Rachel Carson warned in her outstanding work "Silent Spring" as early as 1962, since the 1960s the input of pesticides and chemical fertilizers has skyrocketed in the US, which has awoken social interest on the harm from agriculture to health and the environment (Carson, 1962).

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