Agricultural activities and rural landscape are considered to be the central image of “my hometown” for most of the Japanese people. Maintaining and enhancing multifunctionality of agriculture becomes a key principle in sustaining agriculture and rural environments. This paper discusses recent policy reforms of agriculture and rural areas. The discussion includes (1) Diversity and transformation of agriculture and rural areas in Japan (diversity by nature of climate, topography, and historical background); (2) Drastic physical/ socioeconomic changes taken place since the 1970s, in agricultural production and land use (population decline and diminishing conservation efforts; resource degradation resulted, urbanization and industrial development pressures on land); (3) Modernization of agriculture to use more chemical inputs, farmers intensified land use, deterioration of rural resources and huge loss of biodiversity, problems for whom, and how to revive them?; (4) Value changes among people for improvement of agriculture and rural areas, city people’s participation in voluntary activities in rural areas, green tourism, groundwork activities, etc.; (5) Awareness of multifunctionality of agriculture and rural areas; policy discussion at OECD: multifunctionality of agriculture and rural areas (physical/environmental/ecological functions; social/economic functions, and cultural/spiritual functions); and 6) Policy alternatives for sustainable agriculture and rural development, direct payment to farmers, subsidy for more environmentally-friendly agriculture, groundwork activity and trust, affiliation of consumers and producers for direct marketing, expanding green tourism, and various support schemes by local governments.
PERCEPTION AND SIGNIFICANCE OF AGRICULTURE AND RURAL LANDSCAPE IN JAPAN

For most of the Japanese people, agricultural activities and rural landscape are considered to be the central image of “my hometown (furusato, in Japanese),” which not only gives the people feeling of security, easiness and/or nostalgia but also brings about various aesthetical, spiritual and cultural values. Even today, autumn festivals for thanksgiving of good harvest are very common almost everywhere in rural Japan. In the “Obon” reunion time (the mid-August), family members and relatives get together to worship their ancestors; in most cases they come back to their hometown in rural areas.

The typical scenery of rural landscape perceived by most Japanese may be terraced paddy fields where full of water is pooled for transplanting of paddy in spring, or abundant golden ears of rice are extended before harvest in autumn. In fact, rice, the staple food among the Japanese, and paddy fields have for long been the symbol of psychological backbone and cultural identity of Japan. Very interestingly, this country is often called as “the Land of Vigorous Rice Plants.”

Such a long-lasting agriculture and rural landscape of Japan have, however, undergone tremendous physical and socioeconomic changes after the Second World War, especially since the early 1960s when Japan started its economic...
recovery and rapid growth. Patterns of agricultural production and land use systems have been modified; rural communities have lost many young people exiting to cities, while only aged people remained in rural and remote areas. An increasing area of farmland has been neglected for cultivation.

In this process, agricultural production has also been deteriorated due mainly to urbanization and industrial development pressures on farmland. An increasing portion of good farmland has been converted for nonagricultural uses. Conservation efforts for maintaining rural social infrastructure, including edges of brooks, waterways, and plant hedges, has become shrinking or lost. In addition, more and more paddy fields have become idled or diverted to crops other than rice because of a sharp decline of rice consumption. Alternatively, more and more artificial or industrial elements, with modern buildings and advertisements, have invaded or become dominant in rural scenes which many city folks consider as ugly or unsuitable for rural areas.

The implication of this deterioration process is that agriculture and rural landscape are not automatically existent, but it has been maintained and sustained by rural people in accordance with farming activities and their daily life. In fact, many conservation efforts have been made by collective actions of village people. Now it has been changed, and changed for worse.

The present paper tries to analyze why and how such deterioration took place in rural Japan; how Japanese agriculture has changed with respect to sustainability; and what sorts of policy reforms are challenged so as to recover and revive the agricultural activities and rural landscape in recent years.

"THE TRAGEDY OF COMMONS": WESTERN CONCEPT AND REALITY IN RURAL JAPAN

According to G. Hardin, a famous U.K. biologist, “the tragedy of commons (common land)” takes place when farmers put too many cattle to grazing for a greater profit, under the condition that pasture is limited but which is commonly owned and can be utilized by anybody. This story is frequently quoted by Western environmental economists in order to illustrate the case of market failure and the need for orderly resource management.

In Japan, however, it is generally considered that this sort of tragedy did not take place neither in farming, fishery or forestry, mainly because a certain communal conservation rule had protected from the overuse of limited resources among villagers. In other words, since the Edo period, the feudal days of Japan,
both formal and informal institutions had been existent which helped to prohibit
overgrazing, over-catching of fish, etc. among villagers.

In the paddy rice farming, too, this sort of orderly resource conservation
had been a long-lasting institution among villagers in Japan, typically in the case
of water use for paddy, since water was the most precious resource at that time.
Similarly, other pooled resources, including rural landscape, had also been
managed by the cooperation of village members.

During and after the rapid economic growth period, however, urbanization
and industrial development pressures have influenced greatly and negatively the
nature of rural landscape in Japan.

An increasing portion of good farmland had been converted for
nonagricultural uses. Conservation efforts to maintain rural social infrastructure,
such as edges of brooks, waterways, plant hedges, and communal wood places,
had become more and more difficult. Since the 1980s, an increasing rate of paddy
fields has become either idled or diverted to crops other than rice because of a
sharp decline of rice consumption.

All of these changes had negatively affected the aesthetical and
environmental values of rural landscape, which has gradually been realized by the
general public, especially the city people. It is gradually recognized that rural
landscape is not automatically existent, but it has been maintained and sustained
by collective efforts of rural people in their daily life.

POLICY ISSUES OF SUSTAINABLE AGRICULTURE AND
RURAL DEVELOPMENT: AN INTERNATIONAL PERSPECTIVE

The first UN Conference on Human Environment held at Stockholm,
Sweden, in 1972 aroused global concern on the need for subjecting all
devvelopmental activities to well define ecological ground rules. It also pointed out
that so long as widespread poverty persists, there would be no hope achieving
harmony between humankind and nature.

Twenty years later, in June 1992, a UN Conference on Environment and
Development was held at Rio in Brazil to adopt the Agenda 21, for action in the
21st century, and global conventions were held on climate, biological diversity
and forests, etc. Sustainable agriculture has been widely discussed as key
elements to determine the future of food and environment in many developed
countries, while sustainable agriculture is defined as the alternation of agricultural
system from the conventional agriculture with high-inputs to the one of ecologically sound, economically feasible and socially acceptable.

Since the 1970s, agriculture in most of the developed countries such as EU, the USA and Japan has changed to a more intensive type with greater chemical inputs per unit of farmland. As a result, agriculture has caused various negative impacts on natural environments and those on food safety for human beings.

In Japan, agricultural modernization has been very successful in providing food and raw materials for a growing population. Government encouraged, and in many cases supported, the use of chemicals such as chemical fertilizers and pesticides, and the development of irrigation systems to expand the agricultural productivity of their limited land resources.

Agricultural policy have also been reformed since the mid-80s by many EU countries and USA so as to enhance the sustainability of agricultural resources, lessen pollutants from soil and water, and enhance food quality and safety. These efforts were also compatible with the policy goal of reducing overproduction of cereals and livestock products in those countries. One of the important outcomes has been the introduction of "decoupling" policy tool in the form of direct payment to producers, which has been widely adopted by EU and USA.

In contrast, paddy rice farming in Japan, under the Asian monsoon climatic conditions, has been continued and sustained for many centuries without jeopardizing natural resources. In other words, paddy rice farming in Japan has been extremely sustainable, which has maintained the high yield level of rice production for a long time.

In recent decades, however, Japanese agriculture in general has also changed drastically to affect various negative impacts on natural resource conditions, due mainly to sharply increased use of chemical inputs or highly intensive nature of livestock operations. In order to improve these negative impacts from agriculture, the government of Japan has started to implement sustainable agricultural policies since 1993 by assisting farmers to adopt environmentally friendly technologies. Soil and water conservation and recycling of organic materials have also been encouraged with the partnership of general citizens (NPOs) and local industry people.

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1 Note that high support prices and input subsidies led to higher-than-optimal application rates for fertilizer and pesticides, causing surface and groundwater pollution through residual spillover and leaching. Currently, total fertilizer use per hectare of cropland is 4.2 times higher in Japan and the Rep. of Korea than in the United States.
SUSTAINABILITY OF PADDY-RICE SYSTEM ADAPTED TO REGIONAL CONDITIONS

Agriculture could be sustainably maintained and developed for centuries if appropriate agricultural practices are adopted and harmonized with local environmental conditions. Sustainable agriculture can also contribute to the overall socioeconomic development in addition to stable food supply. Paddy rice farming system under Asian monsoon climate can be described as a typical example of this.

As we all know well, Asian monsoon region is characterized by a lot of annual precipitation, often over 1500 mm, and most of this precipitation is concentrated within several month of rainy season during the year. In contrast, upland dry farming usually possesses a much higher risk of soil erosion and flooding.

Paddy rice farming is well adapted to such climatic and environmental conditions. Combination of leveled paddy field in a staircase pattern and continuous water use helps preventing soil erosion. Rice varieties adapted to wetland paddy could grow under the condition which other upland crops should otherwise get serious damages. With these conditions, paddy rice farming has established highly sustainable agriculture for an extremely long period, often over one thousand years’ history by adapting to local environmental conditions in monsoon Asia.

In addition, it is recognized that, besides producing rice, paddy fields as well as rice production play multifunctional roles in the preservation of natural environment, such as flood control, prevention of soil erosion and landslides, and fostering of groundwater resources.

As an example of these functions, we would like to explain flood prevention function played by paddy fields as follows:

- In a paddy, rice is cultivated under a shallow covering of water. In order to utilize irrigation water effectively, the paddy field has to be leveled and each field be surrounded by bunds (small dikes). As a result, many small, shallow and leveled reservoirs of water are formed and networked each other, often in close proximity. In addition to such wisdom of hydrological cycle, various social institutions played important roles such as communal rules of efficient water use and control, associations of irrigation districts, etc.

- On gently sloping hillsides, paddy fields are built as terraces, while in low and wet areas, highly productive paddy fields have been created through a carefully calculated combination of drainage and leveling. Terraced paddies in hilly or mountainous areas serve the function of slowing the runoff from...
heavy rains and act as temporary retardation ponds when flooding occurs. This is how paddy field plays a very important role for flooding or mitigation of landslide occurrence\(^2\).

**EXPANDING NEGATIVE EXTERNALITIES IN AGRICULTURE: JAPAN AND OTHER ASIAN COUNTRIES**

There is a growing concern about the loss of sustainability in agriculture and the expansion of negative environmental impacts from modernization of agriculture, urbanization, and loss of population in remote rural areas.

There is no question that modernization of agriculture has brought about a drastic productivity growth and helped the overall economic development. Under this rapid economic growth, however, agricultural development, which put too much emphasis on growth and productivity, has resulted in the loss of agricultural sustainability and surrounding natural environments in the following manner:

- Soil degradation is known as one of the serious example. According to the report of UNEP (1997), about two billion hectare of earth surface is affected by desertification, one-third of which is occurring in Asia, including central Asian region. Soil degradation can be caused by various human activities. Its main cause in Asian region is deforestation (30%), over-cultivation (32%) and overgrazing (26%) which are derived mainly from population increase and economic growth.
- As for Japan, the decrease of farmland area is causing a social problem. That is, resulting from rapid urbanization or an increase of abandonment of farmland, positive environmental functions supplied by farmlands is gradually being lost, which results in more frequent occurrence of flooding in the surrounding area and downstream city areas.

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\(^2\) The total water storage capacity of paddy fields in Japan is estimated to be around 5.2 billion tons. This is contrasted to an annual cost of depreciation and maintenance for a flood-controlling dam of the same capacity, which is estimated to be about ¥2.5 trillion (US $24 billion). Also in Japan, a total area of 840 thousand hectares is classified as landslide hazard zones. According to the MAFF research, the rate of landslide occurrence is 0.56% per year for cultivated land, whereas the rate increases to 2.03% for abandoned farmland.
It is obvious that chemical fertilizer input is an essential element for improving productivity. However, excessive use of chemical inputs could sometimes result in negative impacts such as water pollution and the damage to biodiversity, while productivity increase is limited at this high level of such inputs.

Contamination of groundwater from crop and livestock production activities has been investigated intensively and has become an important public issue in some areas due to the essential role of water to life. Nitrates are major source of water contamination, introduced not only through the use of chemical fertilizers, but also associated with the application of animal manure.

Similarly, pesticide residues can be toxic to humans and animals in food, feed, or drinking water. They also may be hazardous to farm workers during application and have undesirable side effects on non-targeted living organisms of the natural ecosystem.

Intensive livestock production system, especially confinement livestock operations, accumulates large amount of animal wastes in solid and liquid form. Manure, in concentration or untreated, can be considered to be a potential hazard to the environment due to its high content of nitrate, phosphate, potassium, and ammonia.

MULTIFUNCTIONALITY OF AGRICULTURE AND POLICY ALTERNATIVES

Compared with other industries, agriculture and forestry play an important role to preserve natural resources and provide desirable rural amenities for the people who either live in the region or visit the place. Such multifunctional roles are seldom marketed or traded, most of which are so-called external economies.
that are not compensated by anyone through market mechanism. For this reason, it is indispensable for future research and policy implementation to make an economic evaluation and quantify the magnitude of those externalities provided by agriculture and rural communities.\(^5\)

Recently in Japan, new movements are occurring so as to revitalize rural communities and revive environmental and amenity values attached to agricultural resources. An increasing number of city people or groups are voluntarily participating to help farmers and rural communities in one way or another. Agricultural policies by both central and local governments are being reexamined. Multifunctionality of agriculture is strongly influencing the nature and direction of government policies. Direct payment scheme to farmers and rural communities with certain conditions is adopted by MAFF and various local governments, which are more or less supported by regional people and consumers.

In addition, the following types of activities have become more and more active:

(1) Groundwork activity and trust

For preservation of biological diversity (insects, fish, birds and flora) and landscape conservation, there have been vigorous attempts to construct ecologically-friendly wetlands, parks and ponds in harmony with agricultural activities, both on public and voluntary basis. In addition to the government projects, the Groundwork movement has started recently, and the association is promoting ecosystem projects in various areas in Japan. There have been limitations, however, for the progress of Trust movement in Japan, due mainly to high land prices, small and fragmented farmland plots, and lack of managerial capacity.

(2) Affiliation of consumers and producers

One of the important attempts for supporting regional agriculture, many types of contracts have been made between producers and consumers for fresh and safe farm products. Direct marketing system such as farmers’ market and producer-consumer affiliated marketing has become very popular in Japan today.

\(^5\) According to the quantitative evaluation of the external values of paddy fields in Japan, the functions of flood prevention and the recreation and relaxation are far more important than others. One estimation results by replacement cost method show that out of the total value 68.8 billion yen per year, flood prevention was 28.8 billion yen (41.9%), whereas recreation and relaxation was 22.6 billion yen (32.8%).
This affiliation movement is particularly promoted by consumer cooperatives on a commercial distribution basis.

(3) Expanding green tourism

Green tourism in Japan is expanding in many rural communities by inviting city people for their green leisure time. Activities are varied: among typical examples are visiting to rural landscape, enjoying farming experiences, gardening for their own consumption, and voluntary works for forestry and paddy in remote rural areas. For rural communities, these tourism-related activities can help to create employment and indigenous development.

(4) Direct support by local governments for environmentally friendly agriculture

A number of local governments, at a municipal level, are providing supports for maintaining rural and environmental values. For example, direct subsidies are paid to farmers who keep paddy field, where otherwise occasional flooding cannot be prevented. For receiving this subsidy, the local government requires that the owner of the farmland do not reclaim the paddy land and sign a contract to that effect. For landscape preservation, too, subsidies are provided for those who preserve farmland by contracting the methods of land use or cropping patterns.

CONCLUDING REMARKS

Taking into consideration the above stated drastic changes in rural situations and social needs, alternative policy measures should be constructed. It would be more desirable for our society to alter the course of agricultural and rural policies to achieve sustainable agriculture and rural environments.

With respect to this policy reform, we would like to stress that externalities, in both positive and negative aspects, are generated and/or strongly influenced by agricultural activities. But these externalities have seldom been valued appropriately, by researchers or policy makers. That is to say, positive impacts of agriculture on the environment and rural landscape should be maintained and enhanced through appropriate policy measures, whereas negative impacts should better be mitigated.

In recent policy reforms by Japanese government, the “maintenance and enhancement of multifunctionality of agriculture” has been clearly stated as the key principle in the Basic Law for Food, Agriculture, and Rural Areas enacted in 1999.
Since then various new policy measures have been initiated to achieve this goal. One typical example of this is the introduction of direct payment system for the first time in history. In 2000, a direct payment scheme was introduced to help preserving hilly and mountainous areas. In any event, it is time to change the course of agricultural and rural policies to meet with the changing perception and significance of rural values.

**GENERAL REFERENCES**


