

Japan

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1. Basic information and agrarian status of Japan

(1) Geography

Japan is a crescent-shaped archipelago consisting of four main islands named Hokkaido, Honshu, Shikoku, and Kyushu, and of a few thousand small islands, with a total area of 377,907 square kilometers. The country is mountainous, with forests accounting for 66% of the total area, and arable land 13%.



Fig. 1. Map of Japan

(2) Climate

The archipelago is almost 3,000 km in length and stretches from north to south, and therefore includes subarctic, temperate and subtropical zones.

In winter, the side of the country facing the Sea of Japan, include Niigata and Fukui, is known worldwide for its heavy snowfall, but the side facing the Pacific Ocean has little or no snowfall. From spring to fall, there is no big difference between these areas. The summer season starts with an almost one month long *baiu* (rainy season) around June. After the *baiu*,

the temperature rises to more than 30 degrees Celsius, and it become very humid. In the fall, a few typhoons hit Japan, occasionally causing a major disaster.

(3) Population

The population of Japan was 127.8 million as of 2005. The population exceeded 50 million in 1912, and 100 million in 1967. A low birth rate, however, has slowed population growth, and the population began to decrease in 2005. Coupled with the long life expectancy in Japan, this means that Japan is rapidly turning into an aging society.

Table 1. Fundamental Data about Japan and its Agriculture

Item	Unit	1950	1960	1965	1970	1975	1980	1985	1990	1995	2000	2005
Population	million	83.2	93.4	98.3	103.7	111.9	117.1	121.0	123.6	125.6	126.9	127.8
Cultivated land area	1000ha			6020		5570		5380	5240	5040	4830	4690
Average cultivated area in each household	ha/household			0.91	0.95	0.97	1.01	1.08	1.14	1.2	1.25	1.27
Rate of abundant cultivated land area	%					2.0	1.9	2.0	3.3	3.8	5.1	5.8
Population directly engaged in farming	10,000	1636	1326	1098	940	669	548	485	392	342	285	289
% of workforce engaged in agriculture	%	45.4	30.1	22.9	17.9	12.6	9.8	8.3	6.4	5.3	4.5	4.7
Labor hours spent on rice cultivation	hr/10a			141.0		81.5	65.2	55.1	43.8	39.1	33.0	30.6
Number of public extension advisors	1000	10.4	13.3	13.7	13.5	12.6	12.3	11.7	11.2	11.1	10.3	8.9
% of GDP from agriculture	%	21.2			4.4	4.2	2.6	2.4	1.9	1.4	1.4	1.4
% of exports comprised by agricultural products	%		4.1		1.9		0.7		0.4		0.3	0.4
% of imports comprised by agricultural products	%		19.7		17.2		10.6		11.1		9.7	10.2
% of national budget dedicated to agriculture	%				10.8		7.1		3.6		4.0	3.9

(4) Cultivated land

As it is a mountainous country, Japan has little flat terrain. Even in what flat terrain it has, the area of land under cultivation has decreased year by year because of road construction, housing, land development, and so forth. Over the past 20 years, the area under cultivation has decreased by 13% from 5.3 million hectares in 1985 to 4.7 million hectares in 2005 (Table 1.).

The area of land under cultivation, 4,692,000 ha, is comprised of paddy fields (54%), ordinary upland fields (25%), permanent crops, i.e. orchards, (7%), and short time meadows (13%)(Table 3). Most of the paddy fields and 20% of the upland fields are irrigated, making 63% of the total cultivated land irrigated; the remaining 37% is under rain-fed

cultivation(Table 4).

Table 2. Area of cultivated land, roads, and housing as a percentage of total national land area

	1975	1985	1990	1995	2000	2004
Cultivated land	15.3%	14.5%	14.1%	13.6%	13.0%	12.7%
Roads and railways	2.4%	2.8%	3.0%	3.2%	3.4%	3.5%
Housing	3.3%	4.0%	4.2%	4.5%	4.7%	4.8%

Ministry of Land, Infrastructure and Transport

Table 3. Area of cultivated land

	Paddy fields	Ordinary upland fields	Land with permanent crops	Short time meadows
Area (1,000 ha)	2556	1173	332	631
Percentage	54%	25%	7%	13%

Ministry of Agriculture, Forestry and Fisheries (2005)

Table 4. Irrigation ratio

	Irrigated area	Rain-fed area
Percentage	63.3%	36.7%

Ministry of Agriculture, Forestry and Fisheries (2001)

(5) Change of average cultivated area in each household

The average cultivated area per agricultural household is around 1 ha, because small sized family farming accounts for most agricultural activity. Over the past 40 years, the average cultivated area for each farmer only increased from 0.91 ha to 1.27 ha. Full-time farming families who mainly grow rice now need to enlarge their farm size up to about 15 ha to earn enough income (Ministry of Agriculture, Forestry and Fisheries of Japan (hereinafter referred to as MAFF), 2005). For this reason, the national government has implemented support measures for the expansion of rice farming, but change has been slow to occur.

(6) Agricultural population change and GDP

Up until 1950, 45% of all persons were engaged in agriculture. At that time, labor hours for rice cultivation which depended on human and animal power amounted to over 200 hours per 10a (0.1ha). Since the 1960's, labor hours have decreased year by year as a result of the rapid spread of agricultural machinery and chemicals such as herbicides. As of 2005, the average number of labor hours spent on rice growing was 26, only one eighth of the number in 1960.

As rice cultivation was modernized, the reduced number of agricultural labor hours left an increasing amount of labor power available for the manufacturing and service

industries. As a result of this change, the percentage of the GDP derived from agriculture decreased from 21.2% (1950) to 1.4% (2005), and the percentage of the population engaged in agriculture decreased from 45% (1950) to 4.7% (2005). The status of agriculture thus diminished considerably.

(7) Food self-sufficiency ratio and imports/exports

Japan's food self-sufficiency ratio is the lowest level among developed countries, standing at 40% (calorie based), with the remaining 60% of its food coming from overseas imports. The only agricultural products which can meet domestic demand are rice, vegetables, and hen eggs. In contrast, almost all domestically consumed wheat, soybeans, and sugar are imported. This leads to a prominent imbalance in exports and imports. The percentage of total imports represented by agricultural products is about 10%, whereas only 0.5% of exports consist of agricultural products.

2. Historical background of the agricultural extension service

(1) Public agricultural extension service

1) Foundation era

Japan's public agricultural extension service (hereinafter called the extension service) was founded in 1948, at the advice of the General Headquarters of the Allied Forces after World War II. At that time, the landlord-tenant system was dismantled, and many tenant farmers turned into new peasant farmers. At the same time, given the severe food shortages just after the war, the expansion of food production was also a pressing task.

Guided by the basic principle of 'educating farmers who can think for themselves', the newly established extension service started used educational means to popularize technology useful for production and for farmers' day-to-day lives, emphasizing a scientific viewpoint and scientific way of thinking.

2) Characteristics of the extension service

a. Cooperative service with national and prefectural governments

The service is promoted under a unified policy, integrating both national issues and prefectural issues.

b. A service that targets people

Through an on-site practical problem solving process, the service supports farmers who aim to improve their farming techniques and management style.

c. Integrated promotion of farming and living (currently of lesser significance)

The service supports the integrated improvement of farm production and living conditions, as there is a close relationship between farm production, farm living, and living conditions in rural areas.

3) Specialization of the Extension service in the high-growth economy period

The mechanization of farming, e.g. tractors, transplanting machines, combines, and so forth, produced a great deal of surplus labor power in rural areas starting in the 1960's.

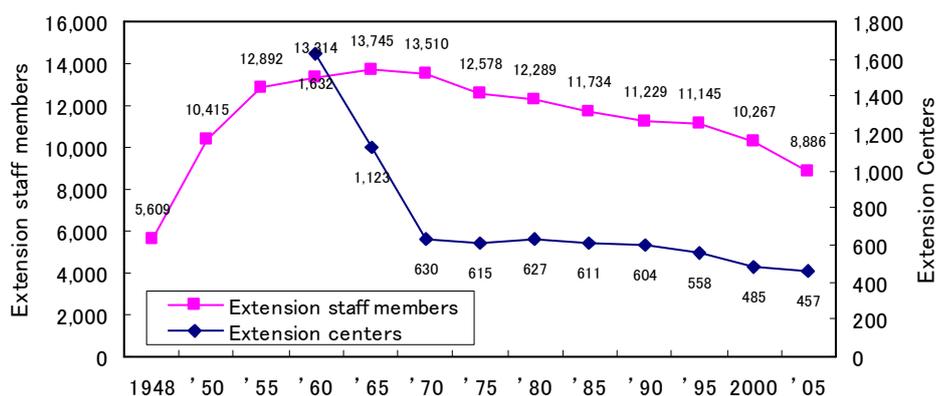


Fig. 2. Number of extension staffs members and centers

This surplus labor power was directed to other industries such as manufacturing, and this labor power supported the rapid growth of the Japanese economy.

This flow of labor to other industries led to a shift from small, similarly-sized farm households to a situation with a large number of part-time farm households and only a small number of full-time farm households. Full-time farmers then increased the size of their farms and adopted specialized management techniques to turn enough of a profit with their farming.

These changes led the extension service to offer an appropriate response to the demands of these sophisticated and diversified farmers. For this reason, extension workers were divided up into those whose responsibilities covered particular regions, those in charge of specific functions, and subject-matter specialists. In order to increase the efficiency of extension activity, mergers of extension centers were also promoted, with the result that the 1,123 extension centers existing in 1965 were merged into 630 centers in 1970, and extension workers in charge of specific functions were appointed (Fig. 2).

4) The district team activity system during the era of surplus rice production

After Japan achieved rapid economic growth, the national consumption of rice fell, and the excess production of rice became a serious problem. In 1978, the national government decided to introduce a supply-demand adjustment system by reducing the area dedicated to rice cultivation and introducing other conversion crops.

At this time, progressive farmers and agricultural corporations started to emerge, and part-time farm households increased. In response, a new district team activity system, which consults on local problems with several extension workers, was introduced in 1980.

5) Fostering a strong framework for trade liberalization

Agricultural policy in Japan changed drastically between the 1990s and the present. The agreement at the GATT Uruguay Round led to the liberalization of rice marketing in 1993. The national government adopted stronger measures regarding rice production. These measures aimed to turn Japan into an internationally competitive rice producing country by reforming the government controlled rice circulation system into a private market system.

This policy highlighted the importance of fostering strong agriculture. Therefore, the government changed the Japanese extension system, as detailed in the next section, and promoted the cultivation of core farmers and corporation farms.

(2) Extension service by agricultural cooperatives

The farm guidance service provided by the Japan Agricultural Cooperatives (hereinafter called JA) was established at almost the same time as the cooperative extension service, as a reflection of the policies of the General Headquarters of the Allied Forces. The JA farm guidance service plays a very important role outside of the public extension service. Since its start, the extension system for the spread of agricultural technology has been carried out through a double structure consisting of the public cooperative agricultural extension service provided by the government and the farm guidance service provided by JA.

Under this double-structured extension system, farm advisers in the JA farm guidance service give advice on the introduction of technologies, shipping and selling, and the organizing of producers' groups, and they occasionally operate agricultural facilities such as country elevators. The number of JA farm advisers has decreased, however, by 11% in the past five years, from 16,216 in 2000 to 14,384 in 2005.

These two extension services share a close relationship with each other in advising farmers, as will be discussed in detail in section 6.

3. Current forces of change of agricultural extension

(1) Change in the public extension service

As previously mentioned in section 2, the agricultural extension service has addressed many problems over the past 60 years, such as the expansion of rice production, the adjustment of rice production, the increase of part-time farm households, the trade liberalization of foods, the internationalization of agriculture, and safety and security of food.

Currently, however, there are many large problems which are very difficult to solve using traditional organization and principles. These are the reasons why major reform of the extension work is now underway. The following three problems were identified by the Panel on Reform of the Extension Service (MAFF, 2004).

1) Expansion of the activity areas makes it more difficult to produce effective results.

It is becoming difficult to concentrate on specific problems due to a high demand not only from farmers but also from many other organizations. In local agriculture, original approaches to the individual producing area are required because of rising competition among producing areas and a changing rural environment. Decentralization as well as these changes has led to a reconsideration of the public extension service, which cooperates with national and prefectural governments under the same policy.

2) The technical guidance provided is insufficient to meet farmers' demands for sophisticated technology.

These changes result from the improved educational level of farmers and the adoption of advanced management techniques by farmers and agricultural corporations. This means that the farmers' own efforts to address diversification of consumer and market needs will become more important. In this way, it is becoming harder for the present cooperative extension work to fulfill an appropriate role based on current demand.

3) What can be done by the private sector should be left in its hands.

In the area of management, farmers can utilize other industry's specialists such as certified tax accountants, small and medium enterprise management consultants, certified social insurance labor consultants, etc. In advanced technical fields such as hydroponic culture, farmers can obtain technical guidance from company engineers.

In consideration of the state of the public extension service, the national government revised the agricultural improvement promotion law in 2005. The outline of the revision is as follows:

1) The certifications of extension worker and subject-matter specialist were unified into a new certification as an extension advisor who must hold a high extension ability, like the former subject-matter specialists. Under this revision, former extension workers with the exception of former specialists therefore need to acquire new certification.

2) Extension centers were deregulated, meaning that prefectural governments can now establish extension centers depending on local conditions.

3) The compensation for former extension workers and subject-matter specialists, the upper values of which were previously set at 12% and 8% respectively, can now be adjusted freely by prefectural governments based on actual conditions.

Following the procedures of the revised law, the extension service can develop into a fast and effective way to meet the diverse needs of farmers, and with new, broad discretionary powers, prefectural governments can promote this service more efficiency.

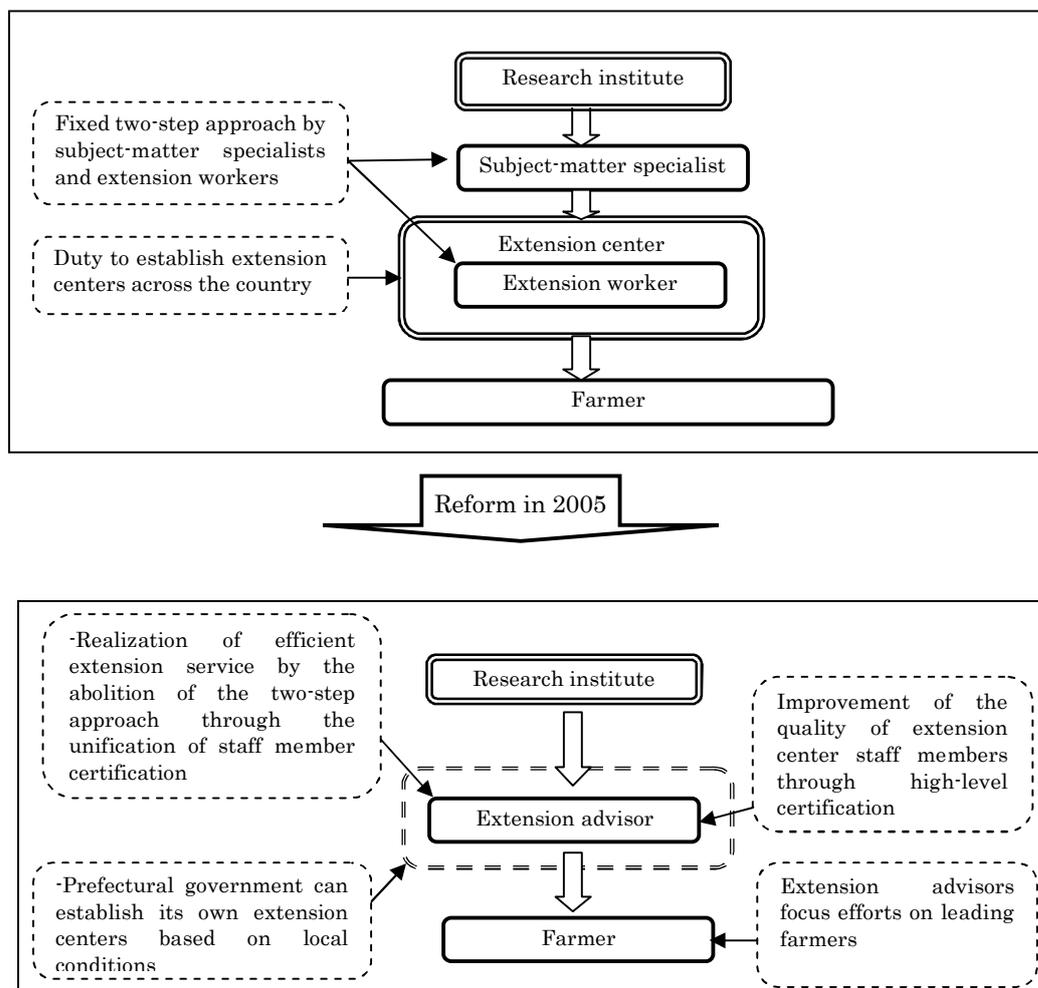


Fig. 3. Reform of the cooperative extension service in 2005

(2) Change in the JA farm guidance service

The JA farm guidance service has also fallen behind in responding to the diverse needs of its members. This delay has resulted in an increasing lack of interest in JA among full-time farmers. A list of some problems follows:

- 1) JA doesn't have the ability to provide guidance to full-time farmers' or agricultural corporations.
- 2) The farm advisors in the guidance service do not only provide farm advice but are also engaged in many other kinds of work.
- 3) There is no effective and efficient farm advice service system in JA.
- 4) The concentration of farm advisors in central JA offices, a result of JA's widening of its services, has weakened its finely-tuned response.

5) There is no effective system for fostering farm advisors who can address changes and issues in regional agriculture.

JA has responded to these problems with the following basic principles (Shimizu, 2001).

- 1) Clarification of goals in the farm guidance service
- 2) Hierarchization of farm advisors to address the diversification of member farmers
- 3) Review of the system, of training, and of personnel exchange
- 4) Review of the certification system
- 5) Cooperation with municipalities and extension centers

Whatever the details may be, the JA farm guidance service is being pressed to adopt almost the same countermeasures as the public extension service.

4. Current public extension approaches

Japan's public extension service includes both the cooperative extension service between the national and prefectural governments, and also—as of 2005—the independent services provided by prefectures at their own expense. In this section, only the cooperative extension service will be discussed, as there is no information yet available on the new independent prefectural services which started just two years ago.

The cooperative extension service is carried out by 8,582 extension advisors nationwide. The system of service is shown in Fig. 4.

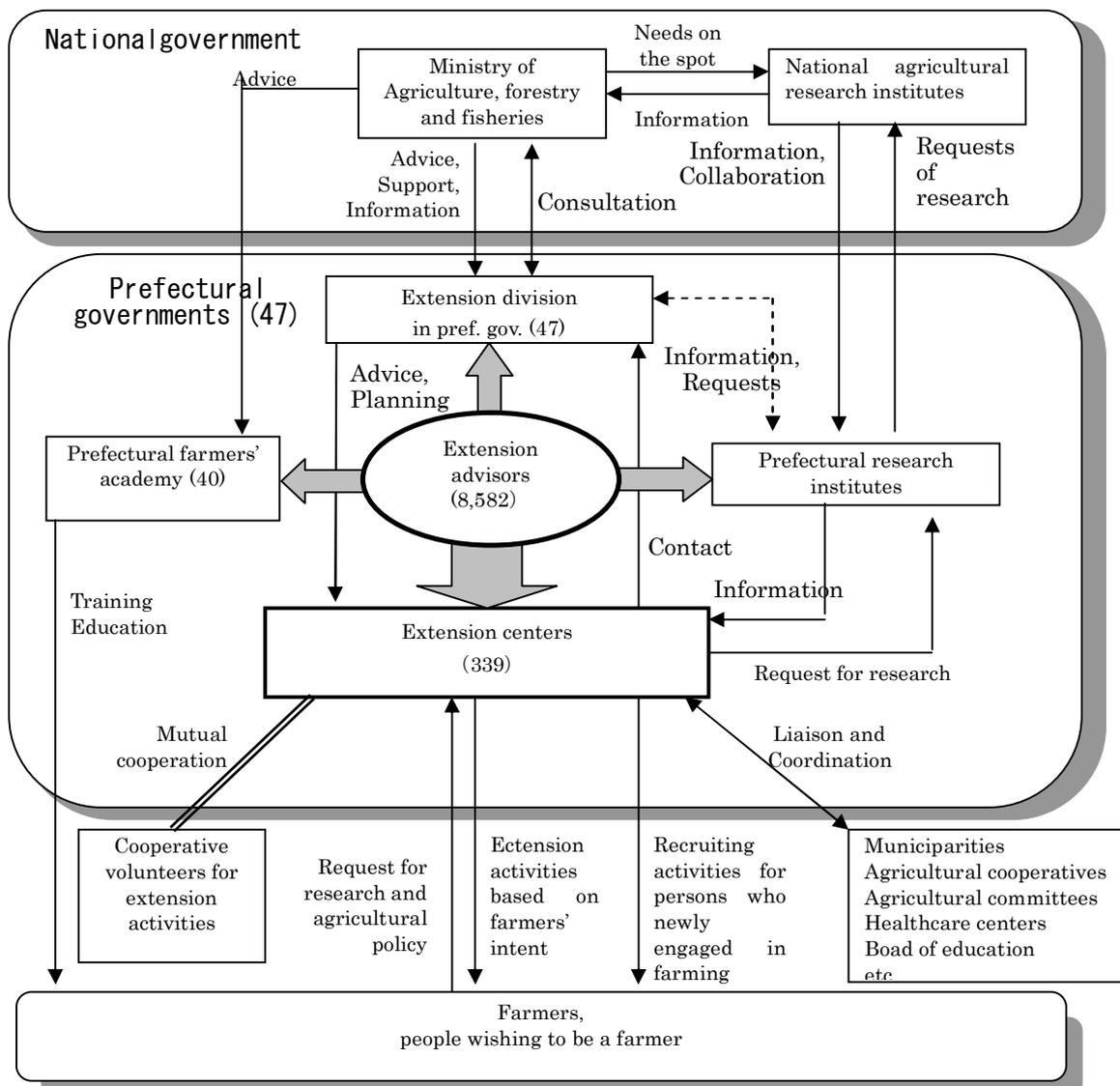


Fig. 4. Cooperative agricultural extension service (MAFF)
(As of April 1st, 2006)

(1) Fundamental areas of activity

The government urges agricultural reform to catch up with the recent drastic changes in food, agriculture and rural areas. An acceleration of agricultural reform is important even in the public extension service. Consequently, the government established new operation guidelines for the cooperative extension service in 2004. The service is now carried out according to guidelines based on the following five fundamental areas.

- 1) Support for fostering of agricultural leaders and the future security of the industry
- 2) Support for promotion of desirable production areas
- 3) Support for environmentally friendly agricultural production
- 4) Support for ensuring secure and safe food
- 5) Support for the development of rural areas

The following five items indicate essential concerns to undertake effective and efficient extension activities.

- 1) Shifting the focus of support activities from a wide range of farmers to leading farmers who incorporate innovative technology, and to supporting rural agricultural technology and management
- 2) Strengthening comprehensive and unified activities among research institutes, extension advisors and farmer's academies
- 3) Improvement of an effective and efficient extension advice system
 - a. Paying proper attention to the circulation of information for comprehensive planning and for coordination division and extension advisors
 - b. Efforts to establish a dynamic consultation and information service by building up an information system and utilizing the data it provides
 - c. Improvement of extension centers as a site for consultations and for providing information to farmers

4) Promotion of active utilization of the private sector

5) Improvement and strengthening of training and education

These fundamental subjects show the operational guidelines for the agricultural improvement promotion law in Japan. The guidelines show that the extension service is strengthening support for agricultural successors and corporations who primarily support the coming age. On the other hand, the public extension service is being forced to weaken its general advice for part-time farmers.

5. Institutional Pluralism

(1) Decentralization of the public extension system

There were many small independent farmers when the extension service was started in 1948. The extension service was started to extend technologies for increasing food production and improving farm life. The most effective method to do so was for the national government to use its financial resources and take a strong leadership role in all prefectures.

These immediate targets were accomplished through the modernization of agriculture. Small independent farm households transitioned into a large number of part-time farm households and a small number of full-time farm households. At the same time, the issues which were targeted by the extension service were diversified according to region to support farmers who form the backbone of agriculture, to promote environmentally friendly agriculture, and to promote secure and safe food production.

In this mature society, it has become very difficult to respond to these issues through a centralized administration system. In 1995, the national government enacted a decentralization law with a transition of powers and financial resources in every area, including the extension service. The decentralization is not yet complete and is still underway. To discuss an appropriate response after the change in national policy in 2002, MAFF set up a panel on the reform of the cooperative extension service.

The panel reported that prefectural governments should be more involved in the cooperated extension service in 2003. The details of the changes were described in section 3. Decentralization is still under discussion, and further decentralization is expected in the future.

(2) The reality of advice received by farmers

Before discussing institutional pluralism, it will be useful to present some facts about the advice received by farmers.

The following survey was conducted in 2002 by MAFF to consider the future of the extension service.

As these results show, more than 80% of farmers received advice from extension centers, about 50% from leading farmers and JA, about 30% from private companies, and 20% from research institutes (Table 5).

Table 5. Source of advice for farmers

Source of advice	Percentage
Extension center	83.7%
Leading farmer	48.6%
JA (Agricultural cooperative)	47.5%
Private company	33.4%
Research institute	23.3%
Municipality	5.6%

n=2,276 (MAFF : 2004)

The next table shows reasons why farmers received advice from sources other than extension centers. At 80%, the number one reason was “already shared a close relationship”, and the least cited reason was “no relationship with extension advisors” at 1%. These results indicate that almost all farmers know extension advisors, but they choose their advice source according to their needs.

Table 6. Reasons why farmers get advice from sources other than extension centers

Reasons	percentage
Already shared a close relationship	80.9%
Received a wealth of shrewd advice suited to the situation	37.7%
Professional and advanced technical advice	36.5%
Useful information for management	31.0%
Quick response to request	26.5%
General advice such as management strategy	13.5%
Introduction of dealers or shops	9.4%
No relationship with extension advisors	1.3%

(MAFF : 2004)

(3) Principal organizations concerned with extension activities

MAFF conducted a survey among municipalities on extension activities carried out by organizations. In this survey, MAFF asked municipalities what organizations hold activities for farmers at present, and what organizations will do so in the future.

The results show that at the present moment, extension centers, JA, and municipalities each represent a third of the organizations holding activities for farmers, and private companies account for 2%. The survey on the future shows almost the same results, except that the percentage of private companies will double from 2% to 4% (Fig. 5).

According to the same questionnaire, increasingly high expectations are being placed on extension centers to foster new technology, on JA to heighten the added value of agricultural products, on municipalities to invigorate rural areas, and on private companies with regards to business management (MAFF:2004).

These results show that agricultural consulting activity by private companies will increase rapidly.

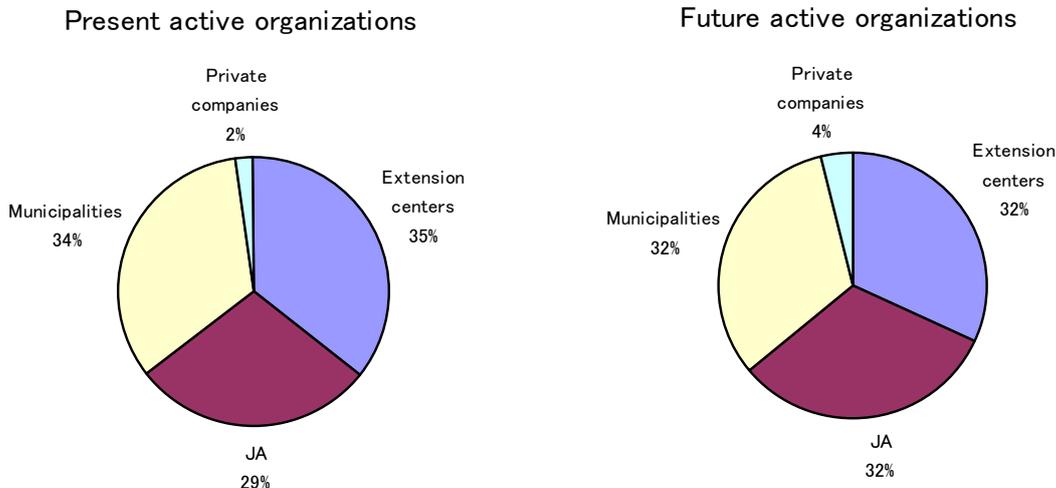


Fig. 5. Present and future active organizations in agricultural advice fields (MAFF:2004)

(4) Commercialization of extension services (fee for extension)

Under Japan’s extension service, there are few large scale farming households which can pay a fee for advice, as compared with the Netherlands or the UK, where such services are already commercialized (Fig. 6). The reason is not only farm size but also severe agricultural conditions, such as the decreasing price of rice. These conditions make it more difficult to commercialize the extension service.

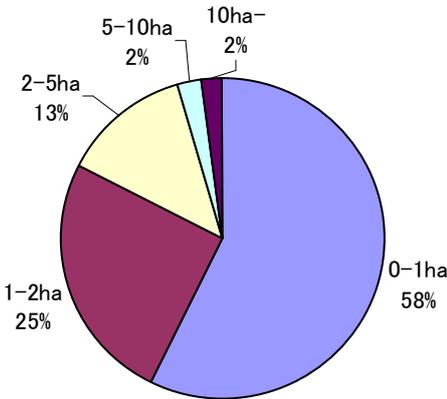


Fig. 6. Percentage of farm households by size (2005 Census)

On the other hand, some prefectures charge farmers a fee for peripheral areas of the extension service. In case of Fukui prefecture, a training course for educating rice farmers which is managed by extension advisors requires a fee of 6,000 yen from each trainee. This trend, i.e. a trend towards the beneficiaries-pay principle, is expected to increase in the future.

(5) Privatization of public extension service

Even as the economic position of agriculture diminishes, there are still many farming households, and they form a large part of rural communities. The public extension service therefore assists not only large-scale farmers but also small-scale farmers and rural communities. People’s opinions with regards to the privatization of the extension service can be summarized as follows.

- 1) Large-scale farmers: Extension advisors should have more sophisticated techniques because of the diversity of consumer's needs.
- 2) Small-scale, part-time farmers: Extension advisors' opinions are very useful for making decisions, because their advice is fair compared with private companies. But I am worried about not getting advice because it is too difficult to pay the required fee.
- 3) Researchers: Privatization would require more cost-benefit performance and a quicker response for each research project, making it more difficult to pursue fundamental research.
- 4) Extension advisors: It takes considerable effort to gather enough technology to receive a fee for advice from leading farmers. On the other hand, there are problems privatization would be unable to tackle such as the environment, food security, and so forth.
- 5) Policymakers: It is becoming difficult to maintain the current extension service, as the budget is reduced year by year. Yet extension advisors are expected to contribute greatly to the promotion of reform based on agricultural policy.

The national government promotes internal reform on the basis of these opinions.

(6) Private extension

1) Agricultural cooperatives (JA)

JA is a fundamental organization for farmers in Japan. JA is a comprehensive organization involved in every type of business for which farmers might have a need, such as the group purchasing of production materials, cooperative marketing of agricultural products, provision of daily commodities, credit business, mutual-aid program, welfare service for the elderly, public welfare work, tourism service, and so forth.

The organization has a three-layer system: a nation level, a prefectural level, and a local level. As of 2005, there were 886 JA offices at the local level and 14,385 farm advisors.

The farm advisor can provide farmers not only with technical advice, but also with

comprehensive advice including production materials, shipping, etc.

2) Technical consultant service

The development of new intensive farming requires a high amount of investment for production facilities and sophisticated techniques. In these cases, farmers need a professional consultant to earn an appropriate income from facilities such as hydroponics culture and rock wool culture in greenhouses.

For example, about ten people might form a group, make a contract with a private consultant, and pay a consulting fee. This sort of example, however, is rare in Japan.

3) Management consultant service

The management of large-scale farming requires advice from a specialist who has specialized knowledge about management. In Japan, the public extension service provides advice on farm management in tandem with specialists, such as a certified tax accountant or a certified social insurance labor consultant. The goals of this service are as follows.

- a) Improvement of management ability
- b) Recommendations for making management plans based on an analysis of the break-even point, etc.
- c) Promotion of incorporation and organization
- d) Advancement of management knowledge such as the social insurance system

4) Agri-business firm

The production materials for rice, wheat and soybeans are purchased mainly from JA because JA farm advisors offer advice on how to produce these crops. In the field of horticulture, however, farmers need distributors' advice because there are too many kinds of seeds, fertilizers, and agricultural chemicals. In this case, distributors can benefit by selling

production materials and therefore sometimes offer biased advice.

5) Newspapers and magazines

Newspapers and magazines are still very important sources for farmers to get information about innovative technology and management. Newspapers provide the latest information, and magazines offer well-organized articles.

There are 12 agricultural newspapers. Three of these are daily papers and others are weekly and monthly. About 30 monthly agricultural magazines are issued in Japan.

The main newspapers and magazines are shown in Table 7. and Table 8.

Table 7. Main newspapers in agriculture

Name (Japanese)	Issue style	No. of issues* (1,000)	Remarks
Nihon-nougyo-shinbun	Daily	380	Agricultural general daily paper by JA group
Zenkoku-nougyo-shinbun	Weekly	350	General weekly paper by the national chamber of agriculture
Nougyo-kyosai-shinbun	Weekly	260	General weekly paper by national agricultural insurance association
Nouson-houti-shinbun	Monthly	80	General monthly paper for young farmer
Nihon-noumin-shinbun	3/month	70	Reports on JA group and agricultural policy
Nouki-shinbun	Weekly	50	Specialty paper for agricultural machinery
Noukei-shinbun	Weekly	30	Specialty paper for imports/exports, distribution, retail
Syukan-syokuniku-tushin	Weekly	30	Specialty paper for meat policy, production, marketing

* Internet research

Table 8. Main magazines in agriculture

Name (Japanese)	Issue style	No. of issues* (1000)	Remarks
Gendai-nougyo	Monthly	56	Description about technology, management, policy and living, etc
Noukou-to-engei	Monthly	17	For specialists in vegetables, flowers and fruits
Nougyo-to-keizai	Monthly	11	Research journal for agriculture, rural areas and agricultural policy for leaders
Kikaika-nougyo	Monthly	10	Description about operational technology, new machines, trends of machinery industry and so on
Gijutu-to-fukyu	Monthly	9	Agricultural information magazine for extension advisors

Kajitu-nippon	Monthly	7	Specialty magazine for fruit orchard managers
Nogyo-kouzou-kaizen	Monthly	5	Articles aiming for the improvement of agricultural structure
Kongetu-no-nougyo	Monthly	5	Articles about insect pest control, chemicals, bio-technology
Chikusan-no-kenkyu	Monthly	4	Specialty magazine for livestock farmers
Niwatori-no-kenkyu	Monthly	4	Specialty magazine for poultry farmers
Youton-no-tomo	Monthly	4	Specialty magazine for pig farmers

* Estimated by the author

In these nationwide printing media, there are many articles written by extension advisors.

On the other hand, many local extension centers provide information independently. For example, each extension center in Fukui prefecture distributes information, e.g. information on cultivation techniques, a few times a year. The means for distributing information are now being switched to the Internet.

6) TV and Radio

Compared with TV and radio, newspapers and magazines are good information sources for specialized knowledge. On the other hand, TV and radio can provide information quickly, and a radio is light enough to take along anywhere. Therefore, they are very useful for transmitting urgent information such as weather warnings or local information.

7) ICT initiatives

a) e-Portal

The penetration of the Internet and the improvement of information content have progressed remarkably over recent years. The diversity of information sought after by farmers has accelerated their use of the Internet.

The extension service places much emphasis on information provided by the Internet. Many prefectures have started an e-Portal which provides cultivation management, research results, and weather information, and some prefectures offer technical support by e-mail.

In Fukui prefecture, the e-portal provides information on public services concerned with agriculture, recent research results, cultivation techniques, weather, funds, and events (<http://www.agri-net.pref.fukui.jp/> : Japanese). The site also provides a rice diagnosis and forecast system which at any time displays useful rice growing data, cultivation management data, yield data and quality data when farmers enter values for a specific area.

b) e-Learning

E-learning is an educational method which uses a personal computer or computer network. The advantages of an e-learning system as compared with classroom teaching include the abilities to get an education even from a remote place and to use special computerized teaching materials.

An extra-governmental organization of MAFF has started an e-learning training system that supports young people who want to begin farming in 2006. Students of the system can also get advice from agricultural specialists by e-mail and learn about opportunities for hands-on farming. In 2006, 47 students were enrolled in the fruit vegetable course, 29 in the leaf vegetable course, and 11 in the poultry raising course, for a total of 87 students.

Another e-learning system for local extension staff members was started in 2005 to replace national level training seminars with four courses: management, community farming, agricultural pests and marketing. In 2007, a new course on support for entrepreneurs in rural areas was added, for a total of five courses.

These courses are highly popular among the extension staff, with about 240 students in the first year, 2005, and about 450 students in the second year, 2006. This kind of system will also be provided for farmers in the near future.

c) Agricultural bookkeeping using personal computers

Agricultural bookkeeping software provided by private software companies has replaced handwritten bookkeeping rapidly. This software will speed up pay slip sorting by hand and heighten management analysis, and will be able to make management plans. The spread of this software depends on the contribution of extension advisors, such as workshops for farmers to improve their management skill.

8) Producers' organization

Most large agricultural producing areas have a producers' organization. The members of each organization actively exchange opinions, because most of the members have an almost identical farm management environment. Usually, these organizations' offices are located within JA.

9) Nongovernmental organizations (NGO)

NGOs have been established in Japan to provide technical aid to developing countries. No such organizations from abroad provide such support to Japan. For example, the Japan Industrial Counselors Association (JICA) has sent 16,000 young people abroad as Japan Overseas Cooperation Volunteers in the fields of agriculture, education, medicine, etc.

(7) Future strategy and conclusion

The public extension service in Japan, as a governmental organization, should play a public role. Therefore, the service should promote national interests such as a steady supply of food, and prefectural interests such as the revitalization of local areas. This means that the continuous support of farmers and organizations who form the backbone of agriculture is important. Yet at the same time, services associated with individual benefit must place increased weight on the private sector's service and on the benefit principle.

Private agricultural services will diversify to soil and plant analysis companies, advice offered

by JA, wholesale firms, or retail sellers. Farmers can choose from among these services according to their needs and budget. For example, farmers may choose only to subscribe to newspapers and magazines, or they may attend an on-site meeting or an individual consultation.

Meanwhile, public sector activities will take on an increased role in supporting activities for environmental conservation, national land conservation, dietary education, and so forth.

6. Public-private partnerships

There is a limit to what the public extension service alone can achieve. Therefore, partnership with other sectors' extension service is very important to expand agricultural production and increase farmers' income.

(1) Partnership between extension advisors in the public service and JA farm advisors

The most important partner in the public extension service is a JA farm advisor. In 2005, the number of farm advisors was 14,385, while extension advisors numbered 8,886. Yet the number of both of these advisors is decreasing every year. The main tasks of farm advisors are technical guidance visits, management of producers' groups, support for shipping and selling, and so forth (Yamazato, 2002).

A concrete case of partnership between farm advisors and extension advisors for an expansion of agricultural production in a specific area is introduced here. The process of production expansion can be considered as follows (Y. Yamasato, 2002).

- (a) Recognition of the current situation, including geographical conditions, human resources, market, etc.
- (b) Realistic goal setting
- (c) Advice and practical training for individual farmers
- (d) Evaluation of results and consideration of possible countermeasures

In those processes, farm advisors are mainly responsible for (a) because they have much information about the specific local area, whereas extension advisors are mainly responsible for (b) and (d), because they have analytic know-how; both advisors share responsibility for (c). Additionally, JA farm advisors are indispensable people for small producers because they can provide production materials along with technical advice, and they can sell farmers' produce directly for them.

(2) Partnership with extra-government organization

The public extension service in Japan gives advice to farmers without charging a fee. If the government plans a business based on the beneficiaries-pay principle, they entrust the business to an extra-government organization.

In the case of the agricultural product certification system in Fukui prefecture, which certifies products grown by environmental friendly cultivation, the public extension service gives technical advice regarding the reduction of chemicals and fertilizer without charging a fee. However, an extra-government organization charges farmers a fee to dispatch an examiner who checks their fields and crops. The government covers the personnel costs for examiners, while entrusting the certification business to this extra-government organization.

(3) Partnership with private agricultural consultants

Private extension services can be considered “agricultural consultants” with the exception of the farm advisory service provided by JA. The need for agricultural consultants is increasing due to the emergence of large sized farming and the diminution of public extension services and farm guidance services. Therefore, growth is anticipated for private agricultural consultants in the following fields.

- 1) Technical consultants to offer advice at the production site
- 2) Management consultants to offer advice on finance and tax accounting
- 3) Marketing consultants to offer advice on circulation and selling

Currently, technical consulting by agricultural material makers and cow's reproductive management consulting by animal doctors are offered only as a business. However, it is difficult for most consultants to run a business without a subsidy because consultant farmers can't pay enough to the consultants. In this case, these consultants are appointed as a specialist in the chamber of agriculture, and they are dispatched from the chamber to give advice to farmers.

7. New area of extension service

(1) Environmentally friendly agriculture and eco-farmers

In Japan, agriculture has been carried out through a sophisticated use of limited water and soil for a long time. In particular, the improvement of cultivation technology using fertilizer and chemicals contributed to the rise of agricultural productivity. Yet in recent years, problems with environmental conservation such as an inappropriate use of chemical fertilizers, pesticides, livestock waste, and so forth have become controversial issues.

Amidst an upsurge of public interest, efforts towards sustainable agriculture have increased in many areas, such as soil amendment using manure compost and a reduced use of chemical fertilizers and pesticides. The national government started a certification system called “eco-farmer” through a sustainable agriculture law in 1999. An eco-farmer is a farmer who practices sustainable agriculture along with a concrete plan that includes the reduction of chemical fertilizer and pesticides. The number of eco-farmers is 99,000 as of March 2006 and is targeted to reach 100,000 by 2009 (Fig. 7).

The rate of eco-farmers is still about five percent of all selling farmers, so regional expansion is the next issue facing the promotion of sustainable agriculture.

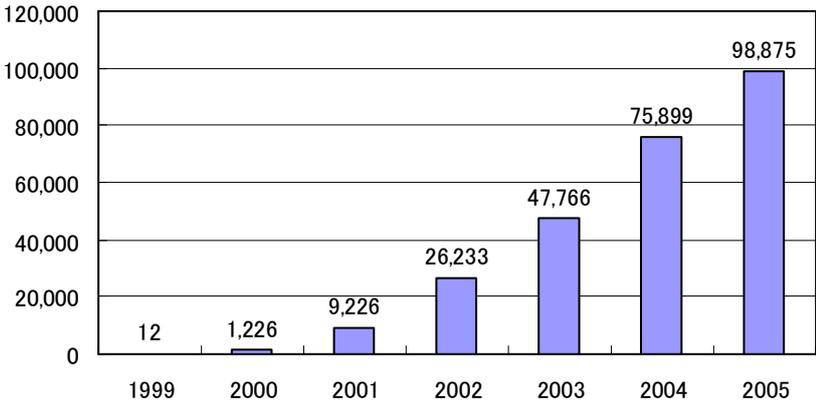


Fig. 7. Rise in the number of eco-farmers (numbers for the end of each fiscal year)

(2) Realization of rural women's ability

Rural women play an important role as farm workers, but they have fewer opportunities to participate in management than men in most situations. Rural women also have fewer opportunities to gain a responsible social position. In order to improve rural women's situation, the "Basic Law for a Gender-Equal Society" and the "Basic Law on Food, Agriculture and Rural Areas" clarified women's position regarding participation in society.

In accordance with these laws, the extension service aims to clarify the members' roles in individual farm management and to promote equal participation in management decision-making. It also encourages the creation of a local society where women can actively speak out and enjoy the same social standing as men.

8. Alternative financing mechanism to support the extension service

(1) Outline of the agricultural financing system

Agricultural financing in Japan is classified broadly into three categories: agricultural cooperative financial institutions, private financial institutions, and government financial institutions. Though these institutions have many funds, there is a fund called the “Institutional fund” which is used to achieve government policy goals effectively. Farmers can choose from among the following loans based on their intended use.

1) Agricultural improvement fund

This is an interest free loan from the government for innovative farming in the areas of new crop introduction, distribution processing, pioneering technology, and so forth.

2) Agricultural modernization fund

This is an agricultural cooperative group fund for modernization of farming, with part of the interest subsidized by the government.

3) Agriculture, forestry and fisheries finance corporation fund

This loan is appropriate for difficult cases in private financial institutions, such as an excessively long redemption period, money for purchase of agricultural land, etc.

4) Private fund

This is a private loan using a private fund such as the agricultural cooperative group fund.

(2) Role-sharing arrangement between subsidies and the institutional fund

In principle, subsidies target highly public, broad-based, widely-used, and politically important fields that should be strongly promoted. In contrast, the institutional fund aims to complement these subsidies and to promote individual modern farming that results in an increase of personal assets. This relationship is shown in Fig. 8.

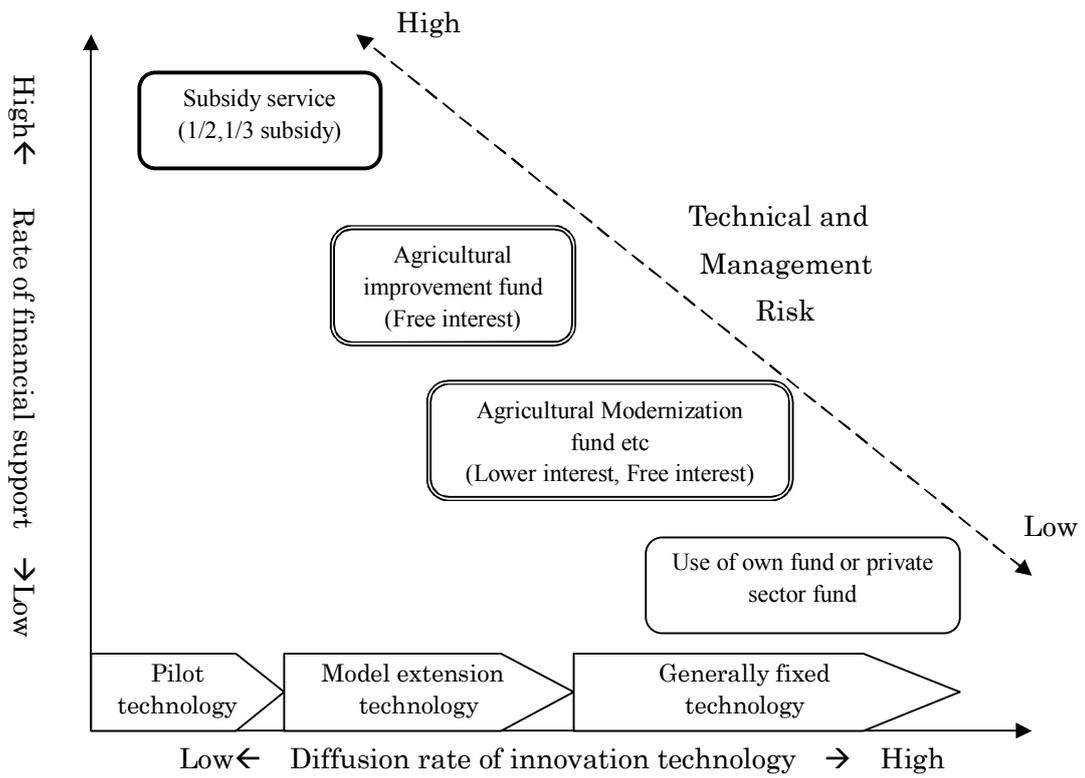


Fig. 8. Role sharing arrangement between subsidies and the institutional fund

9. Experience of extension approaches

– Case study approach to the extension of the direct sowing method of rice –

The fundamental goal of the public extension service is to help farmers think for themselves by using educational methods that emphasize a scientific view and scientific thinking. Therefore, the extension service undertakes activities that heighten motivation and encourage feedback from farmers or groups by providing knowledge, technology and related information.

In this section, the role of each organization—the extension center, the government, and the research institute—is introduced using an example from Fukui prefecture of an innovative technology, the direct sowing method of rice (Inoue, 2006 and Kitakura, 2004).

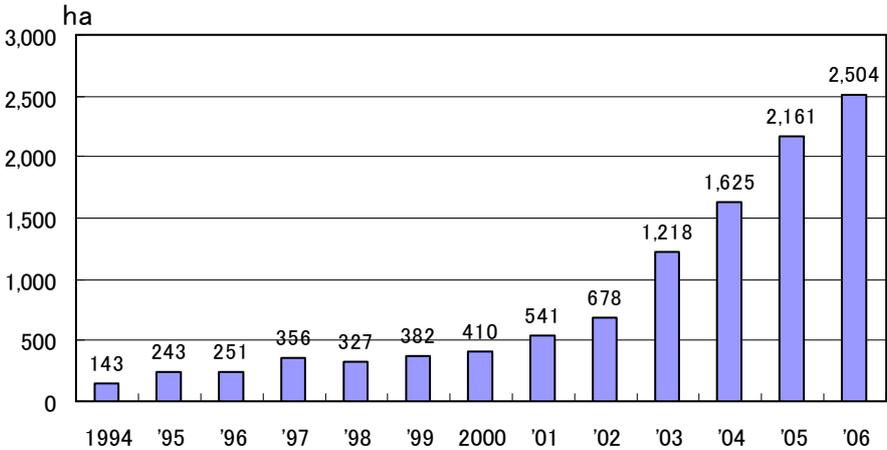


Fig. 9. Acreage change of direct sowing area (Fukui prefecture)

(1) Outline of the case

The direct sowing method of rice was initiated as a highly important technology for reducing labor hours and production cost in Fukui prefecture. In the process of extension, many problems arose, such as instability of emerging, a lack of effective herbicide, limited rice variety and unstable yield. Introducing this method to rice farmers at that time was highly

risky. After these problems were solved through technological improvements, the acreage where the direct sowing method is used has been increasing rapidly, from 143 ha (0.4% of total paddy fields in Fukui prefecture) in 1994 to 2,504 ha (7% of the total) in 2006.

(2) Client orientation

Whether new methods in farming are accepted or not depends on how the extension service resolves technical problems and how feedback is given to farmers. In the direct sowing case, the extension service has made efforts to solve many technical problems by frequently listening to farmers' opinions and by maintaining a close relationship with research institutes.

Table 9. Main problems associated with the direct sowing method of rice, and solutions

Farmer's problem	Solution by extension service and research institutes
Instability of emerging	Development of new method which stabilizes emerging by surface drainage
Weed control	When an effective herbicide appeared on the market, its proper use was promoted by the extension service
Unsuitable for the most popular Japanese rice variety Koshihikari*	The introduction of a highly accurate sowing machine that can even handle varieties like Koshihikari that lodge easily was supported by the government

*: Koshihikari has high quality and good taste, as well as a high price, but it lodges easily.

(3) Accountability

The extension service encourages farmers to decide whether to introduce new technologies after receiving a thorough explanation, including associated risks. For example, farmers were provided information not only about the advantages of reduced production costs and a less strenuous, less time-consuming workload, but also about the shortcomings, such as the instability of emerging and the problem of weed control. Farmers then decided for

themselves whether or not to introduce this method into their farming.

(4) Satisfaction level of farmers

Whether or not new technology is accepted by a large number of farmers is greatly affected by the satisfaction level of leading farmers who introduce innovative technology. In the case under discussion, the extension service and the research institute have been improving and developing the technologies based on feedback from farmers' since the project started in 1994. As a result, farmers' opinions on a questionnaire demonstrate satisfaction with these technologies (Fukui prefecture, 2006).

Table 10. Farmers' satisfaction for introduction of the direct sowing method (n=111)

Question	Agree	Difficult to answer	Don't agree
The method is difficult	25%	19%	48%
I am satisfied with the method	61%	19%	10%
The method is nerve wracking	18%	16%	42%
The method has improved operation	25%	48%	18%
I need a subsidy to continue using the method	23%	34%	33%
The method is not advantageous for small scale farming	14%	17%	58%

(5) Sustainability

A new technology is introduced for its comparative advantage over conventional technology, and this new technology will give way to different technology when it loses its comparative advantage. Based on farmers' positive attitudes towards the method as seen in

the questionnaire, the use of this method is expected to spread over the next few years. To ensure the continuation of this method, it is very important to enhance farmers' satisfaction by providing appropriate information for farmers' needs.

(6) Expansion / Renewal

During the first stage of spreading an innovative technology, strong support by the extension service is required. Once the technology spreads beyond a certain level, the speed at which it accelerates will increase without strong support. In the case under discussion, the acreage in Fukui prefecture under the direct sowing method gradually increased from 1994 to 2001. When the acreage topped 2% of total paddy fields in 2002, however, the acreage began to increase rapidly. This suggests that the new technology has expanded and been readopted.

(7) Impact on farm production

The conventional method of rice cultivation in Japan is to transplant a young seedling, because this method is a very stable technology for rice production. The direct sowing method, however, does not call for the use of seedlings, and therefore offers a great reduction in labor costs. For this reason, the possibility of direct sowing has long been explored, yet no effective technologies were developed to counter the instability of emerging and the problem with weeds.

It is very important that innovative technologies based on farmers' needs be adopted by many farmers rapidly. The direct sowing method plays a big role in expanding farmers' choice in their farming, as compared with farming that relies exclusively on the conventional transplanting method.

(8) Example of recent innovative technologies developed by the national government

Table 11. Examples of recent innovative technologies and extension problems

Recent important extension problem	Example of innovative technologies
Fostering core farmers who can respond competitively to internationalization	Direct sowing of rice / Longmat transplanting of rice High quality vegetable production by drip irrigation, CO2 application Systematized reduction of workload by high positioned cultivation bed
Efforts for food safety and security Promotion of environmentally friendly farming	Promotion of bio-control using enemy insects or sex pheromones Promotion of coordination with cultivation and livestock using whole crop silage
In response to the drastic change in rice policy, the development of market oriented rice and of wheat or soybeans according to demand	Quality improvement of wheat, soybeans using protein control techniques in fertilizers, etc. Introduction of consumer oriented special varieties that have low protein content, that are pest tolerant, etc.

10. Conclusion and the way forward

The extension service in Japan was formed about 60 years ago in the post war era, when agricultural production constituted one fourth of the GDP. Since then, the extension service has mainly been carried out by two services, the cooperative agricultural extension service managed by the government and the farm guidance service managed by agricultural cooperatives.

Since then, farmers who mainly produced rice could concentrate their farming on obtaining a high yield and on high quality rice, since the agricultural cooperative (JA) dominated circulation and selling. At that time, the public extension service could devote itself to diffusing new technologies that focused on high yields and high quality. The JA farm guidance service gave consistent advice from production to selling, and JA earned a good deal of income by distributing farm products in bulk.

As product price decreases, farmers require more sophisticated technologies or specialized knowledge to sell their products for a profit. On the other hand, new problems such as the environment, food safety and security, and so forth have emerged. How the extension service responds to these new problems is an issue.

The cooperative extension service by the government was reorganized in 2004, and the reform carries out decentralization within the limits of cooperative work. The reform was undertaken to provide quicker and more effective advice to farmers. The JA farm guidance service has also reduced its staff, and they now have to advise member farmers on matters from production to selling with a small staff.

In such a situation, both the cooperative extension service and the farm guidance service have no choice but to depend on private extension services. In particular, in the areas in which farmers can benefit, they will choose from among these private extension services based on their needs and finances. However, there are still few specialists in areas such as tax accounting, finance, marketing, information technology, etc. who are familiar with farming. It has become necessary to foster such specialists.

In any case, reformation of the extension service is not yet complete, and further

reformation to correspond to diverse and high-quality farming is inevitable amid drastic agricultural change and continued decentralization. These changes increase the importance of private extension services in Japan that are coordinated with the public extension service and with JA's guidance service.

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