

REVITALIZATION OF HILL FARMING THROUGH ORGANIC AGRICULTURE IN JAPAN: THE JOETSU TOKYO NODAI AS A BUSINESS MODEL

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ABSTRACT

The hilly and mountainous areas contribute about 40% to the entire agricultural sector in Japan, but agricultural decline has become very apparent in recent decades. There is a great need for revitalization of hill farming by adopting strategic approaches in order to maintain the food production of the country. This paper aims to describe the serious problems facing hill and mountain farming as well as the current status of organic farming in Japan, and to present the case of Joetsu Tokyo Nodai, Inc. established in 2008 in order to deal with these problems.

Key words: Abandoned fields, organic farming, rice, vegetables

INTRODUCTION

Revitalization of hill and mountain farming is urgently needed for the maintenance of food production in Japan. However, there are many serious problems in this low efficiency farming. A strategic approach is significantly important to tackle the existing challenges. For the future of Japanese agriculture, not only the rehabilitation of abandoned fields is vital, but also the establishment of a sustainable farm management system.

This paper aims to take an overview of the current condition of hill and mountain farming as well as organic agriculture in the country, followed by the presentation of the evolution, constraints and prospects of the Joetsu Tokyo Nodai, Inc. This corporation was founded in April 2008 and has since been making continuous efforts to rehabilitate abandoned fields for the cultivation of organic rice and vegetables, which are provided to niche markets as high quality food items with the Tokyo Nodai brand. It is considered to be one business model for the promotion of agricultural development in hilly areas of Japan.

It should be noted that this paper depends heavily on an earlier paper in Japanese (Fujimoto 2012) and my plenary presentation at the ISSAAS International Congress 2012, held in Bicol, Philippines, last 14-16 November 2012.

HILL FARMING IN JAPAN

For statistical purposes, the farming areas in Japan are divided into four categories, namely Urban, Plains, Hill, and Mountain. The Plains has more than 20% of arable land of the total land area and less than 50% of forest coverage, while in the Mountain area the arable land rate is less than 10% and forest more than 80%. The Hill area has 10~20% of arable land and 50~80% of forest coverage. In general, statistics are taken on the basis of municipality or former unit before amalgamation of

cities, towns and villages. There are currently a total of 720, 758, 1,022 and 735 municipalities in the Urban, Plains, Hill, and Mountain areas, respectively.

Table 1 shows cultivated area, number of farm households, and the average sale of agricultural products per farm household by area in Japan. It also shows the average age of farmers in these areas. It is clear that a combination of hill and mountain areas contribute roughly 40% to the total farmland area, total sale of agricultural products, and total number of farm households in the country. However, the average farm size remains small at 1.16 ha and 0.96 ha in hill and mountain areas respectively, compared to 1.88 ha in the plains. It follows that the planted area and agricultural sales are also smaller in hill and mountain areas. The average value of agricultural sales per farm household was 1.99 million yen in the mountain area, and 2.53 million year in the hill area, compared to 3.88 million yen in the plains in 2010. Off-farm income opportunities are more severely limited in hill and mountain areas than in the plains where major cities and industries are located. These facts indicate that the average income of farm households in hill and mountain areas is much lower than their counterparts in the plains area.

Table 1. Contribution of hill and mountain areas to the agricultural sector in Japan, 2010.

Areas	Cultivated land (1,000ha)	Number of farm households (1,000 hh)	Commercial farm households (1,000 hh)	Average sale per household (Million yen)	Average age of farmers (years)	Rate of abandoned fields (%)
Urban	550	708	420	2.54	63.0	13
Plains	1,700	911	730	3.88	62.1	6
Hill	996	859	590	2.53	64.1	13
Mountain	354	376	220	1.99	65.3	15
Total	3,608	2,848	1,960	2.98	64.2	11

Sources: MAFF 2010a; MAFF 2010b, pp. 67, 71 and 123.

Note: Rate of abandoned fields (%) = Abandoned area / (Arable land + Abandoned area) x 100

This low level of income and the less favorable living conditions in hill and mountain areas have been the major causes of the lack of farm successors and the aging of the farmers. The average age of hill farmers is 64.1 years old, while that of mountain farmers is 65.3, compared to 62.1 years in the plains area. Another serious issue in hill and mountain areas is the significant increase in abandoned fields. In the Agricultural Census, abandoned fields are defined to be those arable lands not planted to any crops for more than one year and with no intention to cultivate in the foreseeable future. As of 2010, the rate of abandoned fields was as high as 15% and 13% in mountain and hill areas respectively, compared to only 6% in the plains. Actually, abandoned fields have been gradually increasing in recent decades due to general agricultural decline in Japan. As shown in Table 2, more than 217,000 ha of arable land (4.7% of the total arable land) were abandoned in Japan in 1990, increasing to as much as 400,000 ha (10.6%) by 2010.

In other words, even though hill and mountain villages are often regarded as beautiful landscape and a treasure house of cultural heritage, which many city residents actually admire and wish to visit, the life and agricultural activities are not easy at all. Let me neatly summarize the reality of hilly and mountainous farming in Japan by the following 10 keywords: (1) lack of successors, (2) aging of farmers, (3) marginal villages, (4) excessive depopulation of rural villages, (5) social differentiation, (6) small farm size, (7) low efficiency, (8) damage from wild animals, (9) low income, and (10) abandoned fields.

Table 2. Changes in arable land and abandoned fields in Japan, 1990-2010.

Years	Arable land (1,000 ha)	Abandoned area (1,000 ha)	Abandoned rate (%)
1990	5,240	217	4.7
1995	5,040	244	5.6
2000	4,830	343	8.1
2005	4,690	386	9.7
2010	4,590	396	10.6

Sources: MAFF 2010a; MAFF 2010b, pp.74-75.

The term “successor” has two meanings in Japan, namely successor to the household and successor in farming. In suburban villages, the young generation may succeed to the household but not necessarily to farming, as the youth are most likely engaged in off-farm employment and willing to commute to work from the family house. However, in hill and mountain areas, the young generation tends to migrate to the urban area, leaving no child to succeed to either household or farming. Population in a village can be maintained in the former case but decreases in the latter case, leading to an excessive depopulation of rural villages in hill and mountain areas. Those remaining in the village are likely to be elders, causing the so-called phenomenon of aging of farmers. In Japan, if more than half of the village residents are older than 65 years old, it is called a marginal village, and we see now an increasing number of marginal villages in hill and mountainous areas. There were 7,878 marginal villages in 2006 in Japan, of which 423 is expected to disappear within 10 years (Muramoto, et al, 2010).

Why does the young generation tend to migrate? Two fundamental reasons can be pointed out: (1) low agricultural income, caused by low farming efficiency and small farm size, and sometimes damage from wild animals, and (2) inconvenient living conditions caused by social differentiation wherein social infrastructure is far better in cities and towns, while life is very inconvenient in the hill and mountain areas, especially for elderly citizens. It is no wonder that young people do not wish to live in these unfavorable villages.

There is an increasing understanding of and support for hill and mountain farming problems in agricultural policy in Japan. Among various subsidy programs (e.g. Individual Household Income Support Program, Paddy and Upland Fields Income Stabilization Program), the Hill and Mountain Villages Direct-Payment Program, which was introduced in 2000, is the only program exclusively directed to these unfavorable farming areas. Under this program, about 200,000 yen per hectare of cultivated arable land is provided to beneficiaries in hill and mountain areas. It should be noted that half of the subsidy is given to the village community, while the other half is directly paid to the individual farmers. However, this amount is considered far too small to reduce the existing large gap in the average income of farm households between favorable and unfavorable areas, and to provide incentives for the young generation to start and continue farming in these unfavorable areas. For fundamental solutions of the problems of hill and mountain areas, it is therefore necessary to establish the basic social and economic conditions to attract and convince the young generation to settle and continue their engagement in farming, and to maintain village community functions.

ORGANIC FARMING IN JAPAN

Development of organic farming in Japan up to 2004 was reviewed in my previous paper (Fujimoto 2005). Demand for organic products has steadily been increasing in Japan, as general

consumers have become more interested in safe foods as a reaction to the emerging pollution of the 1960s and pesticide residue problems in the 1980s (Sugihara 2006). The certification system for organic products was made compulsory from 2001, as a result of the revised JAS Law.

Table 3 presents the trends in domestic production and import of organic products in Japan. Three points deserve mentioning. First, the number of certified organic business entities, including producers, distributors, and importers, has gradually increased from 3,639 (2002) to 5,842 (2010). However, certified organic producers accounted for only 3,815 persons in 2010, and the extent of their certified fields remained small in area at 8,506 ha, accounting for a mere 0.18% of total arable land in the country. These certified fields could be further categorized into paddy fields and non-paddy fields, occupying 2,902 ha and 5,596 ha, respectively. The average area of certified fields per certified producer was only 2.2 ha.

Table 3. Changes in the number of JAS certified organic entities, domestic organic products and imported organic products in Japan, 2001-2010

Years	Certified business entities	Domestic production (tons)	Import (tons)
2001	-	33,734	94,186
2002	3,639	43,789	89,019
2003	4,273	46,192	297,923
2004	4,453	47,428	449,649
2005	4,884	48,172	1,440,178
2006	4,611	48,596	1,296,256
2007	5,104	53,446	1,902,279
2008	5,651	56,164	1,981,262
2009	5,514	57,342	704,204
2010	5,842	56,415	859,943

Sources: Ministry of Agriculture, Forestry and Fisheries, various years.

Second, domestic production of organic products amounted to 33,734 tons in 2001 when certification was made compulsory. This gradually increased to 56,415 tons by 2010. As shown in Table 4, vegetables remained a major organic product from the beginning, followed by rice. However, the total quantity of organic products was very small, in that organic vegetables constituted a mere 0.31% of the total vegetables production in the country, and rice only 0.13%, in 2010. MOA (2011) estimated that the inclusion of non-certified organic products would bring the total availability to more than 100,000 tons in 2010, including 62,644 tons of vegetables (0.39% of total vegetables) and 25,565 tons of rice (0.30% of total rice).

Third, the relatively small number of certified organic producers and quantity of domestic organic production does not necessarily mean a small demand for organic products in Japan. As presented in Table 3, the import of organic products has continued to grow, from 94,186 tons in 2001 to 859,943 tons in 2011. For the period from 2005 to 2008, more than one million tons were imported, due to the heavy purchase of organic sugarcane. In 2010, such commodities as vegetables, soybeans, and fruit were the main items of imported organic food, amounting to more than 188,000 tons,

100,000 tons, and 85,000 tons, respectively. The import of organic rice accounted for more than 14,000 tons.

Table 4. Changes in shares of organic products in Japan, 2001-2010.

Commodity	2001		2005		2010	
	Production (t)	Share (%)	Production (t)	Share (%)	Production (t)	Share (%)
Vegetables	19,675	0.11	29,107	0.18	36,854	0.31
Rice	7,777	0.03	11,369	0.13	10,976	0.13
Fruits	1,391	0.03	2,222	0.06	2,506	0.09
Soy beans	1,162	0.43	877	0.39	1,035	0.46
Green tea	927	1.10	1,610	1.61	2,088	2.46
Wheat/Barley	722	0.06	655	0.06	890	0.12
Others	2,081	1.42	2,332	1.45	2,065	1.65
Total	33,734	0.10	48,172	0.16	56,415	0.23

Sources: Ministry of Agriculture, Forestry and Fisheries, various years.

It is thus clear that although the demand for organic products has been greatly increasing, domestic production has showed a small increase, resulting in the great expansion of imports. The question then arises as to why development of organic agriculture has been so slow in Japan. It is most likely caused by the fact that profitability of organic farming has been kept low, on which the following points can be made. From the production point of view, there are many obstacles in organic cultivation technology. Crop cultivation technology in the 20th century has shown a heavy dependence on synthetic chemical inputs, and the development of alternative inputs is severely limited. In many cases of organic cultivation, therefore, farming has to depend on natural conditions and embedded fertility of soil and crops, with consequent difficulty in improving the unstable and low yield levels. Low level of production is necessarily accompanied by high cost per unit of produce. In other words, because of the lack of stable and high yielding technology, there is a limited number of farmers who are willing to convert from conventional to organic farming.

From the marketing point of view, organic products are limited to those products certified under the JAS Law. Differentiation of organic products from conventional products is a necessary measure, but marketing channels for organic products are rather limited. As Sugihara (2006) pointed out, most of the specialized organic dealers in Japan operate on the basis of a contract with producers and consumers, leaving a narrow and limited space for new producers to find a market for their organic products. The compulsory certification system involves a relatively high cost every year for application, examination, and maintenance, which are to be borne by the producers. There is no subsidy given to the current and potential organic producers for obtaining a certificate in Japan. Yet, the prevailing high price of organic products limits further increase in selling prices. In other words, it is not easy for organic producers to recover their high costs and make a profit from selling their organic products. Low profitability also discourages the emergence of new organic producers.

As shown in Table 5, Organic Agriculture Promotion Law was enacted in December 2006, with which Ministry of Agriculture, Forestry and Fisheries (MAFF) introduced a new Basic Plan for Promoting Organic Agriculture in the following year. This basic plan put forward a clear recognition that organic agriculture would be useful in promoting natural circulation, reducing environmental stress, and in conserving bio-diversity. It may be said that the organic policy in Japan has now

shifted from the administration and supervision of organic products to a new phase of the promotion of organic agriculture from the environment conservation point of view. It follows that in 2011 a new direct payment program was introduced for a period of five years for those farmers who adopt environmentally friendly practices, including cultivation of cover crops, living mulch, and organic farming. In 2012, about 12,162 ha of paddy fields were registered for the payment of this subsidy, under the category of organic farming.

Table 5. Chronology of policy and institutional changes in organic agriculture in Japan

Year	Major laws and regulations
1973	First Teikei system for organic products
1989	Organic Agriculture Section in MAFF
1992	Sustainable Agricultural Development, specified as one goal in New Agricultural Policy
1992	National standards for organic products (vegetables and fruits)
1997	National standards for organic products (rice, beans, wheat, barley)
1999	Food, Agriculture and Rural Basic law
1999	Sustainable Agriculture Law
1999	Amendment of JAS Law
2001	Compulsory certification for organic products
2005	National standards for organic products (animal and dairy products, processed foods)
2006	Organic Agriculture Promotion Law
2007	Basic plan for promoting organic agriculture
2011	Subsidy program for environment conservation agriculture (organic agriculture included)

MAFF also set forth a concrete goal for their policy, specifying a target of 50% increase in domestic production of organic products by 2014 over the actual production in 2007 (53,446 tons). However, as shown in Table 3, the actual production in 2010 was 57,342 tons, a mere 7% increase from 2007, pointing to the need for greater encouragement and more effective and support if the goal is to be achieved.

THE JOETSU TOKYO NODAI, INC.

Background

Tokyo University of Agriculture (abbreviated to TUA, and to *Tokyo Nodai* in Japanese) was founded in 1891 and has been conducting research and education activities with a practical science orientation. Contribution to local agricultural development has been one of the main missions of the university. In 2005, TUA signed a cooperation agreement with the City of Joetsu in Niigata Prefecture, and began field experiments in organic cultivation of rice and vegetables in its mountain area under Academic Frontier Research Project (TUA 2005-2009). This area is a typical hill and mountain area where many problems mentioned earlier actually existed, and the extent of abandoned fields accounted for 30% of the total 200 ha of arable land in this Tanihama-Kuwadori area. Some abandoned fields were rented in by TUA from local farmers and cleared for cultivation experiments, which focused on alternative technologies to (1) chemical fertilizer in soil fertility building, (2) synthetic pesticide in pest control, and (3) herbicide in weed control. Therefore, in the case of organic

rice farming, compost and green manure, disease-resistant cultivar, and alternative weed control technologies such as paper mulching, deep water control, rice bran, and mechanical weeding were adopted for experiments. For organic vegetables, compost and green manure, locally adoptable types of vegetables, and living mulch were taken up for experiments.

From the second year of the activity, there emerged an increasing number of landowners who offered their abandoned fields for experiments. These offers gradually turned to a request for TUA to establish a university farm in the area. After a series of discussions with local farmers and the City Office, TUA decided to set up a public company, rather than a university farm, to initially clear abandoned fields of about 10 ha and operate an organic farm. With a total of 50 million yen capital paid up from (1) local agriculturists and business community who wished to conserve and promote agriculture in this hill and mountain area, (2) people originating from Joetsu who wished to contribute to local progress, (3) TUA community who wished to apply research findings to the real world and widen means of practical education, and (4) TUA graduates and concerned parties who wished to support this challenge of the university, a corporation named the Joetsu Tokyo Nodai, Inc. (<http://www.jnodai.co.jp>) was officially founded on the 1st of April, 2008.

As presented in Table 6, its business objectives include not only management of farms and ranches but also training and research businesses in bio-production, processing and marketing. In 2008, agricultural production was conducted under the Academic Frontier Research Project, and the company concentrated on marketing of the products. From 2009, the Joetsu Tokyo Nodai officially entered into farming business by renting in the abandoned fields and employing its salaried staff. The main office is located at TUA Setagaya Campus, Tokyo while the Joetsu Organic Farm is in Tanihama-Kuwadori area, Joetsu City, Niigata Prefecture (Figure 1). The farm is about 340 km away from Tokyo. The JAS organic certificate was first obtained by the corporation in August 2009 and is being renewed every year.

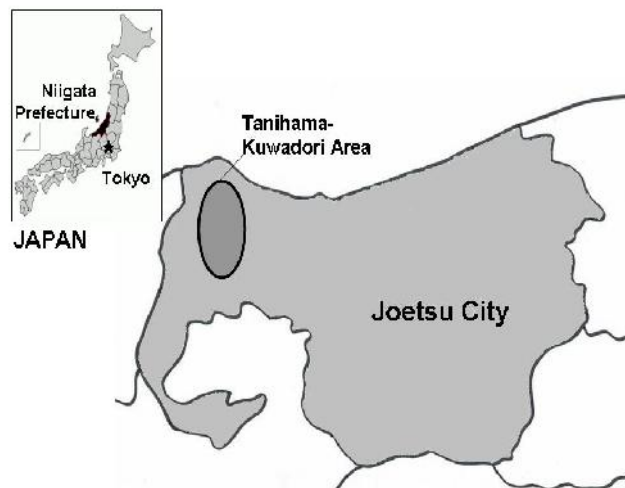


Figure 1. Location of Joetsu Organic Farm

Table 6. Business objectives of the Joetsu Tokyo Nodai, Inc.

Numbers	Objectives
1	Management of farms and ranches
2	Management of orchard and rental farms
3	Management of forests
4	Fishery and aquaculture
5	Purchase, processing (rice cake, pickles, cheese, ham etc), marketing, and retail sale of agricultural, forest, fishery and animal products
6	Manufacturing and sale of alcohol beverages
7	Food and drinking shops
8	Lease, management, transaction and agency services for real estates
9	Contract farming
10	Collection, production, processing (drying, canning, etc) and marketing of medicinal herbs and mountain flora
11	Lease of animals and plants for bio-therapy
12	Training business for bio-production, processing and marketing technologies
13	Research business for bio-production, processing and marketing
14	Ecotourism and food, agriculture and environment education business for urban residents
15	Accommodation business
16	All other business activities related to each of the above objectives

Training Activities

As shown in Table 7, the Joetsu Organic Farm has been a center for practical training and education not only for Japanese but also international students. The following different training programs have been conducted every year on the farm after its establishment:

- 1 Bio-business practice for second year students of Department of International Bio-Business Studies, Faculty of International Agriculture and Food Studies, Tokyo University of Agriculture. Several groups of students spend two weeks engaging in organic farm practice during the summer as well as spring vacations. A total of 20 to 30 students have thus experienced organic farming and rural community every year.
- 2 Internship training for third and fourth year students of the above-mentioned department. Usually this is conducted during the summer vacation and sometimes in spring vacation. A total of 5 to 10 students participate every year.
- 3 TUA's Comprehensive International Education Program (CIEP) has a Joetsu Field Study as a main component. Student participants are able to engage in a whole-day organic agricultural practice at the Joetsu Organic Farm. More than 20 students from various countries participate in this program every year.
- 4 One of TUA's global partners, Michigan State University (MSU), created an organic farm practice for its students. The Joetsu Organic Farm accepts two to four MSU students for a period of two weeks. These students are often from the MSU's Student Organic Farm. During the practice, MSU students usually live and work together with the second year TUA students, thus giving them the opportunity to have cultural exchange.

Table 7. International training program at the Joetsu Organic Farm, 2008-2012.

Years	Months	Programs	No. of participants	No. of countries of origin
2008	Aug-Sep	Bio-business practice for Tokyo University of Agriculture (TUA)	24	4
		Joetsu Organic Practice for Michigan State University (MSU)	3	1
	Oct	Internship, TUA	4	1
		Comprehensive International Education Program (CIEP), TUA	20	6
2009	Feb	Field training, Advanced School, Institute of Developing Economies (IDEAS)	30	10
	Aug-Sep	Bio-business practice for Tokyo University of Agriculture (TUA)	15	2
		Joetsu Organic Practice for Michigan State University (MSU)	4	1
		Internship, TUA	5	1
Sep	Comprehensive International Education Program (CIEP), TUA	21	8	
2010	Feb	Field training, Advanced School, Institute of Developing Economies (IDEAS)	30	10
	Aug-Sep	Bio-business practice for Tokyo University of Agriculture (TUA)	5	1
		Bio-business practice for Tokyo University of Agriculture (TUA)	15	2
		Joetsu Organic Practice for Michigan State University (MSU)	2	1
		Joetsu Program, China Agricultural University	15	1
	Oct	Internship, TUA	4	2
		Comprehensive International Education Program (CIEP), TUA	25	10
	Dec	Joetsu Program, Kasetsart University	15	1
		Field training, Advanced School, Institute of Developing Economies (IDEAS)	29	14
		Agriculture training for Nikkeijin, Ministry of Agriculture, Forestry and Fisheries	6	3
Bio-business practice for Tokyo University of Agriculture (TUA)		12	3	
2011	Feb-Mar	Organic practice, Takada Agricultural High School	160	1
	Jul-Aug	Bio-business practice for Tokyo University of Agriculture (TUA)	9	2
		Internship, TUA	10	3
	Oct.	Comprehensive International Education Program (CIEP), TUA	26	17
		Bio-business practice for Tokyo University of Agriculture (TUA)	9	1
2012	Feb-Mar	Nikkei Training, JICA	1	1
	May-Oct	Organic practice, Takada Agricultural High School	160	1
	Jul-Aug	Joetsu Program, China Agricultural University	14	1
	Aug	Comprehensive International Education Program (CIEP), TUA	23	3
		Oct	Comprehensive International Education Program (CIEP), TUA	23

- 5 TUA also regularly accepts a group of 15 students each from China Agricultural University (CAU) and Kasetsart University (KU) as part of the exchange program. Domestic program for the visiting students includes a field visit to Joetsu City, and one- or two-day organic farm practice in the Joetsu Organic Farm.
- 6 Advanced School of the Institute of Developing Economies (IDEAS), Japan, has a field visit in their curriculum, which is often conducted in Joetsu City, including an organic farm experience in the Joetsu Organic Farm.

These are mostly TUA's education and training programs, to which the Joetsu Organic Farm renders its service as the main venue. In addition, the Joetsu Tokyo Nodai, Inc. offers its own training program every year to two to three graduates who wish to study organic farming, by employing them on a contract basis for up to three years. From 2011, the Joetsu Organic Farm has been recognized by Japan International Cooperation Agency (JICA) as one of the training points for invited Nikkei trainees. One JICA Trainee from Cuba was actually accepted for six months organic farm training in 2012.

Production

The Joetsu Organic Farm has been a fully organically JAS-certified producer since 2009. Although the physical farm land area is a little more than 10 ha, the planted area has been increasing by (1) clearing the abandoned fields and (2) introducing a multiple-cropping system of pumpkin-buckwheat. As shown in Table 8, the planted area was 9.20 ha in 2009 but increased to 10.49 ha in 2010 and further increased to 12.77 ha in 2011. By 2012, nearly 15 ha were planted. The multiple-cropping system was newly introduced in the surrounding area where heavy snow remains usually from mid-December to mid-April. The main crops are rice, buckwheat, pumpkin, zucchini, and radish.

Table 8. Planted area (ha) by crop at the Joetsu Organic Farm, 2008-2011.

Produce	2008	2009	2010	2011
Rice	3.17	4.45	4.41	3.69
Potato	0.42	0.28	0.17	0.32
Sweet potato	0.78	0.41	0.17	0.05
Taro	0.00	0.00	0.15	0.10
Pumpkin	1.07	0.85	1.80	3.16
Zucchini	0.28	0.58	0.31	0.31
Radish	0.20	0.51	0.51	0.79
Buckwheat	1.00	1.67	2.76	4.04
Others	0.35	0.45	0.38	0.30
Total	7.27	9.2	10.49	12.77

However, average yields of most of the crops remain very low (Table 9). Our yields may be compared to the national average for some crops under conventional cultivation in 2011, as follows: Rice 2.52 tons against 5.32 tons (Joetsu City), Buckwheat 670kg against 570kg, Radish 38,240 pieces or estimated 30 tons against 42.8 tons, and Pumpkin 2,410 pieces or estimated 3 tons against 11.7 tons. It is clear that only buckwheat in the Joetsu Organic Farm recorded a higher yield than the national average of conventional cultivation, while rice yield was about half of the national average. The low

yield was due to low fertility of land and weed problem, for which the Joetsu Organic Farm has continuously been adopting improvement measures. It is clear that further improvements are needed.

Table 9. Average yield per hectare by crop at the Joetsu Organic Farm, 2008-2011.

Produce	Unit	2008	2009	2010	2011
Rice	tons	2.07	3.19	1.73	2.52
Potato	tons	4.70	9.95	3.41	9.42
Sweet potato	tons	5.32	8.59	1.47	2.75
Taro	tons	0.00	0.00	2.39	5.45
Pumpkin	pieces	2,180	1,120	2,130	2,410
Zucchini	pieces	14,830	26,090	30,600	11,980
Radish	pieces	20,000	40,100	39,270	38,240
Buckwheat	kg	500	180	600	670

Table10 shows changes in total sales of the Joetsu Tokyo Nodai, Inc. for the first four years. It is clear that total sales have been steadily increasing each year, due to the expansion of rice, vegetable and buckwheat production, as well as the introduction of processed foods and contract farming. In other words, the Joetsu Tokyo Nodai has been diversifying its business activities from dependence on fresh produce such as rice and vegetables by adding and expanding to the processed food business. In 2011, more than 22 million yen of goods and services was sold with the following shares of different commodities: Rice 24%, Vegetables 26%, Processed foods 16%, Training 10%, and Contract works 11%. Even though government subsidies could be added to this total sale, the company has constantly recorded a net loss and now faces a critical time for financial sustainability.

Table 10. Changes in total sales (1,000 yen) by the Joetsu Tokyo Nodai, 2008-2011.

Particulars	2008	2009	2010	2011
Rice	2,700	4,871	5,972	5,524
Vegetables (buckwheat)	2,800	4,660	3,833	5,874
Processed	-	-	2,028	3,693
Training	-	1,190	1,533	2,375
Contract works	-	373	1,762	2,415
Others	504	1,868	2,548	2,774
Total	6,084	12,962	17,666	22,655

Note: Financial year is from April to the following March.

Issues

Some issues for further development of this company can be summarized as follows. First, the rehabilitation of abandoned fields must be continued, as there is still a large area of unused formerly arable lands. Since Japan is a small country and a major food importer, it is necessary to make fuller use of available resources, and for a land-based business it is desirable to enlarge farm size. However, it is not very economical to work many scattered plots of small size especially in hilly and mountainous areas. The Joetsu Tokyo Nodai therefore has a dilemma, in that it looks for a block of

0.3 ha or so as a minimum size for a new area, but many abandoned fields are actually very small in size and fragmented.

Second, crop yield must be greatly raised in many cases. The building of soil fertility is a vitally important improvement. The quantity of compost can be increased, but additional expenses and income must be carefully calculated. Green manure is another option, but limited land area does not provide much scope for a fallow period and green manure planting. Land conditions, especially drainage condition, have been gradually improved, with the aim of removing poor-conditioned fields, which now account for nearly 20% of the entire fields. Increased production with a higher yield is considered economically more attainable than the expansion of farm size, which requires further payment of rental and water fees.

Third, commercialization of grade B products must be promoted. Due to strict market requirements for good size, color, and shape, farm products are carefully graded in Japan. In the case of pumpkin and zucchini, nearly one third of the total produce is categorized as grade B, which can only be sold at very low price or abandoned. The Joetsu Organic Farm began in 2010 to minimize this vegetable waste by carefully selecting and processing them into dried vegetables. In 2012, a cake manufacturer was newly added to a list of end-users for grade B pumpkins.

Fourth, general consumers seemed to have a limited knowledge of the various kinds of products available in the market. For the time being, there are at least four kinds of safe foods according to their certification: (1) Organic products, certified under the JAS law, (2) Specially grown products, certified by a Prefectural Government, (3) Eco-products, certified by a Prefectural Government, and (4) GAP products, certified by GAP organization. It is thus considered vitally important to inform consumers of the meaning and significance of organic products, since it is sometimes wrongly considered that pesticide-free products under the Specially Grown Products category are the safest food. In this sense, it is timely that the Basic Plan for Promoting Organic Agriculture (2007) clearly realized the need for promoting the understanding and interest of consumers, and mutual understanding among organic producers and consumers.

Fifth, the correct understanding of consumers about the nature of organic products is considered to benefit producers in more advantageous marketing. Producers of organic products expect a fair return to their time and expense in producing their products. Low yield alone indicates the higher costs of organic products, and thus higher prices, which can be considered as too expensive if consumers do not understand the nature of the products. Only those consumers who see the value of organic products in environment conservation and maintenance of health are willing to pay higher prices for these products.

Sixth and finally, the prospect of food processing must be mentioned. The Joetsu Organic Farm has been expanding into the food-processing business. Certainly consumers are willing to buy more foods, which are processed into a more convenient form, and therefore there is a good prospect. In fact, the Government has adopted a new strategy of “the sixth industry” in recent years, in order to promote integrated business activities of agricultural production, processing and marketing. The food processing business of the Joetsu Tokyo Nodai is certainly based on its own agricultural production, with the aim of further production of value added products. For the time being, however, the Joetsu Tokyo Nodai has no license for food processing and contracts with specialized and selected processors to produce their products. It is probably time for the company to have its own food processing plant.

CONCLUSION

The hilly and mountainous areas contribute about 40% to the entire agricultural sector in Japan, but agricultural decline has become very apparent in recent decades. There is a great need for revitalization of hill farming by adopting strategic approaches. This paper aimed to describe the serious problems facing hilly and mountainous farming as well as the current status of organic farming in Japan, and to present the case of Joetsu Tokyo Nodai, Inc. established in 2008 in order to deal with these problems. It is a challenge to establish a business model of sustainable farming in an unfavorable area, and may be termed “local condition specific strategy.” With the availability of clean snow melted water and a closed eco-system, the Tanihama-Kuwadori area in Joetsu is ecologically one of the best locations for organic farming. There is an expanding market for organic products in Japan. These two facts combined presented the local conditions for establishing and operating an organic farm. However, ecologically best does not necessarily mean technologically and economically best as well. Thus, the essence of the challenge is to establish ecologically sound and economically viable farming.

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