

ORGANIC FARMING FOR SUSTAINABLE AGRICULTURE IN ASIA WITH SPECIAL REFERENCE TO TAIWAN EXPERIENCE

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ABSTRACT

This Bulletin discusses recent trends and development in organic agriculture in the Asian region, with special focus on the case of Taiwan. In the last few years, organic agriculture has increased rapidly worldwide. The global organic food sale was estimated to be US\$26 billion in 2003. Japan has the third largest market for organic foods next to EU and the USA. In Asia, the total area under organic management was only 0.33 percent of that of the six continents of the world in 2001. However, it increased to 4 percent in 2004, a ten-fold increase in a period of three years. According to IFOAM (2003), land area under organic management in Asia was the largest in China (301,295 ha) followed by Indonesia (40,000 ha), Sri Lanka (15,215 ha), Japan (5,083 ha), Thailand (3,429 ha), Pakistan (2,009), Taiwan (1,092 ha), Republic of Korea (902 ha), and Malaysia (131 ha). Organic standard law is essential to ensure the quality of organic product. Recently, Japan revised its organic standard regulation into a strict legislated law, in which a penalty measure is added for violators of organic labeling regulations. Other Asian countries (China, India, Israel, Republic of Korea, Taiwan, and Thailand) also implemented their own organic regulations but have not yet legislated them into law. Malaysia has finalized its regulation, but have yet to fully implement it, while Indonesia and other Asian countries are either in the process of drafting regulations or no action has been taken at all on this matter. In Taiwan, the Council of Agriculture (COA) officially accredited three nongovernment organizations (NGOs) as Organic Food Certification Organizations. Until June 2003, a total of 1,092.4 ha of land was certified by these organizations to be organic farms to produce various organic foods (rice, vegetables, fruits, tea, and others). Import of organic foods mainly from Japan and USA is increasing in Taiwan in recent years. Imported and locally produced organic foods are sold in supermarkets, organic health food stores, and agribusiness scale chain stores and through e-commerce. Although Taiwan has its official organic standard promulgated in 2003, there is no penalty regulation for violators of the law on organic labeling, casting doubt among consumers on the reliability of organic products in the market.

Key words: Asia, organic farming, sustainable agriculture, organic certification and regulation

INTRODUCTION

Modern agriculture depends on high input of chemical fertilizer and pesticides for crop production. Although such technology-based agricultural practice has increased agricultural productivity and abundance, the resulting ecological and economical impacts have not always been positive. Environmental pollution and food safety due to chemical contamination have become a great concern worldwide. In order to cope with this problem, the Food and

Agriculture Organization (FAO) proposed "The World Food Summit Plan of Action (1999)" in recognition of the importance of developing alternative sustainable agriculture practices such as organic farming. The goal of the Action Plan was to reduce environmental degradation while creating income from the farming operation. Organic farming is an integrated farming system which involves both technical aspects (soil, agronomy, weed, and pest management) and economic aspects (input, output, and marketing) as well as human health.

Chemical-free safe foods produced from organic farms are widely welcomed by consumers around the world today, especially in North America, Europe, South America, Asia and Oceania. Due to the great global market demand, production of organic foods has increased rapidly in the past decades. According to Hanuman (2003) of the Organic Trade Association (OTA), US retail sale of organic foods and beverages, which has grown approximately 20-24 percent per year for the past 12 years, was estimated to have reached US\$11 billion in 2002, representing about 2 percent of the overall US retail food sales. The US market is expected to continue to grow, particularly after the full implementation of the national organic standards. According to estimates, the sale of organic products in North America and Europe will reach US\$105 billion in 2006.

Organic production is also becoming a booming industry in Asia and Oceania. The area of organic farm in Japan increased to 5,083 hectares, which produced organic foods at a value of US\$3.5 million in 2003. In Taiwan, the area of certified organic farm increased from 159.6 hectares in 1996 to 1,092.4 hectares in 2003. Australia has a total organic area of 10,500,000 hectares which is the largest in the world. In other Asian countries like China, Malaysia, the Philippines, Vietnam, Thailand and Indonesia, the area for organic farming is rising from year to year. There are strict organic certification laws in the US, EU, Australia and Japan, and each has its own official organic law which serves as the sole guideline for high quality organic production. Other Asian countries like China, India, Israel, Thailand and Taiwan have their own official versions of organic standards and rules, but have not yet been legislated into laws to include penalty for the violators. Other Asian countries such as Indonesia, Malaysia, the Philippines, and Singapore do not have organic standards yet (IFOAM 2003).

This paper aims to look into the present situation of global organic production and marketing, in general, and recent developments in organic farming in the Asian region, in particular, which includes Japan, China, Hong Kong, Republic of Korea, the Philippines, Thailand, Malaysia, Indonesia, and Vietnam. The Taiwan experience on organic production

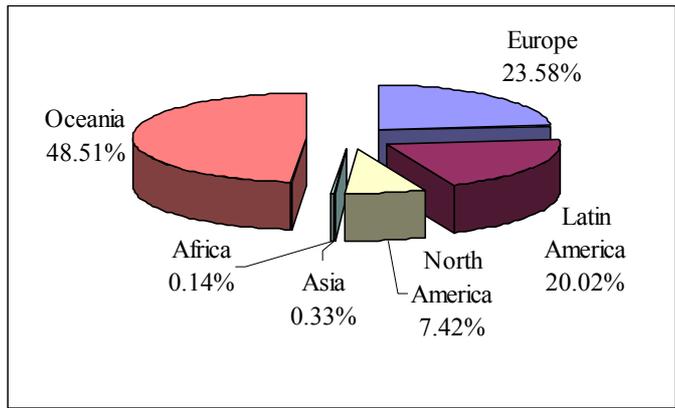
and marketing system is reviewed in more detail given the most recent available data. Positive and negative factors affecting the development of organic production and marketing in Asia such as the certification system are also discussed.

OVERVIEW OF GLOBAL ORGANIC FARMING

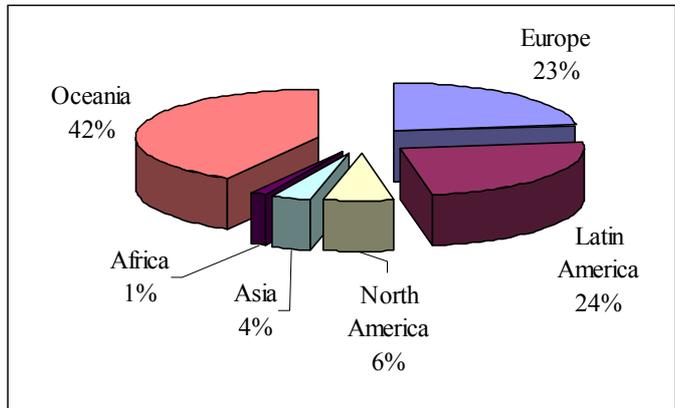
According to the SOL-Survey, Oceania had the largest share (48.51 percent) of total area under organic management in the world in 2001. The share decreased to 42 percent in 2004. This was due to the expansion of organic farming in Asia from 0.33 percent in 2001 to 4 percent in 2004, which is a ten-fold increase in three years. The farm area under organic management in Latin America was 20 percent in 2001 and increased to 24 percent in 2004, becoming the second largest organic area after Oceania. Europe shared 23.58 percent in 2001 and 23 percent in 2004, and remained to have the same share between the years 2001 (23.58 percent) and 2004 (23 percent), the third largest continent to grow organic products in the world. It was followed by North America, which shared 6 percent in 2004. It is worth noticing that Africa, which is a natural-resource poor continent, was increasing its operation of organic farms in recent years. The total area under organic management in Africa shared a small portion of 0.14 percent in 2001 and increased to 1 percent in 2004 (Fig. 1).

The ten countries with the largest land area under organic management in 2003 include: Australia (10,500,000 ha), Argentina (3,192,000 ha), Italy (1,230,000 ha), USA (950,000 ha), England (679,631 ha), Uruguay (678,481 ha), Germany (632,165 ha), Spain (485,079 ha), Canada (430,600 ha), and France (419,750 ha). The land under organic management in the world increased dramatically from year 2000 to 2003. The increase in organic farm in Australia contributed greatly to the large share of organic farm in Oceania (from 654,924 ha in 2000 to 10,500,000 ha in 2003). Uruguay became the world's sixth largest area with 678,481 hectares in 2004, pushing Austria out of the top ten countries (No. 9 in 2000) (Fig. 2).

According to the Organic Consumers' Association (2004), the world market for organic foods and beverages is the largest in the USA, with a retail sale of US\$11,000-13,000

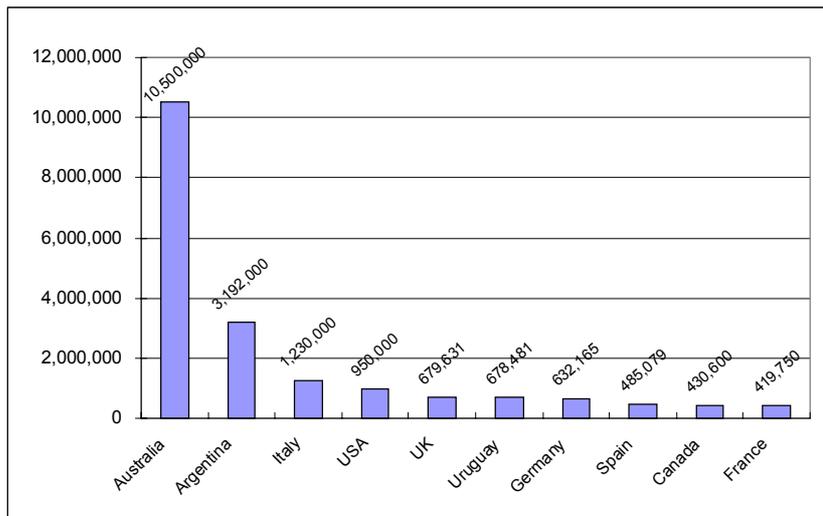


(Source: SOL-Survey, 2001)



Source: SOL-Survey, 2004

Fig. 1. A comparison of each continent's share of total area under organic management between 2001 and 2004.



Source: SOL-Survey, 2003

Fig. 2. Ten countries with the largest land area under organic management in 2003.

million in 2003. The annual growth is expected to be 0.5 percent. Europe has a retail sale of US\$10,000-11,000 million in 2003 with an expected annual growth of 10-15 percent in 2003-2005. Japan has a retail sale of US\$350-450 million in 2003 with an expected annual growth of 5-10 percent. Australia has the largest share of organic farm in the world; its organic products are mainly exported to Europe, USA, and Japan. It has US\$75-100 million retail sale within the country with an expected annual growth of 10-20 percent in 2003-2005. Global total retail sale in 2003 was estimated to be US\$23,000-25,000 (Table 1).

Organic agriculture is now established worldwide in many countries, regulated by local governments and nongovernment certification organizations. The international nongovernment organization, IFOAM (International Federation of Organic Agricultural Movements), plays an important role in pushing organic agriculture globally. IFOAM has 527 member organizations in 92 countries, including 58 in Germany, 22 in the US, 13 in Argentina, 5 in Austria, 4 in New Zealand, 12 in Israel, 1 in China, 1 in the Republic of Korea, and 1 in Taiwan. Europe and Japan are the main importers of organic products. The Japanese market for organic products has been more clearly defined, following the introduction of the country's new organic law in 2001. In the emerging economies of East Asia, the market for organic products appears to be not very significant. In most East Asian countries, there are no regulations governing the production and marketing of organic food. Although there may be some small opportunities for organic market in these countries, the lack of regulation leads the people to doubt the reliability of organic products in the markets.

ORGANIC PRODUCTION AND MARKETING IN THE UNITED STATES

Organic farming in the US was first initiated by farmers who sold organic products as early as 1940. The "Organic Farming Act of 1982" was first passed by the Congress to serve as the guideline for organic production. This law was later revised into a more detailed and strict regulation, the "Federal Organic Food Production Act of 1990." Under this law, the National Organic Standard Board was

established. The Board is responsible in implementing measures to assure that food products labeled as "organic foods" or "made with organic ingredients" meet the strict organic standard across the United States.

Because of these measures, organic farming becomes the fastest growing agricultural industry in the US with a growth rate of 20-25 percent every year since 1990. The sale of organic products in 2000 was US\$7.8 billion, with organic livestock products amounting to US\$618 million and organic processed products, US\$170.6 million. According to the National Foods Merchandiser (NFM), the total amount of sale of organic products in the US increased to US\$10 billion in 2003 (the Organic Consumers' Association estimate was US\$11-13 billion in 2003).

According to the Nutrition Business Journal (2000), fresh vegetables and fruits occupied the largest portion of the sale in the amount of US\$2,250 million, followed by nondairy organic drinks (US\$1,000 million), organic bread and cereals (US\$850), organic packaged food (US\$650 million), and organic dairy products (US\$500 millions) in 2000 (Fig. 3). They are sold at premium price of 8-200 percent over non-organic products (Table 2).

A rise in the number of organic processing facilities resulted to an increase in the variety of organic products available in the market. Almost every food category has an organic version: vegetable-protein products, cereal, meat, and juices have the largest selection among the processed organic foods. The main food categories for organic products in the US are vegetables, fruits, cereals, meats and dairy products. Organic dairy belongs to a large-growth category in the organic industry: its sales reached an estimated US\$24 million in the US in 1994 (Dunn 1995).

ORGANIC FARMING IN EUROPE

Since the beginning of the 1990s, organic farming has developed very rapidly in almost all European countries. At the beginning of 2001, in the 25 EU countries as well as in Bosnia, Herzegovina, Croatia and Yugoslavia, more than 3.7 million hectares of land were managed organically by more than 130,000 farms. This constituted almost 2 percent of Europe's agricultural area. In the European

Table 1. Overview of the world market for organic foods and beverages, 2003

Market	Retail sale, 2003 (million US\$)	Average annual growth, 2003-2005 (%)
USA	11,000-13000	0-5
Europe (Total)	10,000-11,000	10-15
Canada	650-1,000	5-10
Japan	350-450	5-10
Oceania	75-100	10-20
Total	23,000-25,000	

Source: Organic Consumers' Association, 2004.

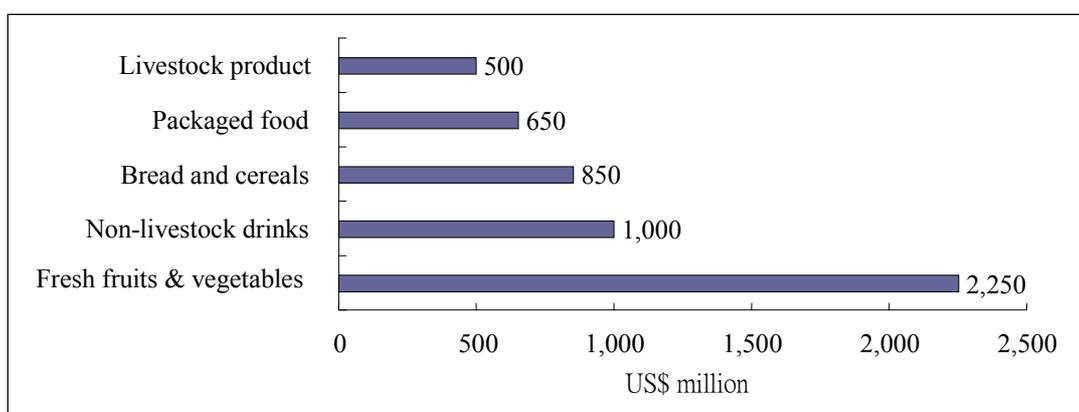


Fig. 3. Value of sales of five major organic foods in the USA, 2000.

Source: Nutrition Business Journal, 2000.

Table 2. Premium of organic over non-organic cereals and soybean price in the USA

	1995	1996	1997	1998	1999	2000	2001
	(%)						
Corn	35	43	73	88	98	89	59
Soybean	114	85	141	202	217	175	177
Wheat	54	59	73	8	87	103	94
Oats	35	59	73	83	77	71	41

*Numbers in the table indicate percent higher price rate of organic over non-organic products, 1995-2000.
Source: Bertramsen and Dobbs, 2002.

Union, between 1986 and 1996 the land under organic management grew annually by 30 percent. In Central and Eastern Europe, there is a rapid increase in the number of organic farms. In Austria almost 10 percent of the agricultural land is organic, while in Germany, it is 2.6 percent. In other countries, however, the market for organic products are still very small.

In 1991 the European Union (EU) passed Regulation 2092/91, which lays down in detail how food must be produced and packaged to qualify for the description "organic." However, it applied only to organic foods of vegetable origin. Standards for organic husbandry is still in the developmental stage (Wight 1997). All foods labeled "organic" must come from

processors or importers who are registered and subject to regular inspection. According to the EU Article 2092/91, organic food products may be imported from countries administering legislation equivalent to that of EU.

In Europe, Germany has the biggest market of US\$1,800 million, while Denmark and Sweden have a higher percentage of market growth (30-40 percent) (Table 3). Marketing channels differ from country to country. In Italy, 60 percent of organic foods are sold in organic stores. Forty-six percent of organic foods are sold in organic stores in Germany and France, while 90 percent are sold in conventional stores in Denmark and 74 percent in England. Ninety-six percent of organics are sold in organic stores in Netherlands. The price of organic foods is generally 20-100 percent higher than that of non-organics as shown in Table 4. EU imported a considerable amount of organic foods from USA, Canada, and Japan to meet the need of the consumers (Table 5).

ORGANIC FARMING IN ASIA AND OCEANIA

According to the SOL-Survey (2001), the total area under organic management in Asia shared only 0.33 percent of the six continents of the world in 2001. However, it increased to 4 percent in 2004, which is a ten-fold increase in three years. Oceania shared the largest portion of 48.51 percent in 2001, but it decreased to 41.8 percent in 2004 (Fig. 1). According to IFOAM (2003), land area under organic management was the largest in Australia (10,500,000 ha), followed by China (301,295 ha), New Zealand (63,438 ha), Indonesia (40,000 ha), Sri Lanka (15,215 ha), Japan (5,083 ha), Papua New Guinea (4,265 ha), Thailand (3,429 ha), Pakistan (2,009 ha), Taiwan (1,092 ha), Republic of Korea (902 ha), Fiji (200 ha), and Malaysia (131 ha). The percentage of organic area of the total agricultural area in Australia is 2.08 percent, and 1.93 percent in New Zealand. Other countries have less than 1 percent organic area of their total agricultural area (China 0.79%; Papua New Guinea, 0.49%; Japan, 0.1%; and Taiwan, 0.03%) (Table 6).

According to the Organic Consumers' Association (2004), Asian consumers are following the global trend of increased use of

organic products, but American, European, and Australian producers are getting the profits. High start up costs, hot climate, and shortage of reliable labeling schemes cause Asian organic farmers to struggle to grab a slice of the fast growing organic market. According to IFOAM (2004), the international market for organic food reached US\$20 billion in 2003, with Japan constituting nearly US\$3 billion, making it the third largest market for organic foods in the world after the EU and USA. Japanese organic farmers, however, worry that cheap "green food" based on organic imports from China might diminish the growth of Japanese organic agriculture.

According to the Organic Trade Association (OTA) (2004), Taiwan produced and traded US\$50 million worth of organic food, and Singapore, US\$3.5 million. Figures were unavailable for Hong Kong and Thailand, but the OTA has put them on its hot list of emerging organic markets where high start up costs and low yields for local farmers need to be solved.

China, Papua New Guinea, India, Sri Lanka, and the Philippines are catching up with the trend of organic farming. Oceania, which accounts for almost one half of the global organic farmland, has a market for organic foods estimated to be worth US\$190 million. Australia has a total of 10,500,000 hectares of organic farmland, while New Zealand has 63,438 hectares, and most of the organic food produced is exported.

Japan

Market size. Japan produced a total of 34,000 tons of organic foods in 2001, which increased to 47,000 tons in 2002. Until September 2003, a total of 4,396 farm households were engaged in organic farming in Japan (Kijima 2004). Japan has the biggest market for organic food in Asia. They called "organic" as "yuki" in Japanese. Yuki includes any product produced organically through organic farming or natural farming, or organically processed. The amount of yuki products was estimated to be US\$500 million in 1994 (Twyford Jones 1998). Since the mid-1980s, it has grown considerably at an annual rate of 20 percent. It is estimated that more than 300 organic products, including fresh organic fruits and vegetables, are available in the market today.

Table 3. The European market for organic products, 1997

Country	US\$ million	% of total food sales	Expected Growth* (%)	Expected growth* (US\$ million)
Germany	1,800	1.2	10	2,500
Italy	750	0.6	20	1,100
France	720	0.5	20-25	1,250
Belgium	620	-	-	-
England	450	0.4	25-30	900
Switzerland	350	2	20-30	700
Netherlands	350	1	15-20	600
Spain	320	-	-	-
Denmark	300	2.5	30-40	600
Finland	260	-	-	-
Austria	225	2	15	400
Sweden	110	0.6	30-40	400
Europe	6,255	-	-	8,450

Source: ITC, 1999.

* Estimate for year 2000.

Table 4. Price of organic foods in Europe

Country	Premium of organic foods over conventional foods (%)				
	Vegetables	Cereals	Milk	Potato	Fruit
Sweden	30-100	10-100	15-20	30-100	100
Denmark	20-50	0-20	20-30	20-50	50-100
Finland	94	64	31	78	-
England	30-100	-	20	-	-
Austria	-	20-30	25-30	50-100	-
Switzerland	40-80	40-50	10	50	50-60
Luxemburg	60	100	10	50	60
Germany	20-100	20-150	25-80	50-100	20-150
Belgium	40	50	30	40	50
Netherlands	20-50	37	98	33	26
Italy	50-220	125-175	20-50	70-130	50-100

Source: Von Ulrich Hamm and Johannes Micholsen, 2000.

Table 5. Ranking of import authorization by country into EU, 1995

Order of size	Country	No. of authorization	Percent
1	United States	109	24
2	Hungary	40	9
3	Turkey	38	8
4	Canada	29	6
5	Mexico	29	6
6	India	21	5
7	Brazil	15	3
8	Dominican Republic	14	3
9	Japan	12	3
10	Bolivia	10	3

Source: USDA, 1995.

Table 6. Organic farming in Asia and the Pacific*

Country	Arable and permanent crop land (1,000 ha)	Number of organic farms reported	Land area under organic management (ha)	Percent of total agricultural area (%)	Year of data
DEVELOPING COUNTRIES					
China	135,557	2,910	301,295	0.02	2001
Fiji	285	10	200	0.07	2000
India	169,700	5,661	41,000	0.03	2001
Indonesia	33,546	45,000	40,000	0.12	2001
Korea, Rep. of	1,919	1,237	902	0.05	1998
Lao PDR	958		150		2001
Malaysia	7,605	27	131		2001
Nepal	2,968	26	45	0.002	
Pakistan	21,960	405	2,009	0.01	2001
Philippines	10,050	500		0.02	2001
Sri Lanka	1,910	3,301	15,215	0.79	2001
Taiwan	3,601	941	1,092	0.03	2003
Thailand	18,000	940	3,429	0.02	2001
Vietnam	7,350	38	2	0.003	2001
DEVELOPED COUNTRIES					
Australia	50,600	1,380	10,500,000	2.08	2001
Japan	4,830		5,083	0.10	1999
New Zealand	3,280	983	63,438	1.93	2001
WORLD	1,497,365	398,804	22,811,267		

* Revised table based on the International Federation of Organic Agriculture Movements (IFOAM) *The World of Organic Agriculture 2003, 5th, revised edition, February 2003: Minou Yussefi und Helga Willer (Eds.)*.

Since September 2002, organic supermarkets and restaurants have emerged across the country, while foreign exporters of organic foods rushed to get their produce certified under the Japanese Standard Law, which came into effect in 2001 (Tim Large, Reuter, Tokyo, 05 April 2002, Taipei Times). It was estimated that organic produce imported from the USA totaled US\$100 million in 2002, of which those from the Washington state was about US\$10 million (USDA 2002). Organic produce imported into Japan through the Sumitomo Company and Nissho Iwai Company was mostly soybeans. Japan also imported some frozen fresh vegetables from the USA, New Zealand, and Canada. Organic black teas were from Latin America, and organic banana were imported from Mexico and the Philippines (trends in Japan 1996). Apart from consumer cooperatives, supermarket chains have been increasing their sales of organic products. The Tokyo-based Citizen's Association for Recycling Movement opened organic stores which attract 1,200 customers a day. Its operation is based on

door to door delivery service for an estimated 55,000 households across the country (Japan Times 1997).

Retail price of organic products are estimated to be, on average, 15-20 percent higher than non-organic products. Competition is increasing between the locally produced products and imported organic products, especially cheap "green food" from China. Europe and the United States are exporting much cheaper and better quality organic farm products to Japan. Some observers believe that organic imports will continue to increase in view of the increasing market demand (Japan Times 1997).

Organic law in Japan. The Ministry of Agriculture, Forestry and Fishery (MAFF) has for many years been implementing a program on organic farming. In 1992, MAFF promulgated a regulation called "Standard of Labeling Organic Products and Specially Produced Agricultural Products." However, the regulation was not welcomed by the consumers, because it did not provide a

reliable labeling system and caused a lot of confusion among consumers. It was then revised into the "Regulation for Labeling Standardized Agricultural and Forestry Commodity." This regulation was further revised in 1996 and 1997, and was classified into four kinds of more strict regulations, officially promulgated as the latest version of the organic law in 2000. These are the: 1) Agriculture and Forestry Regulation for Organic Products; 2) Accreditation Standard for Agricultural Production; 3) Japanese Standard of Processing Organic Products; and 4) Basic Standard for Accreditation of Organic Food Processors. The fourth one was again revised to be the "Standard for Organic Products and Specially Produced Agricultural Products," and was officially promulgated in 2001. The latest version of the organic law is very strict, and the certification organization and inspector must have the official license obtained according to the procedures stipulated in the law.

Only officially certified products can be labeled as "JAS Organic" for marketing. There is also a regulation on the labeling of imported organic foods. The law has a penalty regulation for fake organic foods. The producer of fake organic foods bearing "JAS Organic" label will be fined with a minimum sum of 500,000 Japanese Yen. Much higher amount (double the amount) of fine will be posted to the certification organization which issued fake certification to the fake organic product. Because of this strict law comparable to that of USA and EU, organic consumers gained confidence on organic foods in the Japanese market. This confidence led to increased organic consumption in Japan, at the present market volume of US\$3-4 billion. It is estimated that approximately 3-5 million people in Japan buy organic products regularly for health reasons.

Production and marketing of organic products by big companies.

1. The case of MOA International

The "natural farming" promoter MOA (Mokichi Okada Association International) which has 68 years of history, established a 60-ha experimental farm at Ohito, Sizuoka Prefecture. The technology of natural farming and "Natural Farming Standard" developed at

the experimental farm are transferred to the contracted farmers for application. The contracted "natural farms" serve as "satellite farms" to produce natural foods for MOA. The natural products (organic products) produced from the satellite farms are routinely collected at the MOA Narita Commodity Collection and Distribution Center located near Tokyo. The collected natural products are packed along with the "MOA natural food label." Some of these products are used as raw materials for processing into various types of natural foods, such as natural rice, natural tea, natural tofu, natural soy sauce, natural noodles, natural soybean milk, etc. The natural foods thus produced are then distributed to MOA's health chain stores scattered across the country. The market chain store network of MOA facilitates the exportation and importation of organic foods in Japan.

2. The case of Mizuho Sinsei Organic Agricultural Institute

This Institute is a part of the private Mizuho Food and Grain Company operating in a very similar way as the MOA to produce and market organic foods. The Institute is doing extension work for organic farming through its education program to its 2,000 members. The organic products (rice, vegetables, fruits, and tea) produced by these member farmers are collected, labeled, and sold as organic foods through the marketing section of Mizuho Company. The organic products are delivered to the consumers through its 100 chain stores. In turn, these chain stores distribute the organic foods directly to special fixed consumers by 140 cars every day.

3. The case of the "Tekei" system

The "Tekei" system is a producer-consumer partnership movement launched by the Japan Organic Association. Tekei refers to the concept of creating an alternative distribution system so as not to depend on the conventional market. It is basically a direct distribution system of organic products from the farm. To carry it out, the producers and the consumers should contact each other frequently to gain mutual understanding and trust in terms of product quality. Under this system, the delivery stations are set up to deliver the products to the nearest consumers.

The Japanese organic agriculture movement initiated this Tekei system to take care of both producers and consumers. Through this system, friendly and creative relationship between reliable organic producers and consumers is established. Organic foods are produced according to prearranged plans between the producers and consumers. Prices of organic products are set in the spirit of mutual benefits. According to the Japan Organic Agriculture Association, at present 500-1,000 consumer groups are connected with the Tekei system of operation across the country.

China

In China, organic food is known as “Green Food.” Green food is defined as uncontaminated, safe, high quality, and healthy food produced under a specific scheme of ecological agriculture. It is permitted to be sold under the label of “Green Food” after being certified by designated organizations (Liu 1999). In China, greenhouse vegetables grown under soil-less condition are also considered as green foods, because they are not exposed to any polluting substance (USDA 1997). According to the China Green Food Development Center, green food is similar to organic, natural or ecological food in Western countries (APFI 1997). In 1990, China created the Green Food Development Center (CGFDC) under the Ministry of Agriculture. In 1992, it was renamed as the China Green Food Development Center (CGFDC), which was accepted as a member of IFOAM in 1993.

Recently, a regulation entitled “Green Food Grading Standard” has been promulgated by the CGFDC. This regulation classifies green food into “A” and “AA” grades. “AA” grade green food refers to products produced according to international standard. It is targeted for international markets such as the US, Europe, and Japan. Meanwhile, “A” grade green food, which allows for the use of low level of chemicals, is aimed at the domestic market (Tang 1997).

In 1994, the State Environmental Protection Administration (SEPA) of China established the Organic Food Development Center (OFDC). OFDC then prepared a comprehensive set of “Organic Farming

Production and Food Processing Standards and Management Regulations” for labeling of organic foods. The standards cover crops, eggs and milk products, apiculture, mushrooms, sprout products, and wild plants collection; processing of organic products; distribution and sale; storage and packaging; inspection and auditing; air, irrigation and water quality used in production; and permissible and prohibited material for production and processing. OFDC is now responsible for inspection, certification, labeling, research, education, and training related to the development of organic food (FAO 2002).

Certified products include soybean, buckwheat, sesame, sunflower and pumpkin seeds, rice, walnut, pine nuts, tea, medical herbs, milk, and a few processed products such fruit juices and noodles (FAO 2002). Before 1999, more than 95 percent of the certified organic products of China were exported, mainly to Japan, EU, and USA (FAO 2002).

Production of green foods. Green food production which began in China in 1990 has developed rapidly since that time. By the end of 1995, a total of 568 kinds of green foods were developed. The first group of green foods has been categorized as fresh products without any industrial processing. They are fresh fruits, vegetables, rice, poultry, meat, eggs, fish, and tea. The second group belongs to the processed products from non-polluted raw materials, such as milk powder, milk products, and grape wines. In 1995, the amount of green foods produced in China reached 2.10 million tons, with an output value of RMB 10 million (China Daily 1997). By the end of 1996, a total of 742 kinds of green foods with a total output of 3.6 million tons at a value of US\$1.77 billion were produced. It was a 30 percent increase in comparison with that of 1995 (PSPFI 1997). At the end of 1997, China developed 892 green food products with a total output of 6.3 million tons (Liu 1999). It was estimated that a total of 135,557 hectares of lands were under organic management in 2002, which was 0.02 percent of the total agricultural area (Table 6). The government is targeting to increase the area of green food production to 1 percent of the cultivated area in the future.

According to the CGFDC, China is planning to build 19 additional green food

production bases in 10 major cities including Shanghai, Guanzhou, and Shennantang in the future. About half of the 40 most popular green foods are produced outside Shanghai. Many of these are from the Heilongjiang province in far northeast China, which is considered to be an unpolluted region. In 2002, the author visited the Shanghai Suqiao Modern Agricultural Development Area located in Pudong New Area, which primarily aims to develop green food production. The area is used for experiments in horticulture and aquaculture, as well as mass production of vegetables, flowers, fruits, and melons. Based on the author's observation, green food production in the area is quite different from the organic production methods used by Western countries.

Markets. Chinese consumers have now become aware of the benefits of green foods that may lead to future increases in demand, particularly in polluted cities. In these cities, concern about healthy foods is growing and profit for producing green foods is increasing (USDA 1997). According to a survey, more than 90 percent of consumers in Beijing and Shanghai buy green foods while 79-84 percent hope they can buy green foods. The demand for green food has been rising and is expected to reach US\$2.5 billion in the next few years (China Daily 1997). The great majority of green food is fresh vegetables, dairy products, and fresh live poultry or seafood. According to the CGFDC, the price premium for green food is generally around 10 percent. The "AA" grade's premium, in general, is 30-50 percent in China (Xu Dashan 1997). With its cheap labor and proximity to Japan, China may come to compete with the United States or Australia for the organic market in Japan and even in some markets in Europe. China has not yet formulated an IFOAM-based standard of organic production and marketing, therefore, the organic products need to be certified according to the law of the importing countries. This will hinder exportation of its organic products.

Hong Kong

Hong Kong has yet to formulate an official standard for certifying organic products. The Hong Kong Association of Organic Farmers was established to promote organic food

production and marketing. Because of limited land, only five organic farms with a total land area of 8 hectares are growing organic products. They produce seasonal vegetables such as spinach, lettuce and cabbages, as well as organic fruits such as banana and papaya. The Green Garden which is located in the vicinity of the city, serves as the place for people to experience green agriculture. The author visited the garden in 1998 to observe its actual operation. Seeds of vegetables and organic fertilizers are provided for the public to use for organic farming. There are no reliable statistics available on organic farming in Hong Kong. Locally produced fresh organic products and imported ones are available in the market. The organic products are sold through supermarket chains with 50-300 percent higher price than the conventional food. The sale of organic products is less than 5 percent of the total products sale (USDA 1996). Australia and Japan are supplying organic products to Hong Kong, in addition to mainland China.

Republic of Korea

Organic farming for sustainable agriculture gained increased attention in Korea over the last 20 years. The government has been encouraging farmers to adopt organic farming practices, either directly through financial incentives or indirectly through support for research and marketing initiatives. In 1994, subsidized loans were paid to farmers who were already operating organic farms, or planned to convert from conventional to organic farming (Chong 1999).

"The Act on Sustainable Agriculture" was passed in December 1997. The act recognizes the importance of research, extension, financial support, and market promotion activities for organic farming. In 1998, a total of 902 hectares of lands were under organic management, which occupied 0.05 percent of the total agricultural area (Table 6). Premium prices can be achieved at special organic markets, or by selling directly to consumers. In almost all cases, organic farmers receive higher income than conventional farmers. Organic lettuce and organic eggs get 50 percent premium price, while organic grape gets 287 percent premium price in Korea (Chong 1999).

Organic market in Korea is relatively small, but has grown rapidly over the past decades. In 2001, locally grown organic products (fruits, vegetables, and rice) accounted for only 0.2 percent of total agricultural production (Brehm 2002). Current import regulations are not very clear, so the Ministry of Agriculture (MAF) has developed a labeling program which indicates whether a product is organically grown or not. At present, imported organic products are mainly baby foods, infant formulas, and some health foods (Brehm 2002). Specific information on the size of the retail market for organic products is not available. However, it is expected that the market for processed organic foods (baby food, bread or flour) will grow dramatically in the next few years. About 55 percent of Korean consumers purchase organic products, as they are becoming more concerned about their health (Brehm 2002).

India

A comprehensive policy on organic farming has been proposed by the Ministry of Agriculture. The government promotes organic farming to emphasize the need to reduce the use of harmful chemicals on the farm. The government identifies progressive farmers to participate in organic farming training, and to help them form "Organic Farming Association" at the village level.

According to Mahale (2002), there are three types of organic farmers in India:

- Farmers who follow the old pattern of indigenous farming practice;
- Farmers who are practicing "biodynamic agriculture" or "natural farming" on their own small- and medium-sized lands; and
- Private companies engaged in large-scale organic farming for export.

India produces primary organic products (coffee, tea, spices, fruits, vegetables, cereals, as well as honey and cotton), and processed foods are limited. Organic husbandry, poultry, and fishery do not exist. Domestic organic markets and consumer awareness are underdeveloped in India, but interest is growing. On the domestic market, organic food is usually sold directly from farmers or through specialized shops and restaurants. At present, organic products receive a price premium of 20-

30 percent over conventional products (FAO 2002). India is an exporting country, mainly to Europe and USA, and does not import any organic products.

External certification bodies introduced inspection and certification program in 1989 (FAO 2002). The Indian Organic Standards were modeled on the IFOAM Basic Standards and the seal "India Organic" was established. In October 2001, the export of organic products was brought under government regulation, while import and the domestic market were not (Mahale 2002). India's first local organic certification body, "Indocert," was founded in March 2002. Indocert's aim is to provide reliable and affordable organic inspection and certification service to farmers, processors, and input dealers. It provides certification for the domestic and export market.

Thailand

His Majesty King Bhumipol of Thailand is very much concerned about the degrading environment caused by modern chemical-based agriculture. In order to solve the problem, the King launched a royal project for organic agriculture. The project included experiment and training at the Royal Chumburi Agricultural Youth Training Center and Royal Kao Hin Sorn Agricultural Research and Development Center. The author visited these two Centers to observe their research and training activities on natural farming in 1993. The farmers who received the training courses were expected to start their own organic farms. The efforts made by His Majesty King Bhumipol and government officials laid down the foundation for organic farming in Thailand (Hsieh 2000).

According to the Organic News Line No. 2 (2001), the Thai government launched an organic farm village in a bid to promote environment friendly agriculture in line with the call from the King. Under the project, subsidy and technical assistance were provided to selected farmers. According to IFOAM (2003), a total of 3,429 hectares of farm lands were under organic management in Thailand in 2001 (Table 6). They hoped that under the state support, more farmers (hopefully 30,000 small-scale farmers) will switch from conventional farming to alternative organic farming nationwide. Each province will select its own

village and submit its plan to get approval.

The government has also been helping farmers in finding domestic and foreign markets for their organic produce, and has made organic farming a national agricultural strategy. According to the Asian Times (2004), the government of Thailand launched a program of growing organic tea at Chiang Rai Province with the hope that Thailand will become one of the leading producers of organic tea to compete with China, India, and Taiwan. They plan to increase area of organic tea plantation from 5,600 hectares to 16,000 hectares within five years. Although Thailand has already implemented local organic standard (Table 7), an internationally recognized reliable organic certification system has yet to be implemented.

Singapore

There are several categories of health foods in Singapore: (1) organics which contain no preservatives such as additives and colorings; (2) natural foods which contain no preservatives; and (3) commercial health foods which may have been produced using pesticides and may contain preservatives such as low fat, low salt (USDA 1997). There is little information on guidelines pertaining to organic products.

Due to its limited land for organic production, Singapore has to rely on other countries for its organic products. It is a big importer of organic products and also serves as a trading center for organic products shipped to southeast Asia, the key markets being Malaysia, Thailand, and Indonesia. (Twyford-Jones and Doolan 1998). Health foods or organic foods are mostly imported from Australia, Japan, the United Kingdom, Switzerland, Italy, France, and the United States (USDA 1997).

A greater awareness of healthy eating in Singapore stimulates the people to spend more money to buy organic foods (fresh fruits, vegetables, and other organic products). This is due to: firstly, Singaporeans are well educated and more health conscious; secondly, people pay more attention to the quality of foods, and are willing to pay more to buy healthy foods; and thirdly, Singapore is becoming an aging nation and the rich aged population is paying more attention to health

foods, with the hope that eating health foods will prolong their life. Because of these factors, the consumption of organic foods which is usually limited to a "special group" is now expanding to the "general public." This situation helps to increase the market demand of organic foods in the Singaporean society.

Singapore is now one of the major importers and distributors of organic foods in Southeast Asia. New organic products in Southeast Asia usually appear first in Singapore, then to neighboring Malaysia, and then to the rest of southeast Asian countries. Price of organic foods in Singapore varies greatly. It may cost as high as three to five times in retail price in comparison with the conventional product, because almost all organic products are imported by means of air freight. The high air transportation fee plus high-priced organics from foreign countries contribute to the high price of organic foods in Singapore.

Malaysia

There is an increasing public concern about environment and food safety, but only a few people really know about the relationship between food safety and organic farming. A recent survey made by the Center for Environment Technology and Development (CETD) indicated that there is lack of information on what constitutes organic farming and where to obtain organic products (Quah 1999). There is very few organic training available for producers in Malaysia, and knowledge on organic farming comes from self learning. However, the CETD has lately been providing training on organic farming (Hashim 1997). There are only a few local organic farms (27 farms in 2001), including Malasiahey Penan Organic Farm, Premier Organic Produce Network of Organic Farms in Cameroon Highland and Sungkai, and the organic fruit plantation in Rompin. There is no official regulation and guideline available to monitor whether the products are really organically grown or not in Malaysia.

Organic products are sold directly from farms to dealers and consumers, and the market for organic food in Malaysia is still very small. Sixty percent of organic food in Malaysia is imported. Organic foods such as

Table 7. List of countries with organic regulations in Asia

Country	Fully implemented regulation	Finalized regulation; not yet fully implemented	In the process of drafting regulations
China	+		
India	+		
Indonesia			+
Israel	+		
Japan	+		
Lebanon	+		
Malaysia		+	
Philippines			+
South Korea	+		
Taiwan	+		
Thailand	+		

Source: The Organic Standard, Issue 11, March 2002.

spaghetti, flour, beans, bread, cakes, and ice cream are mostly imported from the USA and UK; import of organic foods from Australia has also increased. In the absence of an official organic regulation, dealers can use any name like “organic food,” “natural food,” or “safety food.” In order to get real organic products, consumers buy organic vegetables directly from the farm where they can see the actual operation of the organic production. In view of this situation, the Malaysian government now requires that all imported organic food should carry a reliable label of “certified organic” by the exporting countries.

Organic industry is too small and still has a long way to go in Malaysia. Only fresh vegetables and fruits are produced organically in small quantity. However, farmers can use the abundant farm wastes (sugarcane bagasse, coconut shells, etc.) for composting to be used in organic farming. Given the expanding organic markets in Malaysia, which reflect the world trend on health food, the country must be able to develop its own system of organic production and marketing. Malaysian version of organic regulation and standards should be developed. Government should have a clear-cut policy to develop its organic industry to catch up with the global trend of organic production and marketing.

Philippines

The Philippine organic industry, estimated at US\$5.2 million, appears to be relatively small, featuring mainly locally grown products that

are limited in variety. The promising news is that production is expanding by 10 to 20 percent annually. It is viewed that demand for organic products eventually will exceed the locally produced supply. Consumers are becoming aware of organic food and now have better access to them; the potential for growth in import is expected to increase. Since for most Filipino consumers, price is the deciding factor in buying food, the future of organic food rests on a niche market, mainly appealing to wealthier, well-traveled customers who have been influenced by the “healthy lifestyle” in advanced countries. Organic food sale may increase because of concern over food safety, environmental pollution, or health consideration by the people of the Philippines.

Indonesia

According to IFOAM (2003), Indonesia has a total of 40,000 hectares of land under organic management which occupies 0.12 percent of its total land area (Table 6). This figure gives an initial impression that Indonesia is a big modernized organic farming country in Asia. However, the real situation is that a large portion of Indonesia’s farmers, especially outside of Java, are counted as organic farmers simply because they do not use modern chemicals and are still practicing traditional, old method of farming until this time. This is due to the fact that they cannot afford to buy chemical fertilizers and pesticides (Down to Earth, No. 49 2001).

Public awareness of what “organic agriculture” means and consumer demand for organic crops are very low in Indonesia today. While the Board of Indonesian Organic Certification (BIOCert) has been set up recently by a nongovernment organization (NGO), there is no national certification or labeling scheme for organic food and also no regulation for labeling of GMO products. In Indonesia, the benefits of organic farming are understood by only a few who are concerned about food safety for their own health. With the efforts of NGOs and the government of Indonesia, people have become concerned about environment-friendly organic farming. For instance, the Ministry of Agriculture is now supporting researches on compost making, as well as on integrated pest management (IPM) and other related areas (Karama 1990).

Generally, farmers are reluctant to adopt new ideas of organic farming due to their belief that chemical agriculture is more productive than organic farming. Nevertheless, there is a small organic farming project by an NGO in Bogor. It started with a small piece of land growing organic vegetables with the use of modern organic farming technology. The organic products were sold by a cooperative type farmers’ group to a special group (NGO and housewives) through a direct delivery system. The goods were priced somewhat between that of traditional market and supermarket price.

One of the few shops was set up to sell organic products in Yogyakarta in 1997 by the Consortium of Fair Trade Company. The shop owners who return most profits to farmers, say that it is difficult to find people willing to pay higher price for organic produce. To catch up with the general global trend of organic development, the BIOCert was set up with a legal entity as an Association, to provide guarantee for organic process and products, to protect the interest of small-scale farmers, and to promote sustainable environment, equality, democracy, transparency, and accountability. It is hoped that BIOCert will stimulate the integration of organic farming and fair trade in Indonesia.

Vietnam

According to IFOAM (2003), only 2 hectares of land were under organic management by 38

farms in Vietnam in 2001. The proportion of organic land is only 0.003 percent of the total agricultural area (Table 6). The post-war country is struggling to enhance agricultural production by encouraging farmers to do modern chemical-oriented agriculture, and not specially emphasizing on low input sustainable agriculture or organic farming. The author visited agricultural research institutions in Vietnam in December 2003, and found that research institutions were engaged in many modern researches, such as gene transfer for crops and embryo transfer for animals. However, among those institutions he visited, there were no research activities related to low input sustainable agriculture or organic farming.

There is evidence that the Vietnamese government intends to limit additives in food imports, and has started to monitor imported foods against a published list of acceptable food additives and ingredients. With the vast area of agricultural land and natural resources for compost making, there is great opportunity for the people of Vietnam to develop modern-type organic farming.

ORGANIC FOOD CERTIFICATION IN ASIA

Modern technology-based agriculture often causes food safety problems, because harmful chemical residues are commonly found in the produced foods. Recently, a standardized analytical technique has been developed to detect such chemical residues in foods. A control measure for food safety is thus developed and adopted through food certification program in many countries of the world, especially in developed countries today. According to IFOAM (2003), about 60 countries worldwide have already implemented their systems of food certification according to their own regulations.

Organic certification system in Asia is relatively young. Japan has the most complete system of organic food certification in the region. Foreign organic foods must meet the Japanese standards of organic law before they are allowed to be imported into Japan. The “JAS Organic” label carrying certified locally produced organic foods can be exported to other countries without any problem. In Taiwan, the government organic standard was first published in 1999, revised in 2000, and again revised and officially promulgated as the

Organic Standard Law in 2003. The government accredited three NGOs as organic certification organizations in Taiwan. The organic label is given to certified organic foods.

In South Korea, the government has devised its own certification system; it does not worry about complying with international standards because certified organic foods are all consumed locally. China also had local certifying bodies but export products are still certified by foreign agencies. It is only Thailand whose certifying body (nongovernment) was recently accredited by the International Organization for Accreditation Services (IOSA). India, Sri Lanka, and the Philippines export some certified products but certification is done by foreign agencies. Meanwhile, initiatives are being done for the establishment of local certification system that includes group certification as a service to farmer organization (Briones 2004). In Asia, nine countries (China, Japan, India, Israel, South Korea, Lebanon, Taiwan, and Thailand) have their own organic certification standards by 2003. Malaysia has finalized its regulation, but has yet to fully implement it, while Indonesia and the Philippines are still in the process of drafting their regulations (Table 7). China, India, the Philippines, Thailand, Taiwan, and Malaysia are also working on organic legislation.

Aside from the organic guarantee, the high market growth in Japan, South Korea, and Taiwan is attributed to education and promotion. Campaigns being done by consumer organizations and environmental groups identify organic foods as an alternative for safe and healthy living.

TAIWAN EXPERIENCE IN ORGANIC PRODUCTION AND MARKETING

Area of organic farming

In the past decades, Taiwan's agriculture depended very much on the use of chemical fertilizers and pesticides which resulted to abundant food production. However, realizing the harmful effects of chemicals on the environment, clean or environment-friendly agriculture has been advocated by the government and private sectors in recent years. The government began to support researches

on chemical free organic farming to various research institutions starting from 1989. Research findings were presented at various seminars to emphasize the importance of organic farming to the human health and the rural economy.

With the development of the organic farming technology, the government in 1995 started to set up demonstration farms in various locations in Taiwan through its seven District Agricultural Improvement Stations. In 1987, the Taichung District Agricultural Improvement Station drafted a guideline for organic farming. At the same time, through the MOA International, Japan proposed its set of organic standard to Taiwan. The organic standard was revised several times since then. Because of efforts made by the government, the private sectors and the farmers, the area of organic farms increased steadily year after year. In 1996, a total of 159.6 hectares of land were certified to be under organic management. It increased to 396.5 hectares in 1997, a 100 percent increase in one year. It further increased to 1,092.4 hectares in 2003, which was 6.8-fold increase in comparison with that in 1996 (Table 8, Fig. 4). This accounted for 0.03 percent of the total agricultural land in Taiwan (Table 6). When multiple cropping on the same land was considered, the total harvested area for organic farming in 2002 reached 2,172 hectares. Organic rice production occupied the largest harvested area of 1,209 hectares, followed by vegetables (697.7 ha), fruit trees (188 ha), and tea (55 ha) (Table 9). The area of organic farming is expected to rise in the future, in view of the growing demand for organic products in Taiwan.

The Lu-Chou Organic Production and Marketing Team (LCOPMT). Among the many Organic Production and Marketing Teams (OPMT) in Taiwan, the operation of the Lu-Chou OPMT is considered a good example. Lu-Chou is a rural town near Taipei City. It is an excellent place to grow high quality vegetables for the populated city consumers. Under the guidance of the Taoyuan District Agricultural Improvement Station and Liu-kung Agricultural Production and Marketing Foundation, the OPMT was organized in 1985. The Team consisted of 10 members with a total land of 5.37 hectares, including 2.14 hectares of plastic houses.

Table 8. Area of farms under organic management in Taiwan Unit: ha

Year	Rice	Vegetables	Fruit trees	Tea	Others	Total
1996	61.50	26.10	67.00	5.00		159.60
1997	239.00	42.50	100.00	16.00		396.50
1998	302.00	98.00	156.00	22.00		579.00
1999	466.00	170.30	157.20	22.00	5.00	820.50
2000	596.27	153.76	208.70	36.50	17.30	1012.53
2001	493.39	171.19	159.00	55.61	18.72	897.91
2002	609.04	174.42	187.87	54.87	21.78	1018.97
2003	599.8	228.27	158.82	62.77	42.77	1092.43

Source: Council of Agriculture 2004.

Table 9. Yearly increase of harvested area (including multiple cropping) of organic farming in Taiwan Unit: ha

Year	Rice*	Vegetables**	Fruit trees	Tea	Others	Total
1996	186.5	104.4	67.0	5.0		362.9
1997	489.0	170.0	100.0	16.0		775.0
1998	682.0	392.0	156.0	22.0		1,252.0
1999	934.4	681.2	157.0	22.0	5.0	1,799.6
2000	1156.6	615.0	209.0	37.0	17.0	2,034.6
2001	981.1	684.8	159.0	56.0	19.0	1,899.9
2002	1,209.0	697.7	188.0	55.0	22.0	2,171.7

* Two cropping seasons per year.

**Estimated by farm size x 4 cropping seasons per year.

Source: Council of Agriculture

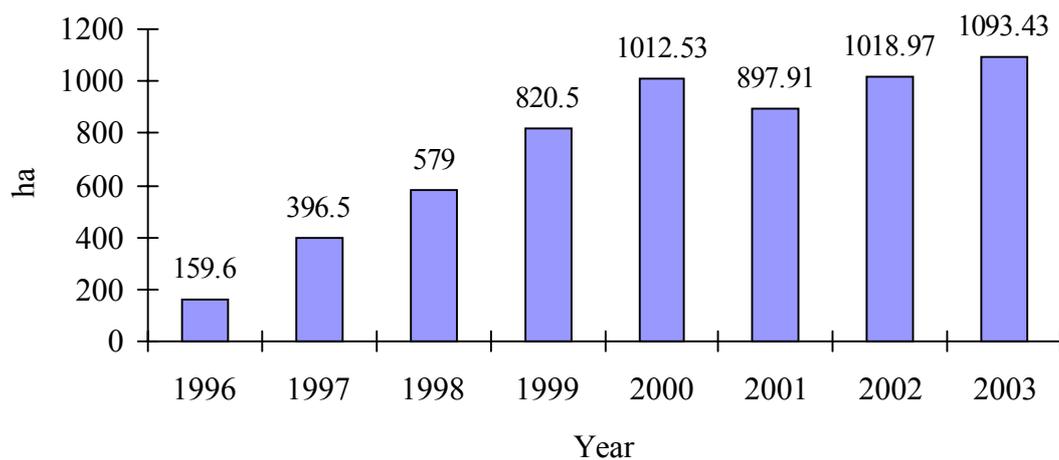


Fig. 4. Increase in area of certified organic farms in Taiwan.

The OPMT followed the government's organic standards, and emphasized on the application of only organic fertilizer and the practice of manual weeding and integrated pest management (IPM). To ensure the quality of vegetables, the Liu-kung Agricultural Production and Marketing Foundation routinely checked vegetables on the farm for chemical contamination. After additional tests on the harvested vegetables by the National Research Institute for Pesticides and Toxic Substances, a certificate of "Safe Vegetables" was issued to the Lu-Chou OPMT. The harvested "safe vegetables" are graded and packed with a certified label issued by the certification unit, and are stored in a cold storage room to keep their freshness. These are then supplied daily to supermarkets in Taipei City. This is a good example of production and direct marketing of safe organic vegetables to the consumers in the city. Operation of other organic farms followed suit.

Certification of organic foods in Taiwan

Organic standard and certification. Prior to 1988, organic farming was just in its initial stage and no organic standard was available yet. In 1993, organic standards were drafted based on the Japanese MOA International version, and endorsed by the Department of Agriculture and Forestry of the Taiwan Provincial Government. The Organic Standard was later revised by the Council of Agriculture (COA) of the Central Government into three rules in 1999 to include: (1) Basic Organic Agricultural Production Standards; (2) Guideline for Operation of Accreditation Organizations; and (3) Guideline for Setting-up Accreditation Team. An additional guideline entitled "Procedure for Application and Evaluation for Organic Certification Organizations" was promulgated in June 2000.

The above mentioned regulations were again revised with reference to the Federal Food Production Act 1990 of USA and the Organic Law of Japan (2000) to become: (1) Control Measure for Handling Organic Products; (2) Guidelines for Organic Production-Crops; (3) Guidelines for Organic Production-Livestock; and (4) Procedures for Evaluation of Organic Agricultural Product Accreditation

Organization. These were then officially promulgated by the COA in September 2003.

The newly published organic standards for crop production include soil management, integrated cultural practices (rotational cropping, mix cropping), selection of right varieties (disease and insect resistance), weed management, IPM (integrated pest management), materials that could be used (compost, boron meal, soybean meal, etc.), and materials that could not be used (chemical fertilizers, pesticides, herbicides, plant hormones, etc.). Rules on postharvest treatment of crops, and packing and marketing of organic products are also included. For livestock production, the origin of livestock and poultry to be raised, feed and feed additives, environment for raising animals, and marketing of livestock products are considered.

1. Organic certification

Both organic farms and organic home gardens are entitled to organic certification. Upon receiving an application for field certification, the certification unit will dispatch an inspector to conduct "On Site Inspection." When the field inspection is passed, the farm can be designated as "Transitional Organic Field." A certificate together with a farm label (plate) will be issued for posting on the farm. The certification is effective for 3 years, and can be renewed after the expiration of the term. If the certified farm did not follow the standards of organic farming, the certified document will be revoked.

2. Inspectors

The inspector shall not be a party to any transition involving the certified products. The inspector may not be an employee of /or have any financial interest in any company, which is a party to any transaction involving the certified products. In cases of suspected contamination, or following a request from the certification committee, the inspector shall have the right to unannounced visits, take samples, and require residue tests.

3. Labeling of organic products

For marketing of organic products, the farmers can apply for organic labels to the certification unit. When approved, they will be given certified organic labels which will be

pasted on the products. If the label is improperly used, the right of using the label will be revoked (Fig. 5).

Organic certification organization. The COA has accredited three private organizations to be the certifying organizations for organic products in Taiwan. They are: (1) Taiwan MOA International Foundation of Natural Ecology (2001); (2) Taiwan Organic Agriculture Foundation (TOAF) (2003); (3) Taiwan Organic Product Association (TOPA) (2003); and (3) Tse-Xin Organic Farming Foundation (TOAF) (2003). They are responsible for organic certification according to the Organic Food Production Regulations promulgated by the COA in 2003. Each authorized organization has its own trade mark (label) for its certified organic products. The MOA International Foundation of Ecology contributed the most in the organic certification. Organic rice certification occupied the largest proportion, followed by vegetables and fruits (Table 10).

1. Taiwan MOA International Foundation of Natural Ecology (MOA)

The Taiwan MOA International Foundation of Natural Ecology was established in 1990 in cooperation with the Mokichi Okada International Association (MOA) of Japan. It is a non-profit organization that advocates the ideology of loving nature and the environment for sustainable agriculture.

The 20-member board of trustees of the Foundation is from Taiwan as well as from Japan. The board members discuss the work and budget plan, and evaluate the results of executed projects at its semiannual board meetings in Taipei. The foundation is the first NGO accredited as an official “Organic Certification Organization” by the Council of Agriculture in Taiwan. The main works of the Foundation are:

- To help formulate the government version of the “National Standard of Organic Farming” with reference to its own “natural farming standard;”
- To carry out organic certification work at field and market levels according to the regulation stipulated in the national standard. In the first crop of 2004, a total of 393.52 hectares of organic farms were certified by this Foundation (Table 10);
- To organize various training courses and seminars to update the knowledge on organic production and marketing of inspectors and organic farmers;
- To organize organic field tours for the general public to let consumers see actual organic farming operation; and
- To organize various activities related to natural ecology preservation for the general public.

For detailed information please visit: <http://www.moa.org.tw/>.

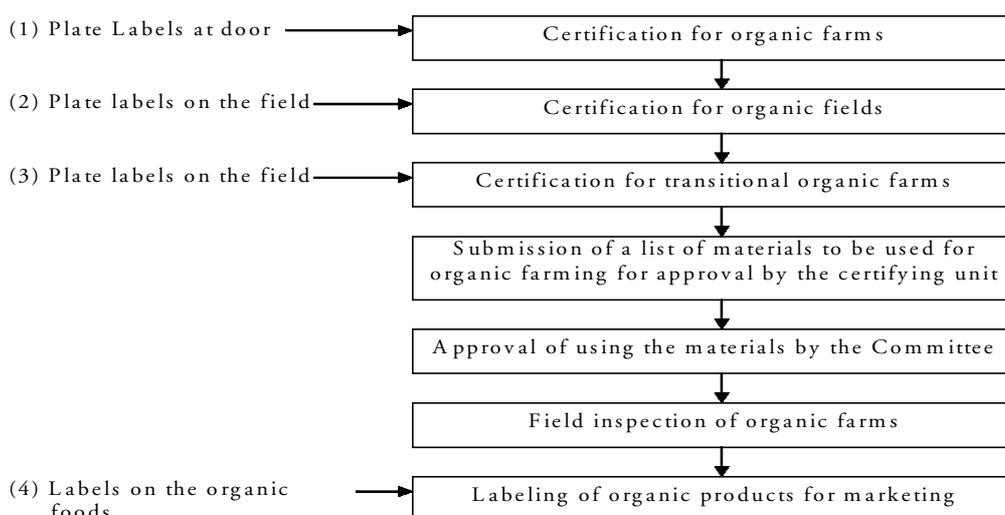


Fig. 5. Flow chart of organic food certification and labeling in Taiwan

2. Taiwan Organic Production Association (TOPA)

TOPA was established to transfer organic farming technologies to farmers, and to establish a reliable system of organic product certification. The main duties of the Association are more or less the same as that of Taiwan MOA. In order to promote organic farming, the Association conducted three field demonstrations and marketing of organic products in 1998. Under the financial support of COA, the Association also conducted six provincial-level organic farming show at different regions in 1999. Similar activities are organized every year until today. Under the support of COA, the Association has been developing biological pesticides for non-chemical control of crop pests. It also established the system of HACCP (Hazard Analysis Critical Control Point) to ensure that organic products are free from chemical contamination. The Association offers organic product certification service based on "The National Organic Standards." The members of the Organic Certification Committee consist of invited scholars from universities and research institutions as well as from governmental organizations. For detailed information, please visit: <http://www.topa.org.tw/>.

3. Tse-Xin Organic Agriculture Foundation (TOAF)

TOAF is a nonprofit NGO belonging to the Buddhist organization to promote eating health foods and executing organic certification. Members of the Foundation are mostly vegetarians, so they are very much concerned about the safety of vegetables and fruits. They established the Organic Agriculture Foundation under the name 'Tse-Xin' (meaning "kind

hearted") in 1997. The Foundation works closely with organic farmers and government units (Council of Agriculture, research institutions) as well as other NGOs for organic certification. The duties of the Foundation are:

- To receive farmer's application for organic certification and field inspection;
- To execute duties of organic farms and organic products certification according to government organic standard;
- To protect the lawful right for the member of the Foundation;
- To conduct survey, information collection, and data analysis for organic production and marketing;
- To transfer organic farming technology through training; and
- To promote organic food marketing through various activities.

For detailed information, please visit: <http://www.niu.edu.tw/toaf/index.htm>.

In addition to the above mentioned three accredited NGOs, the Formosa Organic Association (FOA) and the Chinese Organic Agriculture Association (COAA) are waiting to be officially accredited by the Council of Agriculture to execute organic certification (Table 10).

Marketing of organic products

Imported organic foods. With the rapid economic growth, people in Taiwan has become wealthier than before, so they can afford to spend more money to buy high quality foods such as organics. Under this situation, the demand for organic food has become greater in recent years. Locally produced organic foods are often not enough to meet the requirement of consumers.

Table 10. Area of certified organic farm in Taiwan (first crop of 2004) Unit: ha

Crops	MOA	TOAF	TOPA	COAA	FOA	Total
Rice	211.42	180.79	118.50	65.58	0	576.29
Vegetables	89.09	48.61	51.74	56.40	8.71	245.55
Fruit	50.93	39.30	33.33	26.40	2.70	152.66
Tea	37.19	1.30	20.47	6.15	0	65.11
Others	4.89	3.98	13.97	14.67	0.64	38.15
Total	393.52	325.95	238.01	169.20	12.06	1086.76

Source: Council of Agriculture, Taiwan ROC.

Importation of organic foods from foreign countries has become the solution. The main imported organic foods are vegetables (carrots, peppers, onions, potatoes, etc.) and fruits (apple, grapes, rape fruits, dates, and plums), cereals and pulses (rice, wheat, oats, and soybean), processed food (sunflower oil, olive oil, salad dressing, and spirulina), and beverage mostly from the USA and Japan (Table 11).

One of the largest organic companies in the world, the Organic World Company, which has 30 retail stores worldwide, act as the sole agent for Arrow Mills in Texas, Eden Food in Michigan, and Selt Herb and Shika Products in California. According to the Company, the most popular natural foods are organic grains and noodles followed by fresh organic fruit and vegetables. American products are the most popular among the imported products, but Japanese organic sauces and packaged products are also welcomed by the Taiwan market. As shown in Table 12, organic grains and noodles occupied 40 percent of the total organic sales, 90 percent of which were from the USA and 10 percent from Australia. Dried fruits and nuts occupied 21 percent of the total organic sale, of which 80 percent were locally produced and 20 percent were from the USA. Seventy percent of packaged foods were imported from the USA, followed by Japan (20%), France (5%), and Australia (5%). Taiwan food distribution channels are rapidly shifting toward modern outlets such as supermarkets, chain stores, convenient stores, and e-commerce. The old channels such as farmers' associations and traditional markets are declining.

Distribution of locally produced organic products. There were approximately 300 organic retail stores and groceries in Taiwan in 2002. However, it increased considerably to 643 in 2004, a two-fold increase in two years. The organic products are sold through health-food stores (432 units), farm-to-door direct sale (75 units), wholesale companies (73 units), and supermarkets (63 units) which are distributed all over the island of Taiwan (Table 13).

According to Chan (1998), 40.5 percent of organic vegetables in Taiwan are directly sold to the consumers. Five to six percent of organic vegetables were sold through organic stores in 1998, which increased to 37-63 percent in 2004. In 1998, 40 percent of organic

vegetables were directly sold to consumers while 39 percent were distributed through middle dealers, and 20.5 percent were through supermarkets, organic stores, and OPMT (Table 14, Fig. 6). The marketing channels have changed greatly since that time. The proportion of supermarket sale of organic food in cities jumped up from 8 percent in 1998 to 84 percent in cities and 16 percent in rural-based counties in 2004. The proportion of sale through organic stores was 5-6 percent in 1998, and increased to 37 percent in cities and 63 percent in counties (Table 15, Fig. 7). This indicates the remarkable shift from farm-to-door direct sale and through middle dealers, toward modern conventional stores and organic healthy stores nowadays.

In the USA, 20 percent of organic foods are sold through conventional stores during the period of 1991 and 1995 but jumped up to 50 percent in 2000. The amount of direct sale decreased from 30 percent in 1991-1995 to only less than 10 percent in 2000 (Fig. 8). This indicates that organic products are more popularly obtainable from conventional stores and supermarkets in the US. In Europe, organic foods are mainly sold in conventional stores (Denmark, 90%; England, 74%; Austria, 73%) and organic stores (Netherlands, 96%; Germany and France, 46%). Six to nineteen percent of organic foods are sold through direct sale by the farmers (Table 16).

There is a similar tendency of shifting from direct selling toward conventional and organic health stores especially in the cities of Taiwan, though not exactly in the same pattern as that in the USA. Organic foods seem to be more easily obtainable in many city supermarkets and county organic health stores in Taiwan. Farm-to-door direct selling is still much higher in rural-based counties, similar to that in the German organic market, because organics are mainly produced in the rural areas. The marketing behavior in Taiwan will certainly continue to change with changes in organic food supply situation and people's dietary habits and social changes.

Organic food distribution through Women's Environmental Protection League Foundation. In addition to the above mentioned channels, the Women's Environmental Protection League Foundation in Taipei and Kaohsiung plays an important role

Table11. List of US organic products imported by Taiwan from the Organic World Company

Fresh vegetables and herbs	Fruits	Cereals and pulses	Processed food	Beverage
Carrots	Apple	Rice	Olive oil	Herbal tea
Peppers	Grapes	Wild rice	Sunflower oil	Apple juices
Onions	Grape fruit	Durum wheat	Salad dressings	Various vegetable juices
Potatoes	Dates	Wheat flour	Miso	Red wine
Basil, oregano	Plums (dried)	Oats	Spirulina	White wine
Rosemary				
Thyme	Raisins	Soybeans	Dulse flakes	

Source: Gain Report # TW 0008 (38). Organic insight.

Table 12. Estimated organic food sales by Organic World Company in Taiwan, 1997

Product	Percent of total organic sales	Product source
Fruits & vegetables	10%	USA (90%), Taiwan (10%)
Dried fruits and nuts	21%	Taiwan (80%), USA (20%)
Drinks	15%	USA (70%), France (15%), Japan (15%)
Grains & noodles	40%	USA (90%), Australia (10%)
Sauces	10%	USA (70%), Japan (25%), Australia (5%)
Packaged foods	5%	USA (70%), Japan (20%), France (5%) Australia (5%)

Source: Trappey 1997.

in the coordinated distribution of organic foods in Taiwan. The League, which has 3,000 members, purchases a great amount of organic foods directly from the “contracted organic farms.” The “organic food label” carrying products are then delivered directly to the houses of Team Leaders of the League. The members of the team then get the organic foods at the nearby Team Leader’s home. In this way, the housewives can get the certified organic foods directly from the producers every day. Trust and confidence are built between producers and consumers under this system. The operation of this system is very much similar to the “Tekei” system in Japan (Japan Organic Agriculture Association 1993).

Organic food distribution through other channels

1. Gesp Organic Food Company

The Gesp Organic Food Company based in Kaohsiung collects organic products of seven

certified organic farms around Taiwan. This company sells all kinds of organic foods at its branch shops scattered across Taiwan. In addition to this, the company sells all kinds of imported organic foods including organic fruits, organic eggs, organic milk, etc. Daily supply and prices of organic foods are listed in their web site (<http://www.gesp.com.tw/>). The consumers can buy the organic foods directly from Gesp Organic Shops or order the products through e-commerce system. The organic foods are then delivered to the buyer’s home immediately through a fast home delivery transportation system. Examples of marketing information on the web are listed in Table 17.

Organic foods from the Gesp Organic Food Company are becoming more and more popular today. The company is certainly playing an important role in the marketing of locally produced and imported organic foods in Taiwan.

Table 13. Number of organic food distributors in Taiwan, 2004

City and county	Supermarket	Farm-to-door selling	Wholesale company	Health food stores and others	Total
Taipei city	40	-	12	34	86
Keelung city	1	-	1	7	9
Ilan county	2	6	4	22	34
Hualien county	3	2	-	13	18
Taitung county	1	2	1	6	10
Taoyuan county	2	17	7	31	57
Hsinchu county	-	2	4	15	21
Hsinchu city	1	2	-	21	24
Miaoli county	-	4	2	11	17
Taichung county	-	4	3	27	34
Taichung city	10	-	11	49	70
Chanhua county	-	9	3	27	39
Nantou county	-	4	6	13	23
Yunglin county	-	3	-	21	24
Chiayi county	-	2	1	4	7
Chiayi city	-	-	-	14	14
Tainan county	-	8	2	14	24
Tainan city	-	3	5	23	31
Kaohsiung county	1	-	2	17	20
Kaohsiung city	1	1	5	49	56
Pintung city	1	6	3	14	24
Penghu county	-	-	1	-	1
Total	63	75	73	432	643

Table 14. Marketing of organic vegetables through different channels in Taiwan, 1998
Unit: (%)

Category of vegetables	Direct selling	Supermarket	Organic stores	PMT* of farmers	Middle dealers	Total (%)
Leafy	33.1	13.7	5.1	3.8	44.3	100
Fruiting	51.6	9.5	6.2	13.5	19.2	100
Root-stem	36.9	0.7	5.5	3.3	53.6	100
Total	40.5	8.0	5.6	6.9	39.0	100

*Production and Marketing Team (PMT)

Source: Revised table from the partial data taken from the paper of Chan, Yih-Lang, Taiwan Agricultural Research Institute (1998).

Table 15. A comparison of the number and percentage of organic food distributors between city and county in Taiwan, 2004

City or county	Supermarket	Farm-to-door direct selling	Wholesale company	Health food stores and others	Total
City	53 (84%)	3 (4%)	29 (40%)	160 (37%)	245 (38%)
County	10 (16%)	72 (96%)	44 (60%)	272 (63%)	398 (62%)
Total	63 (100%)	75 (100%)	73 (100%)	432 (100%)	643 (100%)

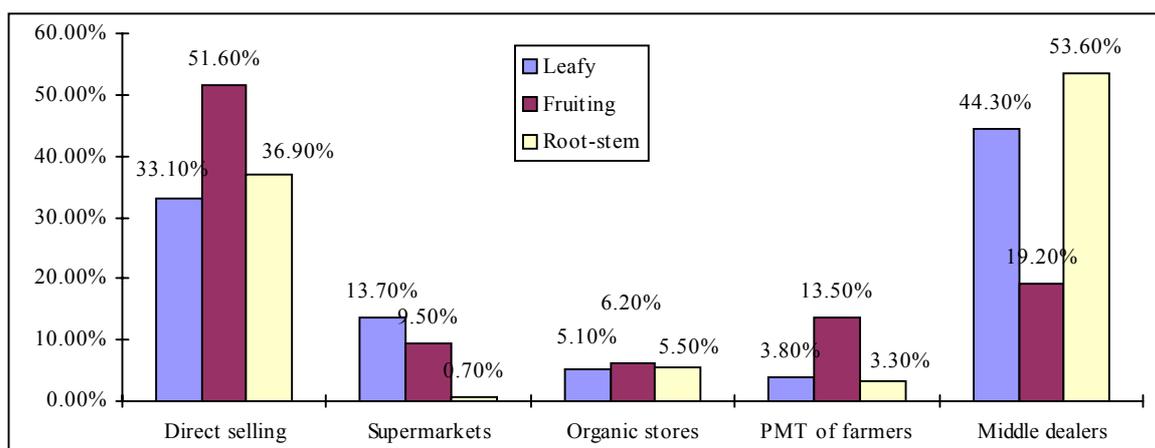


Fig. 6. A comparison of rate of different marketing channels for leafy, fruiting, and root and stem vegetables in Taiwan, 1998.

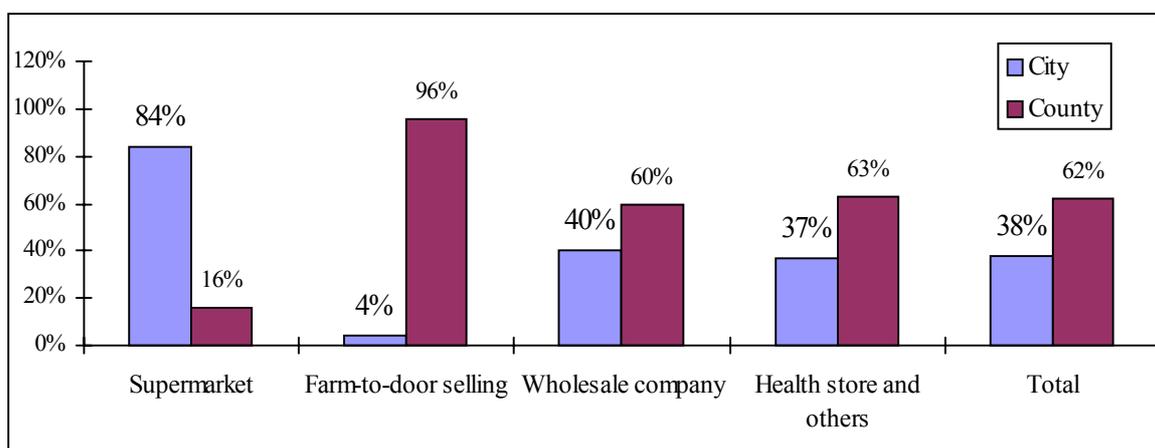


Fig. 7. Proportion of different channels of organic sales in Taiwan, 2004

Table 16. Marketing of organic foods through different channels in European countries

Countries	Conventional stores	Organic stores	Direct selling by farmers	Others	Total (%)
Italy	23	60	17	0	100
Germany	26	46	19	9	100
Austria	73	9	18	0	100
France	38	46	16	0	100
Denmark	90	2	8	0	100
England	74	15	6	5	100
Netherlands	2	96	1	1	100

2. Hsin-Yi-Fang Enterprise

The Hsin-Yi-Fang Enterprise has its own six organic farms with a total area of 10 hectares. The organic products are sent to the markets through three channels: (1) its chain stores in Taipei, Touyuan, and Tainan; (2) direct distribution of organic foods to the customers' homes through the firm's chain stores; and (3) wholesale to health stores and organic stores scattered all over Taiwan.

Pricing of organic vegetables according to marketing channels

Huang and Fang (2000) studied the marketing routes and pricing of organic vegetables in Taiwan. According to their studies, the price of vegetables varied greatly with the supply. Sixty three percent of the total organic products are sold indirectly with 30-100 percent higher price than that of conventionally produced products. Direct sale gets a higher profit than indirect sale. In the United States, organic foods get 35-200 percent premium price over non-organic foods (Table 2). The price of organic foods in European countries is also very high, especially in Italy where 50-200 percent premium is common for organic vegetables (Table 4).

CONCLUSION

Organic agriculture has rapidly developed worldwide during the last few years. The

Organic Consumers Association (2003) puts global organic food sale at US\$26 billion, which is expected to reach US\$80 billion in 2008. The EU and United States showed the highest market growth for organic markets. Japan has the third largest market for organic foods after EU and the USA (Yussefi and Willer 2003). High growth in organic market is also observed in Singapore, Hong Kong, India, Thailand, Republic of Korea, and Taiwan. However, these markets remain a small portion of the size of the Japanese market. In 2000, the market for organic foods including Chinese "green foods" in Asia was estimated at US\$ 2.5 billion. Recently, "green food" in China has been considered to be organic food. However, there is still no internationally accredited organic standards in China. Therefore, their organic certification relies on the importing country such as Japan and the USA. New standards for organic products with the "JAS Organic" label have been introduced by the Japanese Ministry of Agriculture and Forestry (since April 2001).

The market in Japan is reported to be growing rapidly, as consumers are becoming more concerned with their health and also with the environment. The introduction of clearer regulations under the "JAS Organic" label for organic products helps people to understand what organic food is. This contributed further to the growth in organic consumption in Japan. The Japanese market for certified organic food was US\$250 million worth in 2000 (Yussefi and

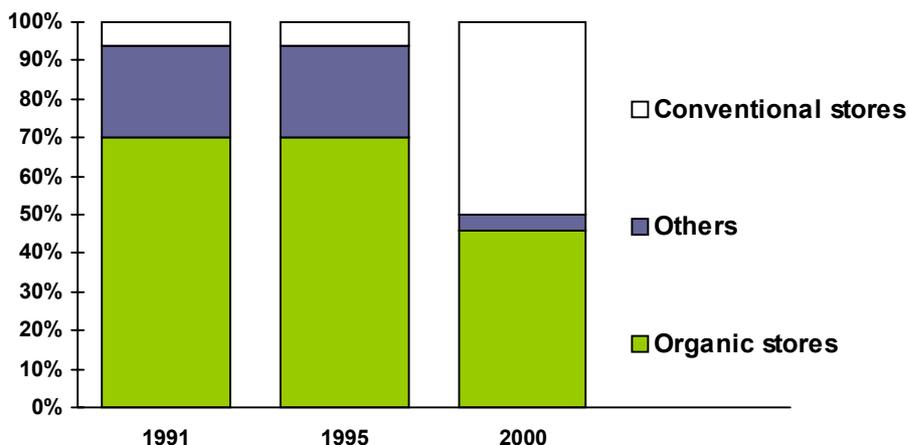


Fig. 8. Yearly change in proportion of organic foods sold in conventional and organic stores in the United States. (Note: "others" include direct sale and exportation).

Source: Natural Foods Merchandiser, Package Facts.

Table 17. Marketing prices of some organic foods in Taiwan (<http://www.gesp.com.tw/>)

Product No.	Item	Package content	Price (NT\$)
L01	Pea	1200 g	60
L02	Organic brown rice	3 kg	225
L06	Organic white rice	3 kg	250
L07	Organic faro, carrot	20 g	35
L08	Organic spinach	220 g	35
L10	Embryo attached organic rice	3 kg	240
L11	Rice noodle	220 g	32
L13	Organic oats	454 g	85
L14	Organic buckwheat	454 g	65
L15	Imported organic soybeans	600 g	55
L16	Red waxy rice	450 g	100
L18	Organic millet	450 g	100
L19	Organic wild rice	1800 g	210
L20	Sun flower seeds	1 l	120
L24	Organic seeds of jute	300 g	70
L25	Organic cereals	900 g	130

Willer 2003). The amount of retail sales of organic foods and beverages in Japan further increased to US\$350-450 million in 2003 as estimated by the Organic Consumer Association (2003), with the long-term potential being much greater (Yussefi and Willer 2003).

There are two streams of organic agriculture in Asia, one as part of sustainable farming and the other as export-oriented organic projects. The first is supported by NGOs, and the other initiated by the business sector. The sustainable agriculture movement emerged in the 1970s as an offshoot of the green revolution, while commercial organic farming is the product of commercial collaboration among Asian food exporting countries (Panyakul 2004). The organic enterprise model is seeking opportunity for exporting organic products to advanced countries. The MOA International natural farming enterprise in Japan and green food development enterprise in China, as well as the organic importing companies in Singapore and Taiwan belong to this category.

Due to their export orientation, private organic enterprises had to rely on foreign certification services from importing countries. Small-scale farms, on the other hand, are mainly targeted at the domestic market in most Asian countries. As the market expands, more and more small-scale farms will form themselves into Production and Marketing Team (PMT). This will enable them to enlarge the scale of

production and marketing in a cooperative way. These teams can therefore seek export opportunities while keeping the local market as their primary target. This type of organic farm production is very common in Taiwan (as the case of the Lu-Chou Organic Production and Marketing Team) and other Asian countries as mentioned in this paper. In this case, local competency has to be developed with assistance from the local government as well as from importing countries to establish local organic certification performance.

Countries in Asia have become more and more interested in organic farming in the last five years. However, even if the organic market has expanded, the major organic farming in Asia is still mainly targeted at local consumption. The development of public organic standards and inspection system will harmonize organic quarantine system and contribute to the growth of organic farming in Asia. Private partnership is urgently needed, if rapid growth is to be sustained.

Reorientation of government policies toward organic farming should be a priority in some Asian countries such as Indonesia, Vietnam, and Malaysia. This entails government support in terms of farm extension, post-harvest technology development, and marketing strategy of organic products. Public participation will ensure that organic production and marketing can be further enhanced in Asia.

Table 18. Partial list of retailers and groceries of organic foods in Taiwan

Taipei Region		
Weichuan Chung-Ching Ph: (02)23370705 Organic vegetables	Sung-Ching Supermarket Ph: (02)23370705 Organic vegetables	Hui-kang Supermarket Ph: (02)23370705 Organic vegetables
Chan-Jung Organic Shop Ph: (02) 27979178 Organic peaches,	Sogo Supermarket Ph: (02)27737924 Organic vegetables	Min-Yao Supermarket Ph: (02)27737924 Organic vegetables
Central Taiwan Region		
Organic World Ph: (04)22439195 Organic peaches	Li-Jen Tea Shop Taichung Branch I Ph: (040)6229175 Organic tea	Li-Jen Tea Shop Changhua Branch Ph: (04)3365599 Organic tea
Taichung Tea Shop Ph: (04)23281302 Organic tea	Li-Jen Tea Shop Taichung Branch II Ph: (04)24210446 Organic Oolong tea	Yi-Shiang Organic Tea Farm Ph: (049)2582285 Organic tea, organic peaches
Southern Taiwan Region		
Tainan Holiday Farm Ph: (06)2782441 Organic vegetables	Taisugar Honey Neighbor Shop Tatung Branch Ph: (06)2157625 Organic vegetables	Taisugar Huney Neighbor Shop tsung-Te Rod. Branch (I) Ph: (06)3353264 Organic vegetables
Mei-Touyi Ph: (06)2344349 Organic vegetable	Bu-Bo Garden Ph: (06)2042374 Organic vegetables	Kuan-Yuan Ph: (05)2866970 Organic vegetables
Kaoshiung and Pintung Region		
Pou-ling Shop Ph: (07)7266213 Organic vegetables	Luyeh Tzeun Shop Ph: (07)2368962 Organic vegetables	Fukang-li Ph: (07)7635175 Organic vegetables
Li-Jen Tea Shop Kaoshiung Branch ph: (07)3847892 organic tea	Yang-seng Ph: (07)7138730 Organic vegetables	Wu-chia Source of Energy Ph: (07)8123068 Organic vegetables
Eastern Region		
Ta-Ti Hotel Ph: (089)864330 Organic fruit (peaches)	Puti Organic Garden Ph: (089)325865 Organic fruits (peaches)	

In this paper, special emphasis was given to the Taiwan experience in organic farming. Taiwan has a 20-year history of organic farming. Presently, a total of 1,092.4 hectares of certified organic farms are in operation in Taiwan producing organic foods such as rice, tea, medicinal plants, vegetables, and fruits. The area of organic farm increased dramatically from 195.6 hectares in 1996 to 1,012.5 hectares in 2000. However, the area is not expanding and has remained at 1,092.4 hectares in 2004. Why has the local organic farming area ceased to expand considering that organic markets keep growing in Taiwan? This question must be given due consideration.

As imported organic foods continue to increase in Taiwan, there is now a keen competition between locally produced organics and the imported ones. The consumers are very much concerned about whether the so-called organics are really organically grown under the established standard. Unless sound trust between producers and consumers is mutually built, consumers will remain reluctant to buy organic foods in the market at a premium price. In this regard, the direct marketing of organic foods through the Women's Environmental Protection League Foundation in Taiwan and the "Tekei" system in Japan are considered to be good systems. Under these systems, mutual trust and confidence between producers and consumers are built.

Recently, consumers in Taiwan buy more imported organic foods mostly from Japan and the USA. The biggest organic chain store company "Green Little Town Co." based in Kaohsiung has 29 chain stores across Taiwan. The company is selling more than 800 kinds of organic foods including 40 kinds of locally produced ones. Most organics sold at the company are imported. The consumers seem to have more confidence with "USDA organic" or "JAS organic" labeled products. This is because they are certified with reliable "international standard" to ensure that the products are "real" organic foods. The consumers know that both the USA and Japanese organic law have penalty regulations for violators of the law, preventing producers and dealers from putting fake-labeled organic products in the market. However, this kind of organic penalty regulation is not included in

the newly promulgated organic law in Taiwan, so that consumers do not feel confident that locally produced organic products are really organically grown. The consumers tend to be biased toward "internationally certified organic products" than the "locally certified organic products". This situation will affect consumption of the locally produced organic foods. This is probably one of the reasons why the organic area in Taiwan has not expanded. The author believes that similar situation can happen in other Asian countries, unless proper measure is implemented. In order to protect consumers, the importing country must ensure that "real organic foods" are certified by reliable internationally accredited certification agencies. Fake-labeled organic food dealers should be heavily penalized. This is a very important measure to be taken, in view of the competition that exists between locally produced and imported organic products.

Further, it is interesting to note that Taiwan's retail stores for organic foods increased from 300 units in 2002 to 643 units in 2004, which is a two-fold increase in two years. This indicates the dynamics of organic market in Taiwan. Today 84 percent of organic foods are sold at supermarkets in cities and 16 percent at supermarkets in rural counties, while the rest is sold at organic health stores (Fig. 7). This means that organic foods are easily accessible in the conventional market, as is in the recent trend of organic sale in the USA (Fig. 8). It is hoped that organic production and marketing will further expand in Taiwan as well as in other Asian countries, with the establishment of reliable certification standards.

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