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Report on APEC Regional development of Organic agriculture in term of APEC Food system and Market access

APEC Agricultural and Technical Cooperation Working Group
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APEC regional development of organic agriculture in term of APEC food system and market access

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LIST OF ABBREVISTIONS

ACT	Alternative Agriculture Certification Thailand
AMS	Agricultural Marketing Service (Unites Department of Agriculture)
BSE	Bovine Spongiform Encephalopathy
CBD	Convention on Biological diversity
CBTF	Capacity Building Task Force on Trade, Environment and Development (a joint UNCTAD and UNEP initiative)
EPP	Environmentally Preferable Products
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FVO	Farm Verified Organic
GDP	Gross Domestic Product
GMO	genetically modified organisms
GTZ	German Organization for Technical Cooperation
IDB	Inter-American Development Bank
IAP	IFOAM Accreditation Program
IFAD	International Fund for Agricultural Development
IFOAM	International Federation of Organic Agriculture Movements1
IOAS	International Organic Accreditation Service
IMO	Institute for Market Economy
ISO 65	ISO/IEC Guide 65: 1996(E), General requirement for bodies operating product certification systems
ITC	International Trade Centre
ITF	International Task Force on Harmonization and Equivalence in Organic Agriculture (UNCTAD/FAO/IFOAM)

JAS	Japan Agriculture Standards (law)
NGO	non-governmental organization
NOP	National Organic Program (United States) OA organic agriculture
OECD	Organization for Economic Co-operation and Development
Organic	Organic Agriculture Information Management System (FAO)- AIMS
R&D	Research and Development
SOEL	Stiftung fuer Oecology und Landbau
TBT	The agreement on Technical Barriers to Trade (part of the WTO agreements)
TOAM	(United Republic of) Tanzania Organic Agriculture Movement
TRIPS	The agreement on Trade-Related Aspects of Intellectual Property Rights
UNCTAD	United Nations Conference on Trade and Development
UNDP-GEF	United Nations Development Program Global Environment Facility
UNEP	United National Environment Program
UNFCC	United Nations Framework Convention on Climate Change
USAID	United States Agency for International Development
USDA	United States Department of Agriculture

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REPORT ON APEC REGIONAL DEVELOPMENT OF ORGANIC AGRICULTURE IN TERM OF APEC FOOD SYSTEM AND MARKET ACCESS

1. INTRODUCTION

The population explosion during 1970s and 1980s forced many countries to change into the intensive plant and animal production systems in order to ensure their national food security.

In the APEC, the “Green revolution” has changed the economic figure of many developing APEC economies like China, Chinese Taipei and in Southeast Asia like Malaysia, Viet Nam, Indonesia and Philippines, this trend has also showed foremost development period of the agriculture in other developed APEC economies likes United States, Canada and Japan. The principles of “green revolution” or modern agriculture are to use high input of agro-chemical such as pesticides, herbicides and chemical fertilizers and new crop varieties developed for higher yield, to adapt better with different agro-ecosystems, and resistance to pests and diseases in order to increase productivities.

Recently, the modern agricultural system has showed several negative effects on human health and has caused environmental degradation. In some intensive systems, although the input remain and increasingly, the output trend to go down and. However, those systems still supply for about 98% of food demand for the world population in general and most of APEC economy in particular.

The Organic Agriculture has been developed largely as positive alternative measure for the intensive agriculture, which requires increasingly the investment and more and more harmful agro-chemical to human health and environment. In fact, the Organic Agriculture originally developed without any influence from the government for thousand years ago by the farmers in many countries in Southeast Asia and pacific region likes Viet Nam, Thailand, Indonesia and China, in which the crop had been cultivated by using the renewable materials from the backyards or the plant and animal products had been harvested from the nature.

The Modern Organic Agriculture can be described as “neo-traditional food system”, as it uses scientific investigation to improve traditional farming practices anchored in multi-cropping systems, food preservation and storage in natural condition and risk aversion strategies that have

traditionally secured local food needs. Nevertheless, organic agriculture is among the fastest growing agriculture segments and considers as the key issue for developing APEC economies to reach the millennium development goals.

With the establishment of the International Foundation of Organic Agriculture Movement in 1972, Organic Agriculture is no longer a phenomenon of the developed countries, it has been commercially practiced in 120 countries with about 31 million ha of certified cropland and pastures (about 0.7 percent of global agricultural land and an average of 4 percent in the European Union). Among those 6.2 million ha certified wild land, which is used for organic collection of bamboo shoots, wild berries, mushrooms and nuts. The market for organic foods and drinks was about US$ 40 billion in 2006 (about 2 percent of food retail in developed countries) and is estimated for more than US $100 billion in 2010 (Willer and Youssefi, 2007 and IFOAM).

In the mid 1980s, many countries in the world, and the APEC likes American, Australia, China, Republic of Korea and Japan developed a political support for organic agricultural production. Today, organic farming policies have been more and more influence on different aspects of the agriculture sector in APEC economies like United States, Canada, Australia, China, Japan, South Korea and recently in Chinese Taipei, Thailand, Indonesia, Philippines. The growth of organic farming in APEC economy during the last twenty-eight years has coincided and been influenced by the development of agricultural policy.

The long-standing experience of organic farming policies raise three questions, which this study attempts to answer:

(i) How the organic agricultural production can contribute to sustainable agriculture and improve the food system of the APEC Economy?

(ii) What are the key factors the developing APEC economy should be considered in order to improve the organic agriculture for better market access?

(iii) Does organic agricultural policy help the developing APEC Economy resolving the problem of poverty, environment degradation and impact of climate change?

This report consists of the following sections: After the introduction section, in which an overview of the project will be mentioned, the market for organic food in the world and APEC region will be summarized. In the fourth

section, the development tendencies of Organic Agriculture in some APEC economies will be synthesized The fifth section gives some impression on structural characteristics, the spatial dimension, and the organic agriculture policies of 8 APEC economies as representatives for different geographical areas of the Asia and Pacific. The reasons for policy support are also outlined, the certification system, agro-ecosystem and environment support are discussed, the recently approaches of organic farming policy in developing APEC Economy are mentioned in this section. A special section deals with the case study of organic agriculture in Viet Nam is presented. The final section summarizes the current development of the organic agriculture in the world in general and in APEC in particular. The recommendations are withdraw from the experiences, which are applicable within the APEC region and special recommendation to develop organic agricultural in Viet Nam. The orientations are given to policy makers in Viet Nam and developing APEC economies for developing organic agriculture as tools for fulfilling food security, food safety as well as the targets of the Millennium Development Goals.

1.1 Project initiation

The project responds to the 14th APEC Economic Leaders' Meeting under the theme of "TOWARDS A DYNAMIC COMMUNITY FOR SUSTAINABLE DEVELOPMENT AND PROSPERITY" in APEC 2006 in Ha Noi, Viet Nam. In the paragraph 20 of the section 2 of the meeting proceeding, The APEC Ministers also emphasized the importance of cooperation in developing and sharing new technologies in agriculture as follows: “We also took note of the importance of cooperation in developing, sharing and adapting the existing new technologies in agriculture, as well as mitigating the damage caused by natural disasters”.

The important role of food safety and high value food products has been recognized at the 9th APEC economic leaders' declaration “MEETING NEW CHALLENGES IN THE NEW CENTURY” in Shanghai, China on 21 October 2001. In the paragraph 18 of the meeting proceeding reaffirmed: “Noting that sustainable growth in the APEC region also requires the ability to feed a growing and increasingly prosperous population. Leaders call for accelerated implementation of the APEC Food System (AFS) initiative. Recognizing the benefits of biotechnology is to improve productivity, increasing nutrition, and reducing the environmental impact of agricultural production”.

Developing organic agriculture in the region will be considered as a new objective for APEC Food System. It not only solves the problem of food safety in the APEC but help also some developing member economy to improve the market assess and poverty reduction in the rural areas, where their livelihood relies heavily on agriculture, which is shifting from conventional agriculture to organic agriculture. To promote the organic agriculture policy, the developing APEC economies likes Viet Nam, Thailand, Indonesia, Malaysia, China, and the Philippines have to increase the supply sources of organic products and possibly to capture the attention of the consumers in some economical aspects, e.g. providing the organic agricultural products with cheaper price.

Poverty reduction and socio-economic stabilization in the rural areas through improving the agricultural cultivation systems are also mentioned as a key factors of ATCWG. In order to have a sustainable agricultural production and save our environment for the next generation, the organic agriculture is considered as the natural orientation for APEC economy in general and for the developing member economies in particular.

In the 3rd APEC DECLARATION FOR ACTION made in Osaka, Japan on November 19, 1995, the APEC Ministers recognized the importance of human resource development as well as agricultural technology and proclaimed that “because agriculture and the related industries are the most important sectors for many of APEC economies, their growth must take priority over others for both economic and social well-being”. In the paragraph 13 of the Section B of this document, the common policy for agricultural technology were defined: “APEC economies will seek to enhance the capability of agriculture and its related industries to contribute to economic growth and social well-being.”; “APEC economies will pursue economic and technical cooperation”.

1.2 Brief description of the project

Market opportunities for variety of agricultural products like "environmental preferable” products (EPPs) to be promising. In particular, consumer’s awareness on the safety of foods and quality, and the environmental effects of agriculture has generated greater demand for organic food, especially in developed countries. In the European Union, and the United States of America, the number of farmers practicing this production system and the number of consumers buying its food products have increased sharply during the last two decade. The top five organic producing countries are

Australia, Argentina, Italy, United Kingdom, USA and Germany. The organic sector at the beginning of the 21st century is broadly estimated to be worth USD 26 billion annually worldwide-in Europe USD 11 billion and in the USA 13 billion and generally the most rapidly growing agricultural sector, at anything between 15-30%. Retail sales in Asia are estimated to be in the USD 400-450 million in 2003 (OECD).

To a certain extent that producers in developing countries including Viet Nam, where traditional production methods have been applied, by which little or no chemical fertilizers and pesticides are used, will have more advantages than producers in developed countries in producing organic products. On the other hand, in several developed countries there is an increasing pressure for subsidies and other support measures. This emphasizes the important potential of economical, social and environmental benefits of organic agriculture in developing countries, especially the developing member economies of APEC. This implies that organic agriculture can help to increase productivity, improve and protect the environment, human health and ensure sustainable development as well as solve problem of poverty. The yield levels under organic management may be lower than those under intensive production systems, but higher than those under traditional management practices. Thus organic agriculture offers an opportunity, affordable to small-scale farmers in order to improve farm efficiency and profitability above levels achieved under traditional management.

However, for this new production field, we are facing great challenge of limited expertise and capacity. This challenge is also what Viet Nam has to face while integrating regionally and globally. Meanwhile, some other APEC member economies such as Australia, New Zealand and USA greatly succeeded in this field. Therefore, a seminar/symposium is needed to give Viet Nam and other developing APEC member economies chances to exchange information and expertise with a view to have more progress in organic agriculture.

1.3 Project objectives

To promote exchanging of information, experiences and expertise related to organic agriculture among governmental institutions and stakeholders at national and regional level.

For this objective a national workshop was organized in April 2008, in Hanoi, Viet Nam, in which the status, the development strategies and policy

support for organic agriculture in Viet Nam have been discussed. In July 2008, a regional workshop held in Hanoi with key speakers coming from New Zealand, Australia, Chinese Taipei, Thailand, China and Viet Nam and some other from APEC Member Economies like South Korea, Philippines (only sending the paper). In the workshops and, participants from APEC Member Economies have exchanged information, experience and expertise on organic agriculture through their survey/analysis, researches and studies.

The comprehensive policies at both national and international levels on agricultural production, food safety and trade policy will help Viet Nam and APEC Member Economies to derive larger economic, social and environmental benefits by increasing interest in organic agriculture. Additionally, multilateral understanding will be built among APEC economies with a view to develop organic agriculture strategies for food safety and rural development.

1.4 Key concepts

Organic food, **organic agriculture** (OA) is "a holistic production management system which promotes and enhances ago-ecosystem heath, including biodiversity, biological cycles, and soil biological activity. It emphasizes the use of management practices in preference to the use of off-farm inputs, taking into account that regional conditions require locally adapted systems. This is accomplished by using, where possible, agronomic, biological, and mechanical methods, as opposed to using synthetic, materials, to fulfil any specific function within the system" (FAO/WHO Codex Alimentarius Guidelines).

Organic agriculture is a form of agriculture, which avoids or largely excludes the use of synthetic fertilizers and pesticides, plant growth regulators, genetically modified organisms (GMOs), and livestock feed additives. As far as possible organic farmers rely on crop rotation, recycling of crop residues, animal manures and mechanical cultivation to maintain soil productivity and fit, to supply plant nutrients, and to control weeds, insects and other pests. Organic farming is also often associated with support for principles beyond agricultural practices, such as fair trade and environmental stewardship.

Increasingly, **organic farming** defined by formal standards regulating production methods, and in some cases, final output. An international

framework for organic farming was providing by IFOAM. Legislated standards establish at the national level, and vary from country to country. In recent years, many countries have legislated organic production, including the EU nations (1990s), Japan (2001), and the USA (2002). Codex approved guidelines for organic plant production in 1999, followed by guidelines for animal production in 2001.

2. STUDY METHODS

The key activity under this project is to analyze the current situation of organic agriculture in Viet Nam, and based on the data collection from some APEC member to give an overview on the historical development of Organic agriculture in developed APEC member as well as developing APEC member economies. Moreover, market development and opportunities for developing APEC member economies to export their organic agriculture products to the world markets have also been reviewed. The analysis was organized and implemented as follows:

Literature review and desk study

The current literatures available on the topic from different sources were gathered and reviewed.

National Workshop

All the stakeholders are involved in the early development of organic agriculture in Viet Nam including NGOs, the managers of the pilot projects and the governmental institutions. In the workshop the current situation and strategies for improvement and development of organic agriculture in Viet Nam were discussed.

Selection of representative APEC member economies for the study

A number of countries were selected for a more details in the development stages of organic agriculture on all concerning aspects such as agriculture policy, research, information channel and development of organic domestic and foreign markets.

Regional workshop

APEC regional workshop was held in Hanoi from 17 to 19 July, Viet Nam to gather inputs from APEC member economies for the study and to discuss on policy recommendations. The workshop involved major stakeholders, including representatives of local consumer organizations.

Preparation of draft report

The results of the general literature review, case study in Viet Nam and analysis of market opportunity and challenges outlined in a draft report. In the draft report the results of the regional workshop will be finalised and the collected literature on organic agriculture in the region will be synthesized.

Follow up activities

To design and implement the planned activities and call support from Government and NGOs to build up a national action plan on organic agriculture for Viet Nam.

3. MARKET FOR ORGANIC PRODUCTS IN THE WORLD AND APEC REGION

3.1 Markets for organic products in the world

The market for organic products has grown rapidly since 1990. Global sales were estimated to be around US$ 10 billion in 1997 and has increased to about US$36 billion in 2006. In the world market, the sales of organic foods and drinks in the period 1997 to 2004 has increased every year about 26.9% and has dramatically decreased in the period 2005-2006 with growth rate of 15%.

The biggest market for organic food and beverages is the EU, followed by United States of America and Japan. In 2007, it is estimated that the world market for organic products is Euro 33,5 billion (around US$ 48 billion), the market growth was estimated around 15% for USA and Japan market and about 7% for EU market in average (figure 1).

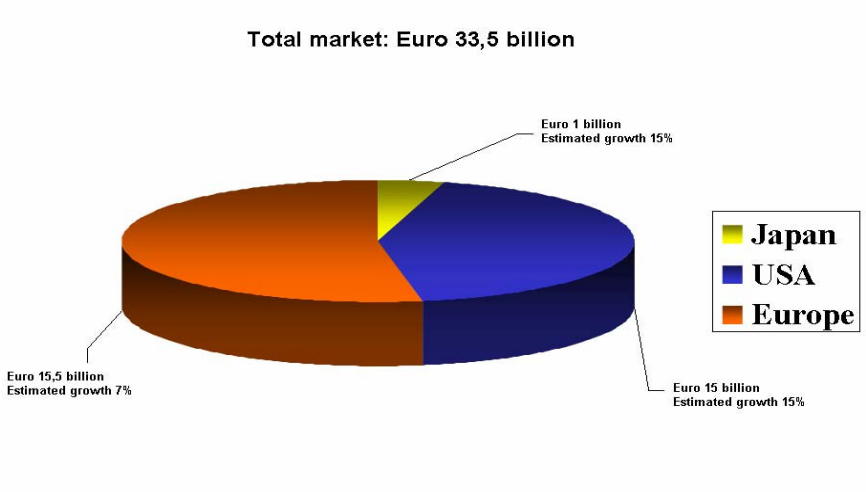

Figure 1. Organic market overview
(source: Joy Clack - The organic Corporation B.V.)

According to market prediction of IFOAM, in 2010 the market value for organic products may reach to US$ 61.3 billion or more. In some EU countries, the market share of organic products in Denmark, Sweden, Austria and Switzerland, of the total food sales may exceeds 4 % in 2010 compared to the current situation ranging from 2 to 3 %. While in the larger markets like Germany and USA, the market share may reach to 2 or 3 % compared to 2000 at level of 1.25 to 1.5 % respectively (Table. 1). In developing countries, organic market is still small, but gradually growing, especially in upper-income developing countries.

Table 1. The market share and market value in 2000 and the estimation in 2010.

Country	2000			2010	
	Retail sale 2000 (m. USD)	Market share (%)	Expected medium trend annual growth rate(%)	Retail sale 2010 (m. USD)	Expected medium trend annual growth rate(%)
Germany	2200-2400	1,25-1,5	10-15	5706-8900	10-15
UK	1000-1050	1,0	25-30	9313-13786	25-30
Italia	1000-1050	1,0	15-20	4046-6192	15-20
Prance	750-800	1,0	15-20	3034-4644	15-20
Switzerland	425-450	2,0-2,5	15-20	1719-2631	10-15
Denmark	350-375	2,5-3,0	10-15	908-1416	10-15
Austria	250-300	2,0	10-15	648-1011	10-15
Netherlands	225-275	0,75-1,0	10-20	584-1393	10-20
Sweden	125-150	1	20-25	774-1164	20-25
Other EU	300-400	-	-	778-1214	10-15
America	8000	1,5	15-20	32364-49534	15-20
Japan	300	-	15-20	778-1214	10-15
Australia	170	-	-	441-668	10-15
New Zealand	59	-	-	153-239	10-15
Argentina	20	-	-	52-81	10-15
China	12	-	-	31-49	10-15
Chinese Taipei	10	-	-	26-40	10-15
Philippines	6	-	-	16-24	10-15
Total	15202-15827	10	15-20	61.372-94.220	15-20

(*Source:* IFOAM)

The first organic markets developed in specialized health food shops and in other non-mainstream outlets. This has changed over the last 15 years, and normal supermarkets, as well as “organic supermarkets” (e.g. Whole Foods in the United States, Basic and Alnatura in Germany) in most countries from the Organization for Economic Cooperation and Development (OECD), sell organic products. The major retailers and food companies in OECD countries are involved in the organic sector. In most cases, organic producers have to meet the same competitive parameters as their conventional counterparts regarding prices, logistics and packaging. Because of the stringent organic standards, organic producers often have fewer problems adapting themselves to other demanding standards such as Global GAP. For example, traceability has already been part of the organic certification process for decades and is not perceived as a major obstacle to organic producers. The fact that no pesticides are used makes it easy to fulfil increasing demands that no pesticide is detected in products. Nevertheless, especially for small producers the demand for documentation and procedures in both organic and other systems can prove to be too demanding. In developed countries, there has lately been a move for more direct sales by small producers, something that has been supported by increased interest for local and regional food and discussions about “food miles”.

Organic is often considered as a solution in particular to small farmers. It is true that small farmers often have a production system that is closer to organic and therefore are often early adopters of organic production methods. However, as markets develop and the policy environment changes, large producers will also enter the market simultaneously with large food industries and multiple retailers. With them, the same pressures of competition will also be exerted on organic small farms as on their conventional counterparts.

Organic farms in Europe, originally small farms in marginal areas, are today more or less the same size as conventional farms (in some countries a little smaller, in others a little bigger than average). Therefore, organic should not be promoted mainly as a strategy for incorporating marginalized farmers in remote areas in the global markets. There are some aspects of organic farming that makes it particularly suited for small farms, such as low use of inputs, diversity in production system, etc.

The trend shows that the market for organic products seems to be affected by the present economic crisis. According to some importers, the prices

seem to be under pressure, in particular for some products and they are prepared to adjust their import programs accordingly. However, there was an important segment of hard-core organic consumers, how will continue to buy organic products. In general, consumers seem to be increasing awareness on environmental problems related to food production and handling products, therefore, fair trade products or kind of relative advantage to environment marketed as climate neutral are selling well.

3.2 Market for organic products in the APEC economies

As looking at the overall world market for organic products, the APEC economies like USA, Canada and Japan can consider as the biggest market for trade in organic products in the region and the growth market in Chinese Taipei, South Korea, Malaysia, and Russia likely to be the imported market of organic products. Meanwhile, the Australia and New Zealand are big organic producers and seem to be self-sufficient and oriented to export more than to import from other developing APEC economies.

From other point of view, the producers in some areas of developing APEC economies use traditional production methods with little or no input of chemical fertilizer and pesticides, that the advantages over producers in developed APEC economies in producing organic products, especially the products are not available like nuts, some tropical fruits and vegetables or off-season products. The demand or outpaces of domestic supply and increasingly market share of organic products to conventional products in developed APEC economies create new trade opportunity for developing APEC economies to export their organic products in the short-term and medium-term. This will enable small farmers in developing APEC economies to solve the problems of food security and earn more incomes to help to poverty reduction, while recovering the fertility of the land and increasing biodiversity as well as supply quality and saving foods to the local consumers.

To have market access to developed APEC economies, most of organic products from developing APEC economies need to be certified by the acceptant organic logo of importing market e.g. NOP from United States or JAS from Japan. In fact, the areas certified organic in developing APEC economies are less than 0.1 % of the total agricultural area see table 2

3.3 Market access and challenges

In many developing APEC economies, the price premiums are important incentives for many farmers to shift to organic production, although such premiums may fall when production increases. In several cases, price premiums may exist but be insufficient to render profit from organic production. However, when comparing profitability of organic agriculture with that of intensive agriculture, it is important to remember that market prices in general do not adequately reflect environmental costs and benefits.

To obtain a larger share of the organic market, producers and exporters in developing countries need to design appropriate marketing strategies, seek more direct link with retailers in importing countries through e-commerce and create partnerships. Fair-trade organizations also play an important role in helping small producers to benefit from trade including in the area of organic products.

In order to be able to take part in the organic market, organic standards need to be adhered to. The organic "guarantee system" assures consumers that the certified products are organically produced. The situation in many Asian countries where the personal guarantee of organic farmers are considering sufficient. This is common practice in small towns and villages across Asia. The producer's guarantee is also sufficient where there has been a mutual understanding between producers and consumers, such as in various versions of producer-consumer partnerships. However, for the anonymous market, certification is required as acceptable condition of the importing countries. For exporting countries, this means that they need to comply with several standards and certification systems. It is important to find a balance between the need for harmonization (trade and fair competition) and the need to take account of local and regional conditions and requirements. The Basic Standards, Codex Alimentarius Guidelines of the International Federation of Organic Agriculture Movements (IF0AM) as well as national standards in the European Union and the United States are reviewed with special attention to trade issues. According to the Codex Alimentarius Guidelines, the import requirements shall base on the principles of transparency and equivalence.

An important constraint to the conversion to organic agriculture was the lack of assured markets and price premiums. Certification costs, technical standards and sanitary and phytosanitary (SPS) requirements (applied to both conventional and organic products) may pose obstacles to export of

organic food products from developing countries. Furthermore, rapidly growing organic vegetable and fruit markets in developed countries tend to rely largely on locally produced food. Comprehensive policies need to put in place to promote imports of organic food from developing APEC economies. This includes, in particular, measures in the area of trade policy.

The authors propose several steps to reduce certification costs in developing APEC economies. Small countries often have a large problem in establishing the necessary infrastructure for national certification. Assistance from donors, as well as sharing the costs of certification with developed country partners, for example in the framework of fair-trade and development projects, may be the preferred option. In the other hand, for developing APEC economies with a relatively large organic potential, establishing national standards and developing a national certification system may be priorities. An important issue for developing APEC economies is also how to make certification more affordable for small producers, for example through group certification.

4. DEVELOPMENTS OF ORGANIC AGRICULTURE

4.1 APEC economies and Development of Organic Agriculture

The Asia-Pacific Economic Cooperation (APEC) established in 1989 through an initiative of Australia in the Conference of Economic and Trade Ministers held in Canberra, Australia started with 12 founders set up APEC for cooperation activities and economic dialogue in the Asia-Pacific region. Nowadays, APEC currently consists of 21 economies, which generate US $19,000 billions, accounting for 60 % of global GDP and the total trade value for about US $550,000 billions. APEC economies cover 52% of the world territory and represents 59% of the world population and 70% of the global natural resources.

In the APEC economies, organic farming area is estimated for around 16.5 million hectares. Agriculture land has been farmed organically, which accounts for 55% of the organic farming area of the world in 2006, out of which Australia has 12.3 million hectares, China has 2.3 million hectares, United States has 1.6 million hectares and the rest make up 0.3 million hectares (see table 2).

Table 2. Organically cultivated areas in some APEC economies in 2007

APEC economy	Organic agricultural land (Ha)	Share of cultivation Land (%)	Organic farms
Australia	12.294.290	2,8	1.550
Canada	604.404	0,9	3.571
Chile	9.464	0,06	1.000
China	2.300.000	0,4	1.600
Indonesia	41.431	0,1	23.608
Japan	6.074	0,2	2.258
Republic of Korea	8.559	0,5	7.167
Malaysia	1.000	0,01	50
Mexico	404.118	0,4	126.000
Russian	3.192	0,00	8
Chinese Taipei	1.746	0,2	905
Peru	121.677	0,6	31.530
Philippines	5691	0,05	no data
Thailand	21.701	0,1	2.498
United States	1.620.351	0,5	8.493
Viet Nam	21.867	0,2	no data

In developed APEC economies, the arable land certified organic ranging between 1 to 3 % of the total agricultural production areas. In the United States of America, only 0.2 % of the total agricultural production certified organic production. In most developing APEC economies, the areas devoted to certified organic production is around 0.1 % or less of the total agriculture area.

Recently, Organic Agriculture has developed steadily across Asian-pacific countries. The area under organic management were estimated for more than 4.1 million ha accounting for 13 % of the world in 2006. Additionally, more than 6.4 million hectares certified as forest and “wild harvested areas”. Except Australia with more than 12 million hectares, mainly certified wild grass land for animal husbandry, the largest organic cultivation area is in China and Russia,. China has the world’s second largest of organic certified

land with 1 million ha for crops and other1.3 million ha for animal husbandry and 2.1 million ha for wild collection. In Asia-pacific, there are some 130.000 other organic farms, representing one fifth of the world's organic farms.

4.2 Development of Organic Agriculture in Malaysia

Malaysia agriculture production consists of commodity crops, rice, fruits, vegetables and livestock for domestic and export market. The main exporting crops include oil palm, rubber, cocoa, pineapple and pepper. The production area covers three quarters of the cultivated land and is divided into two production types namely self-employed smallholders and plantations. The green revolution has been promoted with infrastructure and technical support to smallholders to increase yield and income. The government encourage changing to higher value crops, but for rice, this will be maintained under paddy because of domestic rice self-sufficiency policy targeted on 65% of the national consumptions.

NGOs and the private sector were the two main organic development initiatives, NGOs has started to develop organic agriculture in Malaysia in the 1980s and in the early 1990s a number of pioneer organic production started and during those period the consumers demand also organic products. In early 1985, the selected organic products had been imported and retailed in Kuala Lumpur, but until the 1990s regular importation of organic products was organized. Nowadays, Country farm has been the biggest importer and retailer of organic products in Malaysia.

In 1995, a major breakthrough came with the conversion of a number of commercial vegetable producers. The products were distributed through a subscription system, where the subscribers paid a fix price in advance for their weekly pack of vegetables and distribution was covered several major cities in Malaysia with more then 500 families. The Malaysian organic sector is a growing niche sector and production mainly undertaken by the professional operators. The early NGOs initiative models are now largely taken by the small and medium-size market entrepreneurs

In 2001, the Department of Agriculture (DoA) reported total organically cultivation of 131 hectares with 27 organic producers involved, which was five times higher than the early organic producers listed by the NGO in 1996. DoA has also estimated that the organic farm land will increased to about 900 hectares and market valued for about US$ 10 million a year.

Malaysia is a net importer of food products with value of US$ 3.4 billion in 2003. There is no market statistics data available. In 2004, market turnover was estimated for about US$ 14 million and continuously growth. Imported products comprise the large portion of organic grains, pasta, juices, cereals, beverages, fruits and vegetables sold in the country. Fresh products are imported from Australia and New Zeal and some are from Thailand and China. The processed products are imported from United States and EU.

In 2001, the Organic Alliance Malaysian (OAM) was founded and currently has more than 30 members, most of them are importers and retailers. Beside OAM, there are two other groups.

In August 2001, the Malaysian Standards for production, processing, labeling and marketing of plant based organically produced food (MS1529) was approved and published by the Department of Standards Malaysia. MS1529 was developed based on the three major references (i) FAO/WHO Codex Guideline for the Production, processing, labeling and marketing of organically produced foods; (ii) IFOAM Basis Standards and (iii) Concepts, Principles and Basis Standards of Organic Agriculture of Indian Standards Committee.

In August 2002, the government established certification program, Skim Organic Malaysia (SOM) with in the framework of the organic standards finalized by DoA. Registration for certification currently covers only primary crop production.

In July 2003, the management system was changed and the certification scheme for domestic market will be implemented on a voluntary basis. The DoA is expanding the scope from primarily production to whole process covering processing, repacking and retailing.

Currently, there is no organic regulation or labeling regulation in Malaysia, the operators are certified by foreign certification bodies working in the region, but most farms, processors, wholesalers and retailers are not certified. The imported products are sold as finished certified packed products

The National Agriculture Policy (NAP) identified organic as a niche market opportunity, particularly for fruits and vegetables and as plans to encourage small-scale producers to invest in organic farming to increase their income and overcome the problem of chemical residues in food and protect environment. Setting up an accreditation scheme to facilitate domestic market is also included in the NAP.

In the eighth Malaysia Plan from 2001 to 2005, the government tried to increase organic production area to 250 ha with support for infrastructure improvement like farm road, irrigation system, electricity and water supply for US$ 1,300 per hectares. The organic producers are also having assessed to the eligible credit scheme and special loans for agriculture enterprises. Under the Ninth Malaysia Plan from 2006 to 2010, the government targeted the organic farming reach the market value for US$ 200 million, plan to have organic production area of 20,000 ha by year 2010, increasing the local production by 4,000 hectares per year and organic consumption expected to grow by 20% per year. The government support for organic agriculture like research, extension and promotion is not open for private sector involvement.

Organic agriculture is young growing sector in Malaysia, it is lack of the sector organization aspects and partly constrained by absent of support services like research and training and a platform to provide clear sector leadership and direction.

Although, the market premium are high, but the farm conversion is still low due to the risk and high cost of conversion. The current technical development is largely dependent on the producers" initiatives and self-learning from practical experiences. Many farmers are reluctant to invest time and resources to soil improvement due to insecurity of the land tenure

The MS1529 has no impact on the Malaysian organic industry. The producers and market players are concerned about the lack of transparency and efficiency in the process and the sector concerned about the mandatory labeling regulations that would be premature for sector development. Therefore, to develop organic sector in Malaysia, many activities need to be conducted mainly in the research and extension on the product development and private sector standards and certification.

4.3 Development of organic agriculture in Chile

Organic Agriculture started in Chile in the early 1980s in the same time with operation of the organic product systems by small farmers. With growing in agriculture export, Chile has also produce a wide range of products due to favorable agro-ecological conditions in the early 1990s, this allows Chile to supply for big market in the Northern Hemisphere.

NGOs were the pioneers in promoting organic agriculture in Chile through several sustainable development programs. These programs were

initiatives to self-sufficiency of food in the rural areas. The government did not consider organic agriculture as an important activity, but only as an appropriate cultivation for small farmers. Therefore, no policies support the organic sector during the 1980s and 1990s. The first policies were implemented when the areas under organic cultivation and demand on exported organic products is increased. The different stakeholders were established and the private sectors started to organize themselves.

In 1999, a new committee was established to develop the Chilean norm on the requirements for certification bodies of organic products and the Chilean Organic Association (AAOCH) was established to promote the organic sector development in Chile. AAOCH has about 90 members including farmers, certifiers, traders, consulters, students, professionals and others, who are recognized by the Government as representatives of the Chilean organic sector. The Network of small organic farmers has also established by INDAP an Institution of the Ministry of Agriculture in charge of supporting farmers.

In 2000, the national certification system was established to certify primarily products for export. In 2001, the Ministry of Agriculture published the document “A States Policy for Chilean Agriculture, period 2001-2010”. The quality and sustainability of agriculture are stressed in the context of implementation of Good Agricultural Practices and modernization of inspection systems (HACCP). The regulation for GMOs is only used for seed reproduction and research and prohibited to grow GMOs crops, improve the national policy on pesticides, strengthen traceability mechanisms and program for controlling residues.

The National Commission on organic Agriculture was established in 2005, which is a joined commission of AAOCH and Governmental institutions and chaired by Vice Minister of Agriculture. It aims to discuss on coordinating actions and policies in order to support organic farming, which is very important communication channel and possible to guide government action through.

In 2003, the Ministry of Agriculture started to build the Organic Law. The proposal was sent to the congress in 2004 and Chilean Organic Law was approved by the Chilean Parliament in 2006. This leads to change in system like recognize a competent authority, evaluate and authorize certification bodies operating in the country. The national certification for organic products, group certification, requires the specific regulations, official seal, and protects the organic, biological and ecological labeling.

There are several supporting structures to develop agriculture, which the organic sector may use to develop its own. The main services that the organic sector uses related to promotion, marketing, organic association support and information sources. The research conducted in the University and National Agricultural research Institute, but this is very small compare to research on conventional agriculture.

The raising awareness, the concern for environment and the need to have products grown in a safe and sustainable manner ware the driven force for the growth rates of organic products reaching 20% every year. Nowadays, not only small farmers produce organic products, but also big companies are involved in this business and have dedicated larger areas to produce organic products for exports.

The export of Chilean organic products has increased more than 3 times within 6 years from US$ 2.4 million in 1998 to US$ 8.0 million in 2003. The export expects to continue growing at annual rates ranging from 15 to 20 %.

The area used for organic cultivation has increased from year to year, in 1997/1998 was around 2,678 hectares, 3,300 hectares in 1999/2000 and in 2002/2003 more than 25,790 hectares, the change in the last two seasons in 2002/2003 was 22,490 hectares. The area of organic grape for producing wine shows the highest increase, from 44 hectares in the period 1997/1998 to more than 1,914 hectares in the period of 2002/2003 (ODEPA 2005).

Initially, Chile supplies only products as asparagus, rose hips and kiwi fruits, but at the present, the number of supply products has grown quickly including other products such as medical herbs, fresh and processed fruits, vegetables, berries, wine, olive oil, honey, seeds and cereals. Chile currently exports more than 30 different organic products to big market such as United Stated of America, EU countries (Germany, United Kingdom and The Netherlands). The organic export reached US $ 12,7 million (FOB) in 2004, in which 51,1% was fresh products, 28.2% was frozen products, 13.5% was primary processed and dry products was about 7.2%. In 2004, the export market for Chilean organic products are United States 58.4%, Europe 29.4%, Japan 5.7%, Canada 4.9 % and other 1.6%.

The organic certification is mainly conducted by the foreign certification bodies such as Argencert, Letis, Lacon, BCS, CERES, IMO, Biocertificacion and Ecocert, and a government control system, which is voluntary and only certify for primary products for export. The exported organic products have compliance with the standard requirements of the

importing countries such as NOP, EU standards, JAS. In Chile, there is no group certification and the theme on access to certification for small farmers is still under discussion. The options for small farmer groups certification are also mentioned in the Chilean organic law.

The new organic law will allow the government to play a key role in controlling certification bodies, improving the transparency and regulation on domestic market and formulating the best platform for development of the organic sector in Chile in the coming years. However, there will be several challenges such as operation of the control system conducted by the government institution, developing the domestic market, the information channels to consumers, research and technical assistance, data collection and statistics and expansion of the organic areas and involvement of small farmers (UNCTAD-UNEP best practices for Organic Policy).

4.4 Development of Organic Agriculture in China

Since 1978, the Agriculture in China has changed from masse production of grains to diverse products of grains, cash crops, and folder crops. The farmland is managed by collective farms, companies, individual farmers and state owned farms accounting for about 4% of the total cultivation area. The agricultural population is around 70% of the Chinese population about 900 million people, but the agriculture production contributes for only 13.2% of the national GDP. In 2005, the export value of agricultural products was US$ 27.18 billion, while the import value was US$ 28.65 billion. China exports rice, wheat, main, soybean, cotton, oil seed, vegetables, fruits, livestock and aquatic products.

As many countries in APEC region, agriculture is basis of food production in China and it relies on the large input of agro-chemical that can cause several problems concerning food safety and environment. Therefore, the Chinese consumers are very interested in organic food.

The organic food produced firstly in the 1980s when the Nanjing Institute of Environment Science (NIES), National Environment Protection Agency (NEPA) joined the IFOAM. Since1990, NIES staffs work with foreign Inspector to conduct inspection on tea production and processing plans. Then China gets involved in the organic agriculture production and certification, which was considered as a destiny choice of China to develop agricultural economy and environmental protection.

In 1994, the NEPA authorized the NIES to set up the first organic organization called “Organic Food Development Centre - (OFDC) and renamed as SEPA after that. Based on the policies of developed countries and management experiences, the OFDC has developed the official organic rules in “Regulations for management of organic food label” and Technical Criteria for production and processing of Organic food. In 2001, OFDC has compiled the “OFDC Standard for Organic Certification”, which formally the basis for the first Ministerial Standards for organic certification in China.

In 2003, the Primer Minster of China has promulgated the “Regulations for Certification and Accreditation”. The certification authority was handed over to Certification and Accreditation Administration of China (CNCA). The foundation for the centralized management of accreditation and certification of organic in China with the official Accreditation body is China National Accreditation Service (CNAS) and comes long with this a dozen of domestic organic certifier, who has been accredited by CNAS.

Until 2004, the SEPA was the primary government proponent of organic agriculture. However, the local and provincial government also recognized the economic and ecological benefits of organic agriculture in its early development and successfully export-orientated creation. State involvement in organic agriculture extended not only to certification, but also to activities in marketing and production.

In June 2004, 11 Ministries of Chinese Government, including the Ministry of Commerce, the Ministry of Finance, the State Environment Protection Administration and others, joined to issue the “Recommendation to promote Organic Food Industry Development”. This is considered as the first government document to support the organic sector. In the coming years, the Ministry of Commerce and Ministry of Finance detailed the rules for subsidies to agriculture products, which included organic products.

In April 2005, the China National Organic Products standards (CNOPS) GB/T119630-2005 comes in to force and this has change the situation that the certification agencies in China. The CNOPS is mainly based on the IFOAM basic standard, the Quality Management System ISO 9001-2000 and is compatible with Codex Alimentarius, the EU regulation 2092/91, NOP and JAS, therefore CNOPS is the most stringent in the world. The main role of the CNOPS is to regulate and supervise the organic sector including certification, consultation and operation practices.

There are different opinions on the effects of the stringency of the CNOPS. The producers may propose to set up two levels of the standards, a lower level suitable for domestic market and higher level equivalence to the standards of the importing markets. The current Standard may generate some limitation for the operators, but also may push them to improve their organic operation.

Many NGOs promote and develop organic production systems in China such as Pesticide Eco-Alternative Yunnan, Greenpeace Hong Kong, and Partnerships for Community Development Hong Kong. They have conducted many experimental programs for organic agriculture, activate and effectively investigation of Chinese organic agriculture practices.

From 2005, all products sold in Chinese market as organic or organic in-conversion must be certified, and the national organic logo and the logo/name of the certify body must be indicated on the product packages. Imported organic products must compliance with the CNOPS and carry out the label.

Since, the CNOPS has enacted, the CNCA has started to evaluate and accredit all institutions involved in organic certification in China. Now there are 29 control bodies approved by CNCA for conducting organic certification and among those only OFDC has been accredited by IFOAM. There are six foreign organic certification bodies actively operating in China like BCS and CERES from Germany, OCIA from USA, ECOCERT from France, IMO from Switzerland and JONA form Japan, which are officially registered by CNCA and mainly bodies certifying for organic export products.

Main area of organic agriculture production is distributed in the Eastern and North-eastern parts of China. Support of government policy, organic agriculture has been growing very fast in the Western part especially organic animal husbandry. According to the statistical data, the organically managed land has increased from 342,000 hectares in 2003 to 978,000 hectares in 2005 and 2.3 million ha in the end of 2006 of certified organic farmland in China and ranked number 2 in the world. So far, there are 20 different categories of certified organic or in-conversion products, which mainly cover cereals, beans and tea, while fruits, vegetables and a small part of animal products.

In 2004, the total value of the organic products was 2.2 billion RMB (about US$ 350 million), among these 1.2 billion RMB was from exports, 0.8 billion

RMB from conventional products and only 0.2 billion RMB from domestic market. USA, EU, Japan and Southeast Asia ware the main market for export of organic products from China. The export products are mainly soybean, tea, vegetables and cereals (IFOAM building sustainable organic agriculture).

The market value for organic products in 2007 is estimated around US$ 500 million for domestic market and more than US$ 400 million for export. Nowadays, China produces the large number of products likes vegetables, tea, fruit, grains, cereals, oil crops, non-timber forestry product, bee products, Chinese medicinal herbs, cotton, edible fungi, fresh water aquatic product, marine product, livestock and milk products, wild plants, seasonings, flower, microbial preparation as well as inputs for organic agriculture.

The domestic market for organic products has increased rapidly in recently years. The products for domestic market are vegetables, tea, rice, fruits and honey. According to the international requirements, the farmers must experience at least 12 months conversion period and in most cases 24 to 36 months before eligible to certify as organic. But in big cities like Beijing, Shanghai and Nanjing, a survey showed that the price of “organic-in-conversion” vegetables is 1.5 to 2 times higher than that of conventional products, while the certified organic products are up to 7 times higher. This may be the called “rarity makes precious”, but it reflects the real situation of the premium price of organic food in the most developed cities in China at the early stage of its development.

The living standard and consequently the consciousness of health and environmental protection of the Chinese have been increasing. This has created greater demand for healthy food and organic foods. Organic food often sold in big supermarkets in the big cities like Beijing, Shanghai, Guangzhau and Nanjing, and special stores for organic products. However, neither the distribution system nor direct marketing system has been established so far. The limiting factor for the development of the domestic market is high price of organic products. The consumers can accept an extra cost of 10 to 20%, but in fact the price often 3-5 times higher than that of conventional foods, which restricts the domestic market to special group of consumers in the cities. Local media, in their efforts to promote organic food have sometimes twisted the concept of organic food, which has reduced the ordinary consumers" confidence in it. Initiatives to increase consumers" awareness have included annual exhibitions held in Beijing

and Shanghai and directed towards organic operators and consumers. Pioneering organic, stores and restaurants in Beijing, Shanghai, Nanjing, and others also can contribute much more to increase consumers" awareness. (IFOAM - BSOS).

At present, organic products from China are exported to the big markets of developed countries in the region like America, Canada and Japan and a part of EU. The major exported products are processed vegetables, soybean, honey, grains, green tea, herbal medicines and bean. There is a growing market for textile fibbers like cotton and hemp, but currently the organic production is not able to meet the foreign market demand. A major limiting factor for export of the organic products trade is the trade barrier of the importing countries such as its own regulations and standards for organic products.

4.5 Development of Organic Agriculture in Philippines

Worsening rural poverty in the 1980s prompted social development groups to implement projects in sustainable agriculture. The organic agriculture has been initiated by the NGOs as an appropriate technology for small farmers due to the low use of input and independence from agro-chemical. The farmer scientist groups are the MASIPAG, private certification bodies like Organic Certification Centre of the Philippines (OCCP). Consumer groups like the Organic Producers and traders Association (OPTA) were started and supported organic agriculture technology with aiming to encourage and empower small rice farmers to develop their own technologies and farmer-to-farmer extension, and to have access to and control over production resources, especially seeds.

In the 1990s, sustainable organic agriculture became an important aspect of rural development. Many farmer organizations and NGOs engaged in the development of organic agriculture. In 1996, the informal network FOODWEB started to draft the Philippine Basic Standards for Organic Agriculture and Processing, which paved the way for the development of a national organic certification program.

In 2002, the Bureau of Agriculture and Fishery Product Standards (BAFPS) in the collaboration with MASIPAG, OCCP, OPTA and Academies have stared to develop the Philippine Standard for Organic Agriculture (PNSOA). The PNSOA based on the IFOAM basis standards and the Codex standards for organically produced products (CAC/GL 32). In 2003, the

PNSOA was finalized with the aim of providing an uniform approach to the requirement for conversion of organic agriculture, crop production, livestock, processing, special products and consumers" information. Voluntary national standards serve as a guide for organic agriculture practices. The PNSOA regulates all aspects of production such as an avoidance use of synthesizing chemical inputs, antibiotics and GMs, requirement of conversion period, the behavioral environment requirement of animals, audit trail and maintaining strict physical separation of organic and non-organic products.

Together with the implementation of the PNSOA, the Department of Agriculture has issued Administrative Orders like the Accreditation guidelines for organic certification bodies (AO 13) in 2003, which serve as a platform for competent authority in accrediting and recognizing organic certification bodies. In 2004, the Department of Agriculture was able to accredit the OCCP through its accreditation committee established in consistence with the AO 13.

In December 2005, President Arroyo signed the Executive Order (EO) 481 on the promotion and development of organic agriculture in the Philippines. The EO 481 served to provide direction for the organic sector, marked a key step in the attempt of the organic sector to unify the industry and envisions promoting agriculture development through admitting organic agriculture as a farming scheme to enhance global competitiveness, environment integrity, food security and safety, increase productivity and alleviate poverty.

According to the EO 481, the National Organic Agriculture Program (NOAP) was established and focused on regulation and guidelines, certification and accreditation, market promotion and networking, organic information for producers, handlers and processors, and researchers and extensionists. The National Organic Agriculture Board (NOAB) and the National Technical (NTC) have been created to facilitate policy formulation and program implementation.

In 2005, there were 6,599 organic farms with 7,717 hectares accounting for less than 1% of the total certified organic farmland. The targeted domestic organic crops are rice, maize, vegetables, and root crops as well as the organic crops for export like bananas, mangos, coffee and sugar canes.

The total organic market in the Philippines is relatively small. In 2001, exports value estimated for about P 250 million (US$6.2 million), and in

2003 may have exceeded US$10 million. The domestic organic market around P 100 million with an annual increase of 10-20%, while the import is estimated for P 150 million. It is also reported that the demand for organic products much higher than the local production. The major organic products in domestic market are rice, vegetables, Papaya, traditional wines and herbal plants. The 20% went for the producers" consumption and the rest sold directly in the market. Herbal supplement also has an increasing share of the market and accounts for about 5% of the total spending of Filipinos on synthetic drugs.

Organic producers, mainly small farmers usual formed into groups and most are associated with NGOs especially for fresh food like root crops, fruits and vegetables as well as processed products like jams, catsup, local wines and purees.

Fresh bananas, banana chips, virgin coconut oil and coconut chips, vinegar, muscovado sugar, coffee, and asparagus are the major organic products exported by the big producers from Visayas and Mindanao. These include banana growers" associations, coconut producers" federations, herbal manufacturers, and mango exporters" associations, from which banana is the largest export crop. Certification of organic exports is provided by European certifiers such as the Institute for Market Ecology (IMO), which based in Switzerland and is accredited for organic certification by the Swiss Accreditation Service (SAS), the USDA, and the Japanese Agricultural Standards (JAS), Naturland (Germany), and Ecocert (France).

The organic stakeholders, especially the development NGOs and organized groups, provide interventions in the organic chain of production, processing, marketing, and policy in terms of education, training and capacity development, technology and research, support mechanisms and services and pilot or field projects. The Philippines government focuses on providing seed for the rice conservation and improvement program to have greater and longer lasting impact on farmer practices of organic agriculture.

4.6 Development of Organic Agriculture in Thailand

The development of organic agriculture in Thailand started in 1987 with national farming model created by Fugouka at the first stage. In 1991, Chai Wiwat Agro-industry and the Capital Rice Company worked with Department of Agriculture to start organic rice production in Chiang Rai and Phayao. In 1993, Earth Net Foundation promoted farmer in Northeast of

Thailand to produce organic rice and 800 ton were exported to 8 countries in Europe such as Germany, France, Italy, Sweden, Austria, Switzerland, Belgium and Netherlands. In the same year, the Green net was established and 1994 the first public fair on “Chemical free food for health and environment” was held in Bangkok. Capital Rice began selling organic jasmine rice in Thailand and overseas. In 2004 organic brands were available in small shop and supermarkets, especially in Bangkok. The domestic market for certified organic products in Thailand was estimated for about US$ 13,7 million, while export estimated for US$ 11,8 million.

In 1995, the ACT was established and started to conduct organic inspection and certification in 1997. The first Thai organic crop standard was drafted.

In 1996, the Ministry of Agriculture and Cooperative (MOAC) has developed policy to promote organic agriculture in production, marketing, research and extension service with initiative from Senator Anan Dadolom, the Vice President of MOAC. The manual for organic rice technology and organic rice was finalized in the IFOAM-Asia regional Workshop on Certification for organic and alternative market held in Bangkok.

During 1993-2003, the Department of Export Promotion, Ministry of Commerce set up the pilot project to produce fruits and vegetables such as baby corn, asparagus, bananas, pineapples and ginger to export to Japan and Europe. In 1999, Thailand Institute of Technology and Scientific research, the Export Promotion Department of the Ministry of Commerce and the Department of Agriculture (DOA) started to draft standards for organic crop production.

In 2000, the ACT obtained IFOAM accreditation and its first certified products appeared in Thai markets. The Cabinet approved US$ 15.8 million (633 million Baht) to support a three years pilot project on sustainable agriculture for small scale producers. The project was coordinated by the Sustainable Agriculture Foundation and covered 3,500 farming families.

In 2001, DOA published standards for organic crop production. On February 26. 2001, Prime Minister Thaksin set organic agriculture to be an important policy to promote Thailand to become a central country for organic production. In 2005, he was declared the second time that organic agriculture is national agenda for 4 year (2006-2009) with target to reduce chemical fertilizer and agro-chemical by 50%, increase area used for organic production to 85 million rice involving 4.5 million farmers, increase the net income by 20% and export value of organic agriculture by 100%.

In 2002, MOAC established the National Office of Agriculture and Food Commodity Standards (ACFS) responsible for implementing and enforcing the national agriculture and food standard and accreditation. ACFS completed drafting “Organic Agriculture: The production, processing, labeling and marketing of organic agriculture”, which covers crop production, livestock and aquaculture. The first product bearing “Organic Thailand” label appeared in the Thailand market.

The government enacted regulation on standard and certification for organic production, which were managed by Department of Agriculture with about 100 inspectors and a research plan on organic agriculture for period 2006-2010. The field trial conducts research on wide range of fruits and vegetables like sesame, pineapple, banana, mangosteen, longan, pomelo, soybean, chilli, cucumber, kale, yard longbean.

In 2002, Swiss government has recognized the ACT and allowed ACT to conduct organic inspection and certification according to the Swiss Government’s standards. In 2003, ACT was also recognized by the Swedish competent authorities for organic certification according to EU regulation 2092/91.

ACFS launched an accreditation program for organic agriculture in 2004. The organic Agriculture Fair by the MOAC and the cabinet resolved that organic agriculture would be henceforth a part of the national agenda.

In 2006, the 41,253 ha with 2000 farmers were certified as organic production among those rice took 68%, vegetables 12%, fruits 8%, tea 8%, herb and other 4%.

In 2007, the Primer Minister of Thailand promoted to develop organic agriculture to be the national standard with regulation on standards and certification. Many programs have been implemented to support and promote farmers, production and marketing, investment in research and development and other policy in management of organic agriculture.

The Department of Livestock set up standard and certification system for organic livestock in 2008 to develop organic meat, milk, egg, and packaging facilities for organic livestock products. The training program has been conducting for 18 inspectors and 70 advisors. 900 team leaders has been chosen to promote organic livestock in 60 provinces.

In 2008, the Department of Fishery has also enacted regulation on organic aquaculture standard and certification system. 11 inspectors have been trained and carried out accordingly ToT for 32 officers. The German

Technical Cooperation and Earth Safe Foundation supported the organic aquaculture products for internal market to top supermarkets. The Land Development Department organized several training for trainer and setting up 17.000 groups of farmers on using organic substances instead of chemical at provincial and district level. The campaigns against burning rice straw and crop residues. Organic agriculture project started in 133 schools and young mordin focusing on soil management, building up database on use of organic substances for replacing agro-chemical.

In 2005, the Department of Extension has conducted training for farmers on production follows organic standards, certification and marketing in 255 schools (rice 115, vegetables 102 and fruits 38) by using farmer field school model. Organic agriculture has also been transferred to remote area school farmer learn by radio for 6,700 farmers and publication of leaflet, poster and call centers.

In 2007, the cabinet approved the proposal of the Ministry of Science and Technology to establish the National Committee on Organic Agricultural Development (NCOAD), chaired by the Deputy Primer Minister and involved by NESDB, the Ministry of Agriculture and Cooperative, the Ministry of Commerce and the Ministry of Science and Technology and the committee members from the government agencies, Universities, private sectors and local philosophers. The aim of the NCOAD is to ensure that all related agencies are able to put the country's action plan on organic agriculture into practice and supervise the operations in accordance with the action plan and conduct evaluations

4.7 Development of Organic Agriculture in Chinese Taipei

The organic Agriculture development in Chinese Taipei started in 1986 with feasibility studies on possible implementation of organic farming done by Council of Agriculture. In 1988, the organic agriculture has expanded with experimentation on a large scale and long-term observation zones in Kaosung and Tainan. In 1995, the pilot organic farms were set up for demonstration, observation and exhibition.

In fact, the development of organic agriculture in Chinese Taipei really emerged in 1995 with the establishment of the organic certification body by the Ministry of Agriculture of Chinese Taipei. The development of organic agriculture in Chinese Taipei can be divided into three main stages.

The first stage was from 1996 to 2000, there was no any accreditation agent for organic certification and at that time, the Council of Agriculture was the only Certifying Institution. In March 1997, the council of Agriculture started to certify for organic products and approve the organic logo. Two years later, in order to better regulate private sector handling of organic production the organic production standards, the certification guidance for establishment for organic farm products, the organic farm and for organic certification institution were adopted in March 1999. In June 2000, the operating procedures for application and review of organic certification institution were also promulgated.

The second stage was from 2001 to 2007. In February 2003, the Agricultural Development Act was amended, according to the Article 27 Item 2 of the Act, the operation and management guidelines. The operation procedures for qualifications of certification institutions were reviewed, the production standards for organic cops and animal products were promulgated to serve as a governmental basis to guide and promote the organic certification system.

The third stage is from January 2007 to now. As on 29 January 2007, the "Agricultural Production and Certification Act" within the context of the Article 5 Paragraph 1, the agricultural and processed agricultural products permitted to sell as "organic" only when production, processing and packaging are fully in compliance with the guidelines for organic products established by the competent authorities of the government and properly certified. According to the Article 6 Paragraph 1 of the Act, the importing organic products for market were sold in Chinese Taipei and were certified by competent authorities or certification bodies, which accredited by the international organic accreditation institutions. The rules are subject to the mandatory certification and inspection mechanism use of OTAP mark for organic farm products started on January 1st 2009.

In August 2007, the National Accreditation Agent "Council of Agriculture) has accredited four organic certifying institutions such as Mokich Okada International Association (MOA), Tse-Xin Organic Agricultural Foundation (TOAF), Chinese Taipei Organic Production Association (TOPA) and Chinese Taipei Formosa Organic Association (FAO).

In 2007, 936 farmers have certified organic with an area of 2,013 hectares in Chinese Taipei, including 843 hectares of rice, 438 hectares of vegetables, 258 hectares of fruit trees, 125 hectares of tea and 349

hectares of other crops (see the figure) and it is estimated that the organic certified areas will increased to about 3000 hectares in 2008.

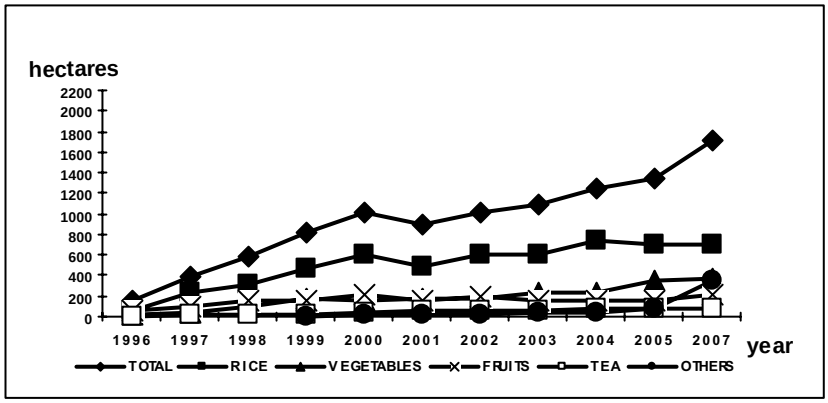

Figure 2: Development of organic certified crops in Chinese Taipei from 1996 to 2007

The development of organic agriculture in Chinese Taipei is very slow due to several problems such as the unfavorable climatic condition, the production and marketing strategies, the legislation of organic certification and the insufficient understanding of the consumers.

Therefore, to develop organic agriculture the government has its own policies such as (i) to strengthen research and development in organic farming likes techniques for pest and diseases control, comprehensive management technologies on soil nutrition and weeding; (ii) promoting the syndicate organic farming by setting up every year 6-10 new organic farm in favourable areas, especially establishing organic villages in Eastern Taipei"s longitudinal valleys with given priorities; (iii) establishing annual sampling and testing of organic in farm or in city market to ensure the quality and safety of the products so its can have to raise the understanding of consumers and finally, (iv) developing the accreditation and certification system for market traceability on organic products.

4.8 Development of Organic Agriculture in Republic of Korea

Started in the late 1970s, the organic agriculture has developed in Republic of Korea for longer time in compare to the South and East Asian countries. In 1978, the Korean Organic Farming Association (KOFA) was established

with aims to solve the problem of the environment degradation in high input agriculture system and health concern of the farmers under the excessive use of agro-chemical. This farming practice was identified as the way to protect consumers, farmers and environment from the abuse of chemical input in agriculture production, but this idea was not accepted by the central government. The aspects of environment conservation and food safety were also under-evaluated during the rapid economic development period.

Until the late 1980s, the change in agriculture policy of Korean government focused on the maximizing the domestic production for the food self-sufficiency. The organic farming has not been accepted as mainstream agriculture in Korea, but generally accepted that the average yield of organic farming practices is lower than that of conventional farming. In spite of the unfavorable government policy, the organic farmers has increased to about 1,400 farmer households in response to the public concerns on environment and food safety.

In 1991, the government founded a task force team on “Planning Body for Development of Organic Farming”. Since than, organic and sustainable agriculture were became important sectors in Korean agriculture and in 1993, the guideline for environment-friendly agricultural products was enacted.

The administrative organization responsible for sustainable agriculture was set up in 1994. Along with the institutionalization of organic and sustainable agriculture, the Korean federation of sustainable agriculture organization was established under the join of organic producer groups and consumer groups.

The government has developed several policy programs to support organic agriculture production and increase the consumption of organic production such as the “Policy program of quality agricultural products by medium and small-size farms”, the “Environmentally-Friendly Farming Area Development Program (EFFADP)” and the “Direct Payment Program for Environmentally-Friendly Agriculture”.

To develop the market for organic products, the direct marketing channel was established and to meet the market demand the Consumer Cooperative Act was enacted by the government in 1998. During this time, the local governments introduce the School lunch supporting programs to promoting consumption of the organic agricultural products. Many NGOs and the PTA mother’s group were actively involved in the consumer-

oriented program likes the movement of local food consumption and the urban-rural exchange programs. The consumer cooperative and the school lunch support program have greatly contributed to helping the organic agricultural starters to market their products and accelerate consumption at the household level and help to develop the direct marketing system through which 20% of organic products are distributed.

The policy programs developed by central government and local government during 1991-2000 to support organic agriculture have resulted in dramatic increase of organic production. As increasing of organic farming, the government in 2000 started to subsidize for organic farmers when they buy processed compost made of animal wastes. The organic agricultural area increased from 100 hectares in 1991 to about 9,729 hectares in 2007. If in included the area cultivate without chemical pesticides (only use chemical fertilizers) than the total area is estimated for around 37,000 hectares about 2% of the total farmland in republic of Korea. At the present, the problem of increasing market demand and reducing production costs for organic products are the major issues in the organic agriculture sector in Republic of Korea.

4.9 Development of Organic Agriculture in United States of America

The organic sector evolved from scattered initiatives into a strong national movement with common goals of maintaining strong regional organizations provide organic advocacy, education and promotion and building the capacity of the organic sector. The organic sector was set up in the 1940s with pioneers like Sir Albert Howard, Paul K. Keene and J.I. Rodale and the early farmers" organization initiated in the early 1970s. The early organic sector was successful because the organizations were farm-based, operated regionally, and had a strong market-orientation as well as a philosophical agenda. The movement of food crops was important in the early period of the distribution and marketing of organic products. Organic food is today an integrated and established part of the market and no longer a niche, with a diversity of market channels. In the early 1970s, organic grains and beans were exported to Europe and to Japan, but exports to Japan significantly declined because of the Japanese organic regulation. Nowadays, Canada has become a strong export market of organic products. In the early 1980s, because of the urging of the organic farmers, organizations, several states began to regulate the organic label.

In the 1990s, a national law was enacted. The National Organic Program (NOP) was implemented in 2002 and considered by the government as a

labeling and marketing regulation, not an endorsement of organic farming. The USDA organic labels are known by 60% of the population.

As there was less government support in term of policy or funding, the organic sector in the United States of America has required to be market-driven. In 2003, certified organic farmland accounted for 0.9 million hectares, about 0.2% of total farmland and this area has increased to 1.6 million hectares in 2007 and account for about 0.5% of total farmland. The wide range of crops that are grown organically reflects the conventional agriculture sector, along with rapid expansion in livestock production.

5. CASE STUDY: ORGANIC AGRICULTURE IN VIET NAM

5.1 Viet Nam economic in relation to APEC economies

In 2005, eight years after acceding to the APEC, the economic relation between Viet Nam and other APEC member economies has greatly been developed. The investment from APEC economies is accounted for the largest foreign investment, at 62.7% of the total foreign investment in Viet Nam. Its Official Development Assistance is also ranked as the first position. Vietnam's export to APEC is also the biggest value, accounting for 72.8% of Viet Nam's total export turnover, US $14.7 billion in 2003. In 2004, it reached US$ 15.5 billion or 58.5 %. Viet Nam imported from APEC economies are also the highest among regions reaching US$ 20.1 billion in 2003 or 79.4%. In 2004, the figure was 25.3% or 79.2 %. APEC's direct investment in Viet Nam from 1998 to July 2005 accounted for US $35.3 billion with 5,354 investment projects.

5.2. Viet Nam geographical and social economic in brief

Viet Nam is in the Southeast Asia on the western rim of the south China sea and the total land mass of Viet Nam is 331,114 square kilometers. Since independence in 1945, Viet Nam underwent for 30 years of the wars and during this time the Vietnam's economic seems to be still stood. After the unification, the economic developed towards the centrally plan economic, farmers followed an agricultural production plan set by the government, all products were sold to the government and in return, farmers received essential farm input as well as foods. Even with a shortage of farming inputs and unsophisticated production management systems, the quality of products was reasonably good but it has showed

several problems with a explosion of the population in the period from 1975 to 1985, the economic scheme and development of agricultural production could not meet the demand of population on food. The transition period started in 1986 with the change in the land tenure, the cooperative land was divided to farmers. They have had their right disposition of crops on their own land without limitation. Only after five years, Viet Nam could not only produce enough foods for the population, but also started to export rice to the world market.

According to the Government Statistic Office-Ministry of Planning and Investment in 2007, the Vietnam's population estimated for about 85.6 million people and growth rate is 1.4% per year. The population density around 260 persons per square kilometers. The GDP reached US $70 billion in 2007 and the GDP per capital accounts for about US $818 accordingly. The GDP growth rate for period from 2001 to 2007 reached an average of 7.6%. The investment for economic development accounted for 44% of the GDP and these mainly based on the foreign investment and export. The investment likely took place in the urban areas and the economic sectors with high capital demand or state enterprises (about 60% of the capital investment). It is unbalance in comparison to the investment in other sectors, especially, the investment in agriculture and rural areas and other sectors with used of labour intensives (GSO 2007).

Viet Nam is one of the countries successful in implementing of millennium development goals. During 1993-1994,, the national food security was setting up with technical support from FAO and relevant agencies. Nowadays, Viet Nam has fulfilled its national food security program. The poverty alleviation in Viet Nam had a great achievement from 58.1% in 1994 to 16% in 2006.

In 2007, the value of agriculture production accounted for 20.1% of the GDP and among these crops took of 76%, the animal products 24.5% and the agricultural services. The total agricultural land covered about 13,184,500 hectares, out of which area for the cereal crops was 8,731 million hectares, for cash crops was 2,454 million hectares, and for fruits and vegetables was 1,402 million hectares. The average yield of cereal cops was about 35.4 million tons during 2002 and 2007, it has increased 18.8% compared to the average yield from 1996 to 2001. Beside that, 641,900 thousand hectares of water surface were used for aquaculture with an average yield of 3,142,800 tons. The capital investment in agriculture and fishery decreased gradually from 13.7% in 2000 to 6.4% in 2007.

The South-western of Viet Nam has large area of upland, over 1,000 m o.s.l. Soil are mainly basalt, which is very suitable for the tropical industrial crops such as rubber, tea, coffee, cocoa, etc. The Mekong and Red river deltas are the main locations where exported rice and vegetables are produced. Moreover, climatic condition in some provinces in the northern part of Viet Nam is suitable for growing the temperate fruits and vegetables.

5.3 Role of agriculture in Vietnam's economy

Agriculture plays a very important role in Vietnam's economy. The sector is regarded as the foundation for national economic development. In recent years, agricultural reform has stimulated the economic development in Viet Nam. However, agricultural development in Viet Nam depends very much on the export of a relatively small number of commodities, which contribute around 30% of total export revenues and account for 20 - 25% of total GDP. The export of the agriculture, forestry and fishery products such as rice, nuts, fruits, vegetables, timber and non-timber forest products and fish and fishery products of Viet Nam has annually increased around 20% over the last few years. In 2006, the total export value was US$10.6 billion and it has increased to US$14.7 billion in 2007. In the first six months of 2008, the export value of agricultural products has increased up to 25% and US$ 8.7 billion and as estimated, the export value of 2008 may exceed US$ 17 billion. The economic crises in the end of 2008 and decreasing price of some key products like coffee, rubber and rice have also big effect on the Vietnam's agricultural export value in 2008.

5.4 Development of organic agriculture in Viet Nam

Since hundred years, Vietnamese farmers have been using the traditional agricultural production systems without synthetic fertilizers or chemical pesticides. Viet Nam agriculture has undergone in different development stages. The last twenty years, the new era of agricultural development expands throughout agricultural sectors in Viet Nam, especially in the Mekong and the red river deltas. The efforts of government in investing in researches and development, through the extension services and support from International institutions (include Governmental organizations and Non-Governmental Organizations) platforms the green revolution in Viet Nam, it is not only to ensure the national food security but also contribute to the agricultural and foods export of Viet Nam to the world market.

The involvement of Viet Nam in the International economic integration and the experiences during last ten years have showed that Viet Nam''s agriculture has not only increased the productivities and quantity, but also improve the quality of agricultural and food products. However, the quality of agricultural products has deteriorated and the government was unable to manage the rising incidence cause of food contaminations.

In response to rising concern of Vietnamese consumers, the government launched the “Rau An Toan (RAT)” means “Safety Vegetables” scheme to ensure the vegetables produced with higher quality and safety to meet consumer’s requirements. The term ”clean vegetables” was used, but local consumers found difficult to distinguish between clean and conventional products. Unsafe vegetables, containing chemical residues exceeding maximum residue limits (MRLs), continued to be found in local market. Apart from the risks of excessive pesticide residues, especially leafy vegetables often contained high levels of nitrates, heavy metals, or pathogenic micro-organisms. To overcome these problems, a regulatory investigation on safety vegetable production was launched, and quality standards established for safety vegetables as guidance to initiate quality improvement for Vietnam’s agricultural production.

The organic agriculture according to the international understanding is a relative new phenomenon for Viet Nam and just started more than 10 years ago. Some foreign companies worked with local company and farmers to produce organic products for export, but the acreage is still limited to a few hundred hectares of tea and spices. Nevertheless, some organic products are already exported like herbs, spices (star anise, cinnamon, ginger), rice, vegetables, fruits, nuts, shrimp and fish. Such products produced under organic certification according to standards of the importing countries by the foreign certification agencies like IMO of Switzerland, ACT of Thai Land, and NOP of United States. Nowadays, around 21,867 hectares in the whole country was certified organically cultivated, among those the largest unit was 6,457 hectares extensive farming of organic shrimp under the mangrove forest.

There is unexploited potential for organic production in Viet Nam. The organic production is driven mostly by companies producing for export (aquaculture, tea, spices, fruits), from which tea has been the most successful organic crop. At present, only a few organizations provide support for organic agriculture in Viet Nam, e.g. ADDA (Denmark), GTZ (Germany), and JICA (Japan).

Following the modernization of Vietnam's society, agricultural development increasingly focuses on the intensive production with an emphasis on volume rather than quality. Poorly selected and incorrectly applied conventional production technologies have resulted in a continuing high incidence of food contaminations in local market. To address that problem, the government strengthen R&D in the functional institutions for agriculture, including the Research Institute for Fruits and Vegetables, National Institute for Plant Protection, and the National Institute of Soil and Fertilizer. In the 1990s, FAO has supported the agricultural sector with a national IPM program on rice and later expanded to IPM on fruits and vegetables nationwide. The concept "train farmers" in practices to reduce or relevant used of pesticides to ensure the yield, quality and safety of products.

In 1984, the Centre for Research and Development of Micro-bio fertilizer founded at the National University in Hanoi. This Centre with supported from a Dutch university and other international organizations. They provide substrates and bio-fertilizers for growers, especially for leguminous plant to improve soil fertility by nitrogen fixation. The centre plays an important role in the development of organic agriculture in Viet Nam.

In 1998, the first organic production project supported by CIDSE, an international NGO and its local office in Viet Nam. CIDSE supported a group of Vietnamese to visit Malaysia and learn about a system of supply chain management for organic vegetables. The system was interesting as farmers themselves undertake mutual farm inspections within their groups, and sell their products directly to consumers without passing through any middlemen. After the trip, they started launching the project using the same system to produce organic vegetables and to develop the market for their organic products. The key partners were the Centre for Research and Development on Micro-bio fertilizer and a group of eight vegetable farmers in Tu liem district, Hanoi.

The most successful projects were the organic tea project funded by New Zealand Aid in collaboration with Thai Nguyen University of Agriculture and Forestry - Ministry of Training and Education. The project area located at Dong Hy and Khe Mo districts of Thai Nguyen province (about 80km Northwest of Hanoi) with involvement of 30 households and implemented from 2002 to 2005. The project aimed to address poverty issues in the hill-land of the Northern Viet Nam by developing the knowledge, skills and infrastructure required for the production of organically produced and certified crops and products. At the national level, the project assisted and

enabled the Ministry of Agriculture and Rural development to develop National Organic Production Guidelines based on the international recognized guidelines for organic tea and other crops in Viet Nam. These technologies and processes are aimed at enhancing the economic viability of small holders and the well-being of farming families thereby contributing to poverty reduction.

In 2003, Ecolink founded by Hiep Thanh processing company with the aim to sustainable development of green and clean environment for all and enable remote communities to better integrate into industrialized society and hope to introduce special agricultural produces of different locals of Viet Nam to customers. This company has subsequently played an important role in the development of organic tea in Viet Nam. Its main production area is in the northwest hilly and mountainous regions of Tan Cuong, Thai Nguyen province, Suoi Giang - Suoi Bu, Yen Bai province and Bac Ha, Lao Cai Provinces. In Tan Cuong, Thai Nguyen the 15 households participated with about 4,5 hectares and produce for about 3 tons annually and among them, 11 households received organic certification from ICEA, an Italian certification body. In Suoi Giang, Yen Bai 179 households involved in the project with total of 350 hectares. In this highland region, the farmers do not use agro-chemicals for their crops, the production is less intensive and the yield estimated for about 16 tones. This area was certified for organic tea production. The main markets for organic tea products are Germany, Italy, US, Belgium and Scotland. The domestic market for organic tea has not yet emerged. In Hanoi, the organic tea from Ecolink can only be found in Metropole Hotel and some special shop or supermarkets. In the future, the company plans to expanding production on organic vegetables in the areas around Hanoi.

In 2005, Viet Nam Farmer's Union was support by Agricultural Development Denmark Asia (ADDA) of Denmark to implement an Organic agriculture project for five years starting from 2005. The aim of the project is to develop a framework for production and marketing of organic product in Viet Nam. The project tries to formulate the linkage between the organic producers and to manage the certified organic products and supply these products to local market as well as promote the production and marketing for organic products in Viet Nam. The main activities of the project is to increase the quantity and quality of organic products produced by small farmers in selected project areas, survey on the local demand organic products and develop marketing strategies for organic agricultural in Viet

Nam, beside the projects also support to develop the organic certification system.

From 2005 to 2007, the project has been implementing at six provinces in the northern part of Viet Nam with involved of 120 farm households. The Organic vegetable has been conducted in Vinh Phuc, Bac Ninh, the organic tea in Lao Cai, the organic orange in Tuyen Quang, the organic litchis in Bac Giang and organic fish in Hai Phong. In each province, a group of twenty farmer households was selected. The technical support was also provided to help them to convert from conventional agriculture production into organic agriculture production and to develop the market for their products.

From 2008 to 2010, the project tries to raise awareness of the governmental organizations and NGOs on the conditions for the development of organic agriculture and the consumers on organic products, to develop a participatory guarantee system (PGS) for organic products in the domestic market and in the project regions and big cities like Ha Noi and Hai Phong. The organic farming systems have been developed on seasonal and perennial crops and aquaculture in the North of Viet Nam and Training of Trainers (TOT) and farmer field schools on organic production have been conducted for 100 organic farmer groups with about 2500 farmers. Attentively, in the end of 2010, at least 150 hectares will be organically cultivated in the project regions.

In December 2006, MARD enacted the decision No. 4094/BNN-KHCN on the issued of 10 TCN 602:2006 Organic - standard for organic agricultural production and processing. The Vietnamese organic standards are based on the IFOAM guideline and the ISO 65 issued by Codex Alimentarius on organic. In spite of the legislation of the organic standards, the picture of the development of organic agriculture in Viet Nam has not been getting better, there is a need on development of the real organic policy to take effect in the future.

5.5 Market development for organic products of Viet Nam

Domestic marketing system for organic products are mixed, some popular producers as private enterprises or cooperatives market their products by themselves. The consumers rely much on the reputation of the companies and cooperatives.

The local market only started in 1999, with the establishment of Hanoi Organics. With some funding from international NGOs, this private company conducted the production of organic vegetables and tea. The company set up a home delivery system based on subscription and advance payments. Since 2002, the organic vegetable was distributed to consumers living in Hanoi through its own shop, mostly foreigners and schools. In 2003, organic rice production was included. The clients placed their orders to the company who then passed on the information to farmers for production and harvest. In 2006, Hanoi Organic is still the only organic trader for the local market but sales have not increased much since 2003.

In other cases, sale of organic products mainly takes places through “safe food” or “Safe vegetables” shops. Most producers sell their products directly to the shops or sign contracts with the supermarkets, canteens or schools but the volume still small. Hung Thien company in Da Lat (Lam Dong highland) was certified by IMO and production standards was also certified by Global-GAP, they have developed a good network to deliver organic products mainly vegetables and herbs to big restaurants and famous Hotel in Ha Noi and Ho Chi Minh city.

Like many developing countries, the domestic market for organic products in Viet Nam is still limited. The organic products are often considered as luxury and affordable only for affluent consumers. In general, Viet Nam faces the same situation concerning political support from the government, the production system towards market orientation, the certification system and marketing strategies for organic products likes other developing countries in the region. The domestic market for organic products will need some time to develop. We have experienced with the “safe vegetables”, although the government supports to produce and establish a certification system, but products under the “safe vegetable” label have still limited market success. The consumers do not trust in the label is currently the main reason for the market failure.

However, the future prospects for Vietnamese domestic market are strong due to the following factors: Viet Nam''s large consumer base with its population of more than 80 million; The increasingly affluent urban populations who can afford higher prices for organic products; Consumers are increasingly concerned about sustainability and healthy life; and Main market channel like supermarkets will develop when Viet Nam open the retail market for foreigner company in 2009.

5.6 Organic agricultural policy

The government has issued several policies in agriculture to support the development of sector itself and to help the farmers improve productivities. Those will also directly or indirectly influence on the development of the organic agriculture in Viet Nam, including remove of the irrigation fees, provide of loans with low rates of interest, and production support and oriented research projects, such as plant and animal breeding, food safety and quality and other extension programmes to extent good agricultural practices. As Viet Nam has moved from a subsidy-based to a market-oriented management system, the subsidy for pesticides as well as chemical fertilizer were no longer exist. Regarding GMOs, the government will also issue a regulation for field trial of GM crops before imported to Viet Nam.

Nevertheless, these are general support policies and there is no specific policy support for organic agriculture development. The organic standard was enacted, however in order to implement it, the government have to issue specific policies such as the infrastructure, the certification and accreditation, the research and development, the training and education as well as the financial support.

5.7 Certification and Standards

Despite a private certification body independent from the government has been attempted to set up, Viet Nam currently has not had any local certification body. Organic products are certified entirely by foreign certifiers, e.g. IMO from Switzerland, ICEA from Italy and ACT from Thailand.

5.8 Supporting structures: Research, education, extension

Three ministries concerned with organic agriculture in Viet Nam are the Ministry of Science and Technology, the Ministry of Agriculture and Rural Development and the Ministry of Education. Many research institutes and agricultural universities operate as part of these ministries. The Viet Nam''s Academic Agriculture Institute is a major centre of excellence in research and applies science. There are a lot of research activities on soil such as biology and soil biological improvement or plant protection by using biological control agents to control insect pests and diseases. Although there is a big argument on the sustainable yield of the crops with organic fertilizer, we may know the demand of crop on nitrogen, phosphorus and

kalians, but worry about the sources of supply. In fact, if we look at the area organically cultivated, we will know that those harmonized together. Currently, no country in the APEC, the certified organic land exceeds 2 or 3 percent of arable land. On the other hand, if we look at in the remote areas, where the farmers cultivate the extensive crops system or many areas, there poor farmers do not have capacity to purchase agrochemical. The good chances and reasons for Viet Nam and the other developing APEC economies to develop the strategies or policies on organic agriculture. This will help them not only solve the problem of food security, but also help them in poverty reduction and sustainable the environment by eliminate the shifting cultivation.

In Viet Nam, the extension service is organized with national extension centre under MARD and through 62 provincial extension centres, each responsible for extension activities in its district. Each commune, there are some part-time extensionists are responsible for assisting farmers. Every year, Government provided for around 100 billion VND (US $6 million) for extension works and besides, the 62 extension centres received financial support from provinces. The extension services will bring new technology and results of research to the farmers in agricultural sector.

Development projects supported by the international donor community also provide important support for research and practices. The project funded by ADDA, Denmark on “Developing a Framework for Production and Marketing of Organic Agriculture in Viet Nam" was considered as the most importance organic project in Viet Nam. Together with Viet Nam Farmer Union (VNFU), the project carried out a number of field and community studies as a first step to identify the specific conditions and constraints for the development of organic agriculture in selected production systems in the six provinces. These studies were used to develop a training curriculum for the Farmer Field School (FFS) using participatory and non-formal methods. The topics of field studies were methods for processing compost, variety testing, organic fertilizer, intercrop production, and erosion prevention.

In December 2006, a Japan-funded project on organic fertilizer (JICA - 3RHN) was established. The project goals are to reduce, reuse and recycle urban waste, which will be sources of input to develop organic agriculture in future.

At present, the French organization CIRAD (Centre de international Cooperation pour Agriculture Recherché en Development) has started a

project on organic agriculture with support from the French Embassy in Viet Nam. CIRAD's main implementing partner is the Fruit and Vegetable Research Institute.

The following table presents an analysis of the status of organic agricultural development in Viet Nam.

Table 3. The status of organic agricultural development in Viet Nam

Strengths	**Weakness**
- Raising awareness of consumers on food safety.	- Government allocates small plot of land to farmers to manage.
- Farmers are aware of negative effects of agrochemicals.	- Farmers are not interested in organic farming because they care more for short-term profit.
- Producers are willing to experiment the new and organic farming technology.	- Farmers do not have knowledge about organic agriculture farming.
- There are some basic organizations of farmers at the commune and village level, which can serve as a vehicle for production and marketing activities.	- Intensive crop production, no fallow period
- Existence of organic production is exclusively for exports.	- Farmers have no interest in long-term investment to improve soil
	- Lack of consumer awareness on organic food
	- Consumers confuse safe food and organic food.
	- Consumers cannot identify organic products and it is difficult to find organic products
	- No guarantee system
	- No existence of commercial-scale organic production targeting the local market (only for exports)
Opportunities	Threats
- Viet Nam has a growing economy, more disposable income among urban people	- Possibility of government introducing GMO crops
- Consumers now have more	- Very cheap and high quality foods import from China and other countries

exposure to the international situation through internet, cable TV, study abroad, traveling abroad

- Vietnamese still cook and eat food at home

- The rise of oil price causes an increase in the price of agro-chemicals and pesticides

- Food import requirements in industrialized countries force Vietnamese exports to be more concerned about safety food

- Organic farming compliments existing health and environment policies of the government.

6. CONCLUSION AND RECOMMENDATION

6.1 Conclusion

The studies was given an overviews of the development of the organic sectors in the APEC economies, which focused on the developing APEC economies. Case studies from nine APEC member economies including Viet Nam were mentioned in this report. Among those, five are developing APEC economies, two are emerging APEC economies and two are developed APEC economies. Based on the case studies and available sources of information the experience were withdraw and recommendations were made.

The retail markets for organic foods and drinks in the APEC economies with involvement of United States of America and Japan, which accounted for nearly 50% of the world market in 2006 and will be increased to 60% in 2020. The United States, Japan and China are the largest retail markets in the world and in the APEC economies. By 2020, the retail value of China is expected to develop two times higher. The United States of America is still in the top five biggest organic retail in the world with 40% in 2000 with retail value of US$ 50 billion. The expand of the retail market in the developed APEC and some emerging APEC economies will be opportunities for the developing APEC economies to export their organic products.

The foundation for market development is the consumers" interest and willing to buy organic products, therefore consumers" awareness needs to be built on the good quality products, the promotion and the common logo and standards. To develop the market channel for organic products, especially for domestic market in the developing APEC economies, the media plays an important role in spreading the value of products, informing about the logo and presenting the good examples. To export organic products to the developed APEC economies and the other countries in the world enough market information is repaired to be provided.

To organize the farmers and producers for marketing, it is importance that supply and quality improvement and the marketing efforts should be oriented towards simple chains, direct marketing and the long-term market channels. The effective strategies for the developing APEC economies to develop the organic sector is to combine the market supply, demand measures. Export plays an important role in the early stage and the exporters have to consider the special demand of the importing markets.

Certification is a market tool to build up the trust in organic products. When the third party certification is not common, the PGS should be good alternative for producers to sell their products in the domestic markets. The organic standard should be developed with domestic market development, in which the stakeholder involvement is critical in standards development, especially in early stage.

To develop organic sector in the APEC member economies, the government should have special policies such as reduction of agro-chemical import, environment protection, rural development and environmental friendly farming for small farmers.

The national strategies or national action plans need to be built. Those will contribute to the development of organic sector in many APEC economies and show the most efficient. Those are related to goals and targets for organic development and consist of specific measures including direct income support through the agro-environment and rural development programs, marketing and processing support, certification support, producer information likes research, training and advice, consumer education and infrastructure support. Without those support, the organic sector will be less successful and develop lowlier. The involvement of government, NGOs and other stakeholders plays a supportive role in organic agriculture policy development.

Education, extension and research are the central issues of organic development. The researches address the urgent needs of the organic production, processing, and marketing, in which all relevant stakeholders should be involved.

6.2 Recommendation

General policy

To develop organic sector, each country needs an overall assessment on its general agriculture policies and plans to have their overview of the effect on organic sector. The agriculture policies should support the general agriculture as well as the organic sector and promote the effective of policy coherence. Especially if the development of organic agriculture was identified as an object.

The government have to involve in the process before any actions are undertaken and encourage other stakeholders involved in policy development and plans. An organic action plan should be developed based on an analysis of the state of the sector, participatory consultations, a needs assessment and proper sequencing of actions. The plan should be stated as measurable targets for the organic sector to help agencies and stakeholders focus their efforts.

It is essential to identify that the relevant government agencies involved in development of organic policy or plans play the leading role in recognizing the interests represented in the organic sector. The government agencies should be active in raising awareness on organic agriculture on all levels.

A dialogue should be established to consult government and all other stakeholders involving in organic sector. The data on organic production and marketing need to be collected and made available to interested groups and policy makers.

Standards and regulations

The national or regional standards for organic production should be developed through close cooperation between the private sector and Government. It should be well adapted to the conditions in the country and focus on the domestic market. For import access and regulation, the country should take into consideration the recommendation of the

International Task Force on Harmonization and Equivalence in Organic Agriculture (ITF).

To develop the Organic Agriculture regulations, Government should clearly identify the purposes and ensure that the regulations ware built up in close consultation with the sector and enable development of the sector than controlling in nature. The mandatory regulations should be considered when it is necessary and is not likely to be a priority in the early stage of development. Regulations for domestic markets should base on local conditions, and not mainly on the conditions in export markets.

Governments should facilitate the certification services, either by stimulating foreign certification bodies or by supporting the development of local service providers. In some countries, the Governments could consider establishing a governmental certification service. The conformity assessment procedures, such as participatory guarantee systems should be explore.

The Government should support producers, stakeholders to comply with standards, certification procedures and regulations. Specially consider to support in certification for smallholders, the training programs and development of internal control systems.

Markets

The governments and stakeholders promote special programs for the public awareness and consumer education, including agricultural fairs, where featuring organic foods and encouraging the purchase of organic products.

The country should have development strategies for domestic market and take into account the supply and demand. A national market for organic product should be set up and possibly promoted from the producers to retailers.

As the largest market and production in the world, the regional market for organic products should be established and promoted within the APEC in connection to the international market.

The supporting system for organic market should be built up including market information system, organic products export or import promotion activities or simply the custom procedures, plant or animal quarantine for import and export of organic products.

Production

The organic extension services have to be developed with the trained staffs. The participatory approach, farm and farmers are the core of activities. The support programs should be directed to the farmers, producers, and consider the small farmers.

The government should pay more attention on research and development on inputs to organic production such as organic fertilizers and insect pests and diseases control measures including the traditional methods of pests and diseases control.

The planting materials such as seed breeding and seed testing should be oriented to organic production and avoiding of seed contamination, especially where the genetic modified crops (GMOs) were cultivated.

7. LESSONS LEARNED AND FOLLOW UP ACTIONS

7.1 Lessons Learned

The policy and program of the government support the development of the organic agriculture. It has showed in countries where the strong support from government the better development of the organic sector and where the less support or only the policy or program support for conventional farming will become the constraints for development of organic sector. The lack of government and policy support lead to low development and lost of market opportunity.

The development programs on the organic agriculture in general often focus on the technical scheme or production aspect on farm level like standards and regulations or certification procedures than the market orientation. The technical support can not solve marketing problem and the less market development the less incentive for organic farmers.

It is important to develop a marketing network. Understanding the requirement of organic trading is much concerning standards and certifications. In the developing APEC economies, the domestic markets for organic products need to be developed by promoting public purchase of organic products and raising consumer awareness and education, which often left behind.

Capacity building in organic production including fulfilling the gap of knowledge, strengthen of extension services and support facilities like

organic inputs, on farm techniques, harvest and post harvest facilities and working capital. The government should provide incentive for organic research and development.

The linkage and cooperation with private sector and all stakeholders is a key factor for development of organic agriculture. NGOs and international organizations are important players and have ability to give training but only on technical aspects, the knowledge on standards and quality management system still limited and need support from governmental institutions which has service on quality management system and organic standard and certification.

7.2 Follow up actions

For the developing APEC economies, especially for Viet Nam, the government should have strategies to develop an organic action plan based on the available research and technical supports. This program should focus not only in the intensive system to help farmers in conversion to organic production but also in the remote and mountainous areas, where the poor farmers are use less chemical pesticides or even have no capacity to purchase.

Set up the forum on organic agriculture within the APEC economies in the frameworks of the ATCWG to exchange the information and experiences as well as to ask the developed APEC economies for their support to develop the organic sector in term of food security and poverty reduction.

Organize a workshop on the standards and certification of organic agriculture and products, ask for the technical support from IFOAM and ITF in term of standards harmonization for organic products within the APEC economies to facilitate trade.

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9. ANNEX - Paper from regional workshop on development of organic agriculture in term of APEC food system and market access

Annex 1 - Development of Organic Agriculture in Malaysia

Annex 2 - Development of Organic Agriculture in Chile

Annex 3 - Development of Organic Agriculture in China

Annex 4 - Development of Organic Agriculture in Philippines

Annex 5 - Development of Organic Agriculture in Thailand

Annex 6 - Development of Organic Agriculture in Chinese Taipei

Annex 7 - Development of Organic Agriculture in Republic of Korea

Annex 8 - Development of Organic Agriculture in United States

Annex 1

"The Application of Organic Principles in Redesigning Sustainability"

Brendan J. Hoare

Introduction:

There is nothing more difficult, more doubtful of success, more dangerous to carry through than initiating change…The innovator makes enemies of all those who prosper under the old order, and only lukewarm support is forthcoming from those who would prosper under the new. Nicolas Machiavelli, 1513.The Prince.

We stand at a momentous period in human history. Never before have we faced overwhelming evidence for concern with the condition of the Earth's systems. People variables such as population growth, gross national product, motor vehicle ownership, water use, the damming of rivers, energy consumption, urban population and the growing disparity between the wealthy and poor have all jumped exponentially and simultaneously since 1950. In synchronicity to these events are nature's responses of CO_2, CH_4 and N_2O concentrations, ozone depletion, increased number of natural disasters, rate of loss of fisheries, rapid loss of tropical rainforests and woodlands and species extinction which have also jumped exponentially since 1950. Are we as capable of turning these trends around? What will it take to avoid what looks like an inevitable collision of humanity dissociation with nature and the colossal consequences?

It is an honour therefore to be presenting a paper at this Asia-Pacific Economic Cooperation (APEC) conference on the "Development of Organic Agriculture in Terms of APEC Food Systems and Market Access". While it is important we meet, take - stock of the situation at hand and share knowledge of each other's activities and insights, it is more important that we agree to create actions which result in meaningful change. It is of firm conviction that the principles and practices of Organic systems approaches are a cornerstone to the challenge humanity faces. This paper's purpose is to provide an overview and explore the importance of Organic principles in assisting with future change.

As a student of agriculture, landscape and rural development, a foundation of my early maturity in Organic systems was F.H. King's Farmers of Forty Centuries[1]. In this 1911 agricultural classic King, a soil scientist, described the methodology used by East Asian farmers, to sustain dense populations, enabled a wide variety of rural livelihoods, and enhance healthy soils for over 4,000 years. Describing cultivation, land management techniques, largely vegetarian based diets and utilization of waste King along, with Sir Albert Howard[2], whose work was mostly in the Indian sub continent, placed in motion the foundations of the modern Organic agriculture movement.

Asia, through these authors insight, provided the world the early inspiration and techniques required to develop an alternative to the rapidly expanding industrial agricultural revolution. Today many of the world's leading modern Organic agriculture movements (post 1930) such as United Kingdom Soil Association[3], The United State of America Rhodale Institute[4] and New Zealand Soil and Health Association[5] (founded in 1939) owe their foundations to this inspirational work.

Nearly one hundred years later we are aware that today industrial paradigm dominates the vast majority of decision making including agriculture. While this paradigm has on one hand offered us physical comfort and material security, it has come at tremendous ecological, biological, social and cultural cost. For its part, the current industrialization of food production is clearly unsustainable and we, the global society, are finally concluding that we have taken a wrong turn. We realize we have to change. It is a time of unprecedented need for international acceptance of the circumstances. We literally are in this predicament together, as one.

What a challenge and opportunity worth living for. We as APEC members now have a clear prospect to inspire and demonstrate a way-out of our current humanity cul-de-sac. We should be conscious though that little progress will be made unless we understand the premise of which Organic philosophy and practice is based on, our principles.

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[1] King F.H. 1911. "Farmers of Forty Centuries: or permanent agriculture in China, Korea and Japan. Carrie Baker King.

[2] Howard, Sir. A. "An Agricultural Testament." London: Oxford University Press, 1943.

[3] http://www.soilassociation.org

[4] http://www.rodaleinstitute.org

[5] www.organicnz.org

Situation Overview:

It is nearly 100 years since King witnessed, marveled and wrote of East Asia farming systems. As we continue to cruise the industrial paradigm and its production system based on "economic rationalism" we find ourselves in a set of circumstances unparalleled in history. The Ecological Millennium Assessment Report[6] (EMAR), completed in 2002, one of the most extensive social and natural scientific studies in human history, paints a seriously grim outlook.

The key findings of this report:

1. Provide us an insight into what we have actually done; taken the ecological and biological world to the edge of a massive wave of species extinctions, and decline of ecological services.
2. Warns us of the consequences of our continued folly; collapse of nature ability to deliver other key services such as purification of air and water, protection from disasters, and the provision of medicines.
3. Clearly outlines that our continued pattern of behavior will only exasperate the situation; unless human attitudes and actions change.
4. Offers clear suggestions regarding decision making; that measures to conserve natural resources are more likely to succeed if local communities are given ownership of them, share the benefits, and are involved in decisions.
5. Highlights the importance of technology in solving solutions; but warns that they are unlikely to be deployed fully, however, until ecosystem services cease to be perceived as free and limitless, and their full value is taken into account.
6. Provides clear indications to governments, businesses and international institutions; that the productivity of ecosystems depends on policy choices on investment, trade, subsidy, taxation, and regulation, among others.

More recently and pertinent to this conference are the findings of the World Bank initiated Report of the International Assessment of Agricultural

[6] http://www.millenniumassessment.org

Knowledge, Science and Technology for Development (IAASTD)[7]. Released in mid-April 2008, the multi-stakeholder group assessment, in open partnership with the FAO, GEF, UNDP, UNEP, UNESCO, the World Bank, and the WHO; 30 government representatives, and 22 representatives from civil society, the private sector, and scientific institutions from around the world including the International Federation of Organic Agriculture Movements (IFOAM).

The aim of the Assessment was to answer the question: how can "Agricultural Knowledge, Science, and Technology (AKST)" be used to reduce hunger and poverty, improve rural livelihoods, and facilitate equitable environmentally, socially, and economically sustainable development; and what policies can enable this to happen? It is a question equally pertinent to this conference.

The outcomes of the study recognized that our current "food crisis" is radically different from that in the 1960s. Summarized by Professor Hill[8], there are clear indications that we need to move:

1. From maximizing farm-level production (with imported inputs), to strategies to enable agriculture to serve multiple, mutually supportive, beneficial functions;
2. From naively simple, decontextual, centrally conceived (hierarchical) approaches to forcing change, to recognizing that non-hierarchical development models and contextually relevant information, incentives and supports are needed to enable individuals to make responsible, appropriate decisions that can have benefits that extend beyond the individual (such as the maintenance of global ecosystem services); and
3. From an over-focus on large, broadly similar farms, to small-scale farms in diverse ecosystems; taking a whole ecosystem, and whole of community, approach that builds on and integrates local resources and knowledge systems.

An explicit aim is to help those who have been served least by past Green Revolution-type approaches, i.e., resource-poor farmers, women and ethnic minorities; and they call for discontinuing subsidies that perpetuate practices that result in unsustainability and inequity.

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[7] http://www.agassessment.org

[8] *Hill, S. 2008 Editorial - Journal of Organic Systems Vol 3 No.1.*

Of interest to APEC was that rather than marginalizing (or critiquing) organic approaches, they recognize them as ideal ways to meet these revised aims of a sustainable agriculture.

The Director of IAASTD, Professor Robert Watson (Chief Scientist, World Bank), has stressed that genetically-modified crops are NOT the solution to spiraling food prices or Third World hunger; and that questions remain over their effects on human health and the environment. Similarly, using productive agricultural land to produce bio-fuels is also likely to exacerbate many of the problems highlighted in the report. To avoid such naïve proposals we urgently need better approaches to policy and management decisions that have a trans-generational perspective and that are multifunctional and caring.

Together these reports from our planet current leading minds conclude that it is not just a shift in practice that is required but a complete change in cultural attitude. According to the EMAR calculations, we have less than fifty years to change who we are, how we think and act towards each other and the Earth if we are to have a glimmer of hope. Together with this mental shift is the need to actually change what we do and how we do it. For humanity therefore, it is less an environmental issues and more a question of what it means to be human. It is heartening therefore to see reports like IAASTD actually recognizing many of the principles Organic systems have been espousing for decades.

The good news is that Organic system approaches now offer significant recognized solutions to the dilemma presented to society by world leaders through the EMAR and IAASTD studies. Organics does have an extensive network of science, technology, experience, institutional support and on the ground "know-how". It combines traditional and modern knowledge and through its principles has been able to capture a universal sign post for a "way out", of the humanity cul-de-sac we find ourselves in. In short, we hold and can demonstrate measurable solutions to the immediate changes required.

What Organic Systems Offers:

Today, according to IFOAM's latest survey [9], nearly 31 million hectares of the world's land are currently certified Organic. An additional 20 million is

[9] Willer, H., Yussefi-Menzler M., and Sorensen, N. (Editors) (2008): The World of Organic Agriculture - Statistics and Emerging Trends 2008. IFOAM

certified as "wild harvest", summing up to a total of 51 million hectares. Together with the solid market demand, Organic produce (at approximately 20% growth), is one of the fastest growing food and fiber sectors in the world. It is an exciting and very challenging environment to be involved in.

Fundamental to this growth and success has been the philosophical base of which Organics is built on and this paper addresses. The "principles" of Organics are what is internationally accepted as the foundation of decision making for farmers, certifiers, traders, consumers and governments. These principles are valued most when expressed as a practice (growing, buying, diet and decision making). This expression, or lifestyle created from this practice has wide approval and confidence from society. Organics is meeting a deeper need of our world citizens, reconnecting us with food, nature, wellbeing and our past.

IFOAM has offered these principles succinctly as health, ecology, fairness and care. These encapsulate the depth, extent or "holistic" nature of the approach. The thinking can also be thought of in the maxim adopted by the Rhodale Research Institute[10] and Soil Associations worldwide of "Healthy Soil, Healthy Food, Healthy People".

Today modern science concludes what traditional knowledge and Organic proponents have known for nearly 80 years, we literally are what we eat and while the gap in wealthy, poor, hungry and obese widens and becomes more apparent we should ask ourselves, "How could such profound simplicity be overlooked?" Emilio Moran a social anthropologists offers an important insight that, “Colonial powers organize themselves to exploit and use energy - and that countries they colonies, have distinctly similar bureaucratic organization to exploit resources long after the colonial powers have left. In other words how nations are politically structured to use resources has deep roots that often remain unexamined for decades, and even centuries. This suggests that the way nations use resources embodies histories, and myths, which remain hidden from public scrutiny because they have become culturally embedded”.[11]

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www.ifoam.org

[10] http://www.rodaleinstitute.org

[11] Moran, E.F (2006) pg 93. People and Nature: An Introduction to Human Ecological Relations. Blackwell publishing.

The dominant industrial paradigm expressed through agriculture now dominates the world food production and affects the way in which farmers behave, traders do business and the consumer interact with food. Through our global economic system it has now also become a culturally embedded practice. Organic system approaches challenges this cultural domination. We are part of a wider community of interests that through several decades has engaged in local, regional and international discussions on sustainability.

There is a clear sense that times are changing as a response to need. Today we live simultaneously in a time where we are seeing the very end of the agrarian paradigm, the realization that the dominant industrial one is ending and the emergence of a new paradigm. The modern Organic movement (post 1930) is now self evidently part of this new cultural paradigm phenomena. Through a strong philosophical and theoretical foundation which is based on practice and nature observation, it is helping explore and direct the future of sustainability dialogue. This new cultural paradigm again links us (farmer, trader, consumer) as a part of nature, wrapping us into its cycles, ebbs and flows that could be described as an "ecological and biological conscious" paradigm.

So, before this paper explores the new paradigm, it is important to ask the question, "Where is Organic practice on the sustainability spectrum?" Table 1 (page 7) "The Sustainability Spectrum in Relation to Food Production", is an attempt to address this and is adapted from Professor Stuart Hill"s work over the last three decades.[12] Its premise is based on the notion that if we are to change our current patterns of behavior, we must fist change our mindset and way of thinking of each other and the world around us. We literally have to create our way out of the situation we find ourselves in, but first we must have the collective will.

Table 1 depicts the "Industrial" method of farming and rationale decision making processes as a lineal mechanism that suffers little immediate consequences from its actions. Maximizing production with little attention to maintenance or protection of the water or soil quality means polluting pays. This system has dominated agriculture for the last 70 years, fits well with the rationalized market lead economies and leads us to our current global dilemma.

[12] Hill, S. B. 1985. "Redesigning the Food System for Sustainability" Alternatives 12 (3/4): 32-36. Also see www.organic-systems.org

Today, we see rapid attempts to become more "efficient" in our practices and it is this thinking that dominates the majority of our current sustainability debate. Central to this belief is that the more "efficient" we are in our use of chemicals and energy for example the more sustainable we may be. Many efficiency models such as "integrated pest management" and "integrated fruit production" are examples of this thinking. While this approach is a positive step in the correct direction, it does little to alleviate the urgency of the situation we find ourselves in. The reason for this is that the systems are often designed on the premise that we can make the industrial model continue to work, albeit efficiently. This thinking seldom responds adequately enough to the current dilemma the world faces. Efficiency models may be considered by some as first steps to sustainability, but in the grand scheme of the situation could be seen as a delay tactic ultimately perpetuating the status-quo.

Others believe that becoming sustainable requires us to follow best practices that substitute one "bad" practice for a "better" one. An example is of this is where "bad" chemicals and practices can be exchanged for the "good" ones (or even Organic permitted ones). This model can produce positive results across a wide spectrum. Nevertheless the thinking that drives these decisions is still fundamentally linear and industrial in their approach.

Today, the majority of Organic practices are actually functioning in "efficiency" and or "substitution" models, they are generally hybrids of the industrial paradigm. The Organic community, while offering measurable examples of change are, also stuck in the dominant paradigm of our age, the industrial one. The reason is fairly simple and consistent with Moran's earlier comment, we are born into the industrial dominant paradigm and our patterns of behavior (social, economic and cultural) are shaped by it. We may be leaving the industrial age but not its mythology. We are all creatures of habit. We need to break the habit. How do we do this?

Redesign approaches see a stark change in emphasis. Problems that are solved by eradication are replaced with preventative and selective ecological controls. The farm is seen as a living biological organism, not a factory. Emphasis is on maintenance and meeting real needs of current and future generations. The approach is broad focused, not narrow, maximization of production and profit is replaced with optimization and producers have a very high level of biological and ecological knowledge, and expertise is local. It is knowledge intensive, both in the traditional and

modern sense of the word, but this does not necessarily mean it is complex, as it is equally as reliant on traditional simplicity as modern complexity. It involves not only our farms but our cities and we design our infrastructures to enhance and support our eco-structures (life supporting systems e.g. soil, water and air). Society enters into lifelong learning mode and we become literate in the biological and ecological complexities of life which are learnt from the youngest of ages.

The challenge for sustainability is how we address the magnitude of the situation the EMAR and IAASTD reports provides us. The status-quo will not do, and for us to have any real impact, complete "redesign" of our physical, social and cultural parameters is required. Could a shift from an industrial paradigm towards a more biological and ecological conscious society committed to redesign be possible?

The principles of Organic systems approaches may well be a cornerstone in ensuring we do.

Table 1: The Sustainability Spectrum in Relation to Food Production

Industrial	**Efficiency**	**Substitution**	**Redesign**
Factory Farm	Low impact sustainable agriculture	Eco-agriculture	Natural farming
High Power	Conservation	Conservation	Low Power
Physico -chemical (soluble fertilizer, pesticides, GE)	Physics, chemistry, biology - slow release e.g. IPM, IFP	Biological and natural materials	Bio-ecological
Imported - input intensive	Efficient use	Alternative inputs	Knowledge skills intensive
Narrow focus - farm as factory (linear design and management)	Efficient factory	Softer factory	Broad focus -farm as ecosystem (integrated design and management)
Problems as enemies to eliminate and	Efficient control	Bio controls	Preventative, selective and ecological controls

control directly with inputs / products			(indirect process service approach)
Maximize production (neglects maintenance, create demands and multiples wants)	Maintain production while improving maintenance	Improved maintenance	Optimize production. Emphasis is on maintenance and meeting real needs of current and future generations
Infrastructures dominate and damage Ecostructures (riparian zones, wetlands, etc)	Infrastructures have lower impact on Eco-structures. Still high level of damage	Infrastructure has little or no damage on Eco-structures	Infrastructures that enhance Eco-structures

Principles of Organic Agriculture and their relationship to Redesigning our Future:

Adhering to ideals and practices of the Organic principles is essential for agriculture in redesigning our future. They are the design criteria from which we build on and check our progress. As already stated IFOAM's principles are:

1. Health - Organics should sustain and enhance the health of soil, [water] plant, animal, human and planet as one and indivisible.
2. Ecology - Organics should be based on living ecological systems and cycles, work with them, emulate them and help sustain them.
3. Fairness - Organics should build on relationships that ensure fairness with regard to the common environment and life opportunities and
4. Care - Organics should be managed in a precautionary and responsible manner to protect the health and well-being of current and future generations and the environment.

These four succinct principles emerged after several years of discussion within international Organic community[13]. They are a result of consensus building, which often entailed compromise. They serve us well when engaging new and emerging communities, explaining the fundamentals and developing a consensus.

Having international agreements are essential in a global conscious society. However, they often fall short of delivering the local expression or genus loci of land based actions and subsequent activity. Redesign does not mean a homogenization of belief, but actually the opposite. The local expression of what Organic means and how it is expressed is an essential tool in redesigning our future. The success of expressing the genus loci is a local expression to an international crisis, from it emerges local response, meaning and culture.

Local expression of principles is best described here by personal experience. The Biological Producers and Consumers Council of New Zealand[14], or better known internationally as BioGro, is New Zealand premier certifying agency bringing together a wide range of stakeholders. Established in 1983, BioGro first standards were written on two pages. BioGro was accredited by IFOAM in 1987 and today holds ISO 17020/EN 45004 accreditation, enabling its license access to markets and organic consumers the world over. It also serves the local domestic market through a varying arrangement of certification schemes and allows its rules to be utilized by the local Participatory Organic Guarantee System, Organic Farm New Zealand[15]. Its standards are reviewed every two years and the review committee has a strong consumer presence though the Soil and Health Association, a founder of BioGro.

A good standard is a guide or tool for better performance and decision making. BioGro purposefully places its principles at the beginning of its standards[16]. The principles therefore dominate BioGro's standard as to provide the practitioner and the auditor a point of reference. Their principles are not dissimilar to IFOAM's, yet provide a local interpretation of what it might mean to be accepted (through accreditation) as part of an international community.

[13] www.ifoam.org/principles
[14] *www.biogro.co.nz*
[15] *www.organicfarmnz.org.nz*
[16] *http://www.bio-gro.co.nz/content/files/1010430_intro.pdf*

Performance to the principles enables critical questions to be asked of the practitioner like, “How is the practitioner adhering to the principles?” How does a producer demonstrate them, foster beneficial processes reduce external controls to an absolute minimum, achieve cycles and flows as to minimize as fewer losses as possible, sustain and enhance the life supporting medium, minimize deleterious effects of management practices, ensure ethical treatment of animals and minimize the use of non renewable resources?

These are some of the questions posed through the use of principles. Good answers to these questions require the practitioner to have less an understanding of material inputs and other substitution or efficiency questions. It requires them to have a deep appreciation of the biological (living) and ecological (communities) systems they are working with. A whole farm management plan through time should chart their journey in adhering to the principles. The journey can take decades, it is often generational.

If we were to consider these principles using the model in Table 1, greater adherence to redesign methodology would see results in production systems that have very few off farm inputs, little disease and pathogen "problems". All fertility should ideally, be managed and manufactured on farm.

Through experiences of organizing tours to farms that have undergone a redesign process, many of those visiting comment that they "feel" different and that their experience of the "farm" is one they have never experienced before. These redesign systems are very complex, multi functional and often adhere to advanced principles of polycultural practices once found in abundance in Asia. They are extremely diverse and have a high level of design within them.

Developing such redesign models, based on principles is an essential task for leaders of sustainability. The expression of these models can vary in scale and purpose from the high profile Eden project in England[17] and Centre of Alternative Technology in Wales[18], to functioning farms[19] and

[17] www.**edenproject**.com
[18] www.cat.org.uk
[19] www.**rainbowvalley**farm.co.nz

community or citizen gardens[20]. These models of redesign inspire, and offer solutions to far more encompassing issues than agriculture.

How we articulate and demonstrate our response to principles and redesign is also expression of our inner thinking. Unitec New Zealand"s Organic demonstration, inspiration and research farm is an example of this. It has two names to express its bi-cultural approach to learning and relationship with local indigenous peoples. Its English name is "Unitec Hortecology Sanctuary". "Unitec" indicates its location. "Hortecology" is a word created to describe how and what it does; no conscious use of animal inputs and the practice is based on ecology. It also identifies an attitude that is bold, daring and willing to create not only new language, but new futures. Hortecology therefore is now a synonym of the word Organic. "Sanctuary" underlines our philosophy congruent with redesign; all living creatures are welcome, we see no difference between good or bad, we trust our design process is correct, where there is fault we take responsibility for our management and do not blame nature but move to correct our actions. Complimenting this is the Maori name "Mahi Whenua". "Mahi" translates simply as work, but is more descriptive in that "mahi" is abut all the emotions that go with our work; laugh, sweat, cry, bleed, toil, rejoice, success, failure and so forth. "Whenua" has a double meaning; land and also placenta. The careful selection of language provides an emotion to the reader even prior to seeing the land.

Language is therefore essential in describing our thinking and approach to redesign. Translating this "redesign" preference into Organic standards is a difficult task. How do we encourage not only producers, but all decision makers to adopt new behavior? Consumers are currently ahead of producers with this demand, prompting this change and creating the bullish Organic market and global movements[21] where leaders share, discuss and debate the latest and emerging issues. What are also emerging are new relationships between producers and consumers[22], including methods of purchase.

[20] *www.**ceres**.org.au*

[21] International Federation of Organic Agriculture Movemnts 16th Organic World Conference, “Cultivating the Future." Modena, 16-20 June 2008.

[22] Global Network of Local Solidarity Based Partnerships between Producers and Consumers www.urgenci.net

An example of this is the Lifestyles of Health and Sustainability[23] (LOHAS) community. Their in- depth analysis and tracking of this global trend is fascinating insight into what is shaping business decisions today. New relationships and businesses are emerging as a result. The whole redesign includes architecture, energy, industrial design and most importantly human decision making processes and spiritual well being.

What this means for top down thinking and bottom up action:

It is easier to continue with past routines than it is to start new ones, unless the benefits from developing a new routine are substantial. For decades governments have failed to respond to the ecological and biological feedback Organics offered. The development of political strategies to support the transition from conventional to sustainable agriculture and Organic systems approaches has progressed considerably over this period, but not fast enough. Central to the transition required to meet today''s pressing needs will be the ability to use the framework of conventional, efficiency / substitution and redesign models to categorize both farming systems and government activities. This framework can then be used to identify short, medium and long term strategies and have them supported by governments at the local, regional and central level. We can ill afford decisions that perpetuate the status-quo.

Immediate actions that can occur from top down approaches include:

1. Redirect funding to provide incentives to produce organically.
2. Extensive training and development in managing resources using redesign methodology.
3. Undertake commitment to education on exploring redesign.

The Organic community must organize itself with support, locally, regionally and internationally, with the most important being the local. Setting in place a clear united vision, developing clear strategies and taking on the challenge of the times is hard work. The stakes are very high, the need for the Organic community to perform is never more in need. There is a marked trend for countries to develop national visions and strategies with Australia, Japan, New Zealand and Chinese Taipei offering recent examples, all choosing different methods to structure themselves with quite

[23] http://www.lohas.com

different outcomes yet equally as effective.[24] IFOAM just recently published a document titled, "Building Sustainable Organic Sectors"[25], which describes how nations could develop their own Organic sectors, using case studies from other more developed countries.

There is also need for international regions to organize themselves. Europe has organized itself as IFOAM Europe, and there are now IFOAM regions emerging in South America and regions of Africa, while there are information points in Japan, and China. The Oceania Pacific region is organizing itself with informal forums as has East Asian nations, which came together in Chinese Taipei end of November 2006 and again now in Vietnam, June 2008. There is equal need for co-operation that is not bound by national or political borders but through common interests like research, education, rice or trade.

Conclusion:

Without a deep transformative shift that involves top down thinking (institutional direction and enabling) and bottom up action little change can realistically take place towards redesigning our future. While Organic system approaches offer real solutions to the calamity we find ourselves in, unrealistic expectations are to be cautioned, it is no panacea.

We are now very conscious of the need to shift our perspectives from industrial mechanic and deterministic assumptions on resource and environmental management to a more dynamic and organic way of thinking. Organic principles bridge the social and biophysical sciences to better understand how humans and nature affect and depend on each other. Never before have we relied on each other and the future will determine how effective we were at implementing the task at hand.

APEC economies while trusting our own intuition and cultural intelligence need to work together on progressive steps internationally. We must encourage one another to undertake the transformation from the industrial paradigm through the efficiency and substitution and redesign models towards a more biological and ecological conscious society.

[24] See Australia"s www.ofa.og and http://www.martech.co.nz/oss.html for New Zealand"s National Organic Strategy

[25] Kallander, I. and Rundgren, G. (2008) Building Sustainable Organic Sectors, Report to IFOAM.

The organic community itself must also retain the leadership required to maintain the dynamic tension in shifting consciousness. We acknowledge that we operate at all levels of the sustainability spectrum. Through our principles we not only offer the design criteria for change but the key to "bottom up" action that gives the "top down" thinking form. This maintained tension follows on the work of Organic pioneers who have laid the fertile ground for which Organic systems approaches now prospers.

Finally, we have enough evidence through international reports that we need to transform our behavior and thinking now. It is no longer responsible to postpone decisions pending on more study that may shed more light on more studies. Perhaps the platform for immediate change could be adapted from MacRae, Hill, Henning and Betly's[26] work, which in working with the Canadian government in the early 1990"s concluded a seven fold strategic plan that when adapted to APEC nations would involve:

1. Long term design and management of the food system using "end use analysis.
2. Initiatives to finance a transition to sustainable Organic agriculture.
3. Developing an optimal diet scenario and its systematic implications.
4. Design of an optimal reward system for land based professionals.
5. Studies of the implications of widespread adoption of sustainable practices in APEC nations.
6. Design of a participatory goal articulation for the food systems.
7. Redefining risk against the EMAR and ISAASTD studies.

Machiavelli[27] in his classic The Prince made it very clear that nothing is more difficult or doubtful than change. The magnitude of the task at hand is understood as is the courage and boldness required to make it happen. It is in gatherings like this APEC conference that such challenges can be met

[26] MacRae, R.J., Hill, S.B., Henning, J. and Betly, A.J. 1990 "Policies programs and regulations to support the transition to sustainable agriculture in Canada." American Journal of Alternative Agriculture. Vol 5, Number 2.
[27] Machiavelli, N (1513), The Prince, Penguin, London(1967).

straight on and we can draw on each other determination and will to actualize and bring Organic principles into direct action. Our responsibility over the next three days together is to work hard to ensure such leadership forums translate into direct measurable change towards using redesign methodology to wards a biological and ecological conscious society.

Annex 2

Organic Agriculture as a Model for Environmental Sustainability

Leu, Andre

Introduction

The recent United Nations Millennium Ecosystem Assessment Synthesis Report (MA Report 2005) raises serious questions about the sustainability of many of our current agriculture practices. *"Over the past 50 years, humans have changed ecosystems more rapidly and extensively than in any comparable period of time in human history, largely to meet rapidly growing demands for food, fresh water, timber, fiber and fuel. This has resulted in a substantial and largely irreversible loss in the diversity of life on Earth."*

A 2001 study from the University of California stated that agriculture will be a major driver of global environmental change over the next 50 years, rivaling the effect of greenhouse gases in its impact. The lead author, David Tilman, found that the use of pesticides, chemical fertilisers and habitat destruction have caused a major extinction event that is lowering the world's biodiversity and changing its ecology. Tilman stated *"Neither society nor most scientists understand the importance of agriculture. It's grossly misunderstood, barely on the radar screen, yet it is likely as important as climate change. We have to find wiser ways to farm"* (Tilman et al 2001).

1.1.1.1 Synthetic Chemicals in the Environment

Tilman and other researchers have raised the issue of agricultural chemicals as significant contributors to global environmental change due persistent and short term environmental toxicants that are responsible for endocrine disruption, immune system diseases and developmental toxicity (*Aldridge 2003, Buznikov 2001, Cabello 2001, Colborn 1996, Hayes 2002, Hayes 2003, Qiao 2001, Short 1994, Storrs 2004, Tilman et al 2001*).

1.1.1.2

Synthetic biocides (pesticides, fungicides and herbicides) have increased exponentially from when Rachel Carson wrote Silent Spring *(Carson 1962).*

More than 7200 registered biocide products are now used in Australian agriculture *(Infopest 2004).* This is similar in the North America and Europe.

The body of science showing that agricultural chemicals are responsible for declines in biodiversity and other environmental health problems continues to grow. These toxic chemicals now pervade the whole planet, polluting our water, soil, air and most significantly the tissues of most living organisms (*Short 1994, Colborn 1999*).

1.1.1.3 Environmental Fate

Pesticides continue to pollute our drinking water and air. In 1999, Swiss research demonstrated that some of the rain falling on Europe contains such high levels of pesticides that it would be illegal to supply it as drinking water (*Pearce 1999).* Rain over Europe is laced with atrazine, alochlor, 2,4-D and other common agricultural chemicals sprayed onto crops. A 1999 study of rainfall in Greece found one or more pesticides in 90% of 205 samples taken. Atrazine was measurable in 30% of the samples (*Charizopoulos 1999.)*

The situation is similar in the USA. *"The U.S. Geological Surveys (USGSs) recent national monitoring study found atrazine in rivers and streams, as well as groundwater, in all 36 of the river basins that the agency studied. It is also often found in air and rain; USGS found that atrazine was detected in rain at nearly every location tested. Atrazine in air or rain can travel long distances from application sites. In lakes and groundwater, atrazine and its breakdown products are persistent, and can persist for decades." (Cox 2001).*

Atrazine interferes with the endocrine system *(Hayes 2002, Hayes 2003, Storrs 2004)*

It causes tumors of the mammary glands, uterus, and ovaries in animals (*USEPA 2002).* Studies suggest that it is one of a number of agricultural chemicals that cause cancer in humans (*International Agency for Research on Cancer 1999, Mills 2002).*

1.1.1.4 Environmental Health

In experiments conducted by Warren Porter et al. at the University of Wisconsin-Madison, mice were given drinking water with combinations of

pesticide, herbicide and nitrate, at concentrations currently found in groundwater in the USA. They exhibited altered immune, endocrine and nervous system functions (*Porter 1999).*

Porter showed that the influence of pesticide, herbicide and fertilizer mixtures on the endocrine system may also cause changes in the immune system and affect fetal brain development. Of particular concern was thyroid disruption in animals. This has multiple consequences including effects on brain development, sensitivity to stimuli, ability or motivation to learn and an altered immune function.

A later experiment by Porter and colleagues found that very low levels of a mixture of the common herbicides 2,4-D, Mecoprop, Dicamba and inert ingredients, caused a decrease in the number of embryos and lives births in mice at all doses tested. Very significantly the data showed that low and very low doses caused these problems (*Cavieres 2002).*

1.1.1.5

Research shows that the current toxicology models used by our authorities are inadequate in determining the safety of many chemical compounds (*Aldridge 2003, Buznikov 2001, Cabello 2001, Colborn 1996, Hayes 2002, Hayes 2003, Qiao 2001, Short 1994, Storrs 2004).*

A significant numbers of studies show that compounds considered to have very little toxicity in parts per million (ppm) have a range of adverse effects in parts per billion (ppb). These compounds disrupt hormone systems at levels 1000 times lower than previous research stated was safe. Agricultural chemicals have been shown to mimic hormones such as estrogen, blocking hormone receptors or stopping hormone activity. These chemicals have been implicated in lower sperm counts, increases in breast, uterine, testicular and prostate cancers and deformities in the genital-urinary tracts in a wide range of species, including humans *(Colborn 1996).*

An example of this is Atrazine - one of the worlds most commonly used herbicides. Two peer reviewed studies conducted by Tyrone Hayes showed that levels 1000 times lower than currently permitted in our food cause severe reproductive deformities in frogs (*Hayes 2002, Hayes 2003).*

Sara Storrs and Joseph Kiesecker of Pennsylvania State University recently confirmed Hayes" research. They exposed tadpoles of four frog species to Atrazine. *"Survival was significantly lower for all animals exposed to 3 ppb compared with either 30 or 100 ppb… These survival patterns*

highlight the importance of investigating the impacts of contaminants with realistic exposures and at various developmental stages" (Storrs 2004).

Dan Qiao et al. of the Department of Pharmacology and Cancer Biology, Duke University Medical Center found that the developing fetus and the newborn are particularly vulnerable to amounts of pesticide far lower than currently permitted by most regulatory authorities around the world. Their studies showed that the fetus and the newborn possess lower concentrations of the protective serum proteins than adults (*Qiao 2001).* A major consequence is developmental neurotoxicity, where the poison damages the developing nervous system (*Aldridge 2003, Buznikov 2001, Cabello 2001).*

The scientists stated: *"These results indicate that chlorpyrifos and other organophosphates such as diazinon have immediate, direct effects on neural cell replication... In light of the protective effect of serum proteins, the fact that the fetus and newborn possess lower concentrations of these proteins suggests that greater neurotoxic effects may occur at blood levels of chlorpyrifos that are nontoxic to adult." (Qiao 2001).*

Epidemiology and Scientific Testing

Most of the biocides used in farming are synthetic chemicals that have never existed in nature before. Scientists are continuing to find serious unintended consequences on the environment and human health. An abundance of published scientific research links commonly used pesticides such as Malathion, Diazinon, Chlorpyrifos and other organophosphates as well as the carbamates, synthetic pyrethroids and herbicides to disruptions the hormone, nervous and immune systems. They are also linked to cancers such as pancreatic, colon, lymphoma, leukemia, breast, uterine and prostate. Autoimmune diseases linked include asthma, arthritis and chronic fatigue syndrome (*Aldridge 2003*, *Hardell 1999, Harras 1996*, *Nordstrom 1998*, *Cox 2001, Cox 2004, Buznikov 2001*, *Cabello 2001, Garry 2001***,** *Steingraber 1997).*

This paper cannot detail them all; however, a few examples of common herbicides follow. A case-controlled study published in March 1999 by Swedish scientists Lennart Hardell and Mikael Eriksson showed that non-Hodgkin's lymphoma (NHL) is linked to exposure to a range of pesticides and herbicides (*Hardell 1999).* Hardell and Eriksson published an earlier

study linking phenoxy herbicides such as 2,4-D. to non-Hodgkin's lymphoma (NHL) in 1981.

Before the 1940s, non-Hodgkin's lymphoma was one of the world"s rarest cancers. Now it is one of the most common. Between 1973 and 1991, the incidence of non-Hodgkin's lymphoma in the U.S. increased at a rate of 3.3% per year, to become the third fastest-growing cancer. In Sweden, the incidence of NHL has increased at the rate of 3.6% per year in men and 2.9% per year in women since 1958 *(Harras 1996).*

One of the biocides linked to NHL by the Hardell study is Glyphosate. A previous study in 1998 had implicated Glyphosate to hairy cell leukemia (*Nordstrom 1998).* Several animal studies have shown that Glyphosate can cause gene mutations and chromosomal aberrations (*Cox 2004).*

Research has shown that glyphosate can cause genetic damage, developmental disruption, morbidity and mortality in amphibians at normal levels of use *(Clements et al. 1997, Howe et al. 2004, Lajmanovich et al. 2003).*

Clements et al. published a study showing damage to DNA in bullfrog tadpoles after exposure to glyphosate. The scientists concluded that its "genotoxicity at relatively low concentrations" was of concern *(Clements et al 1997).*

A 2003 study showed that a glyphosate herbicide caused both mortality and malformations in a common tadpole *(Lajmanovich et al 2003).* A 2004 study conducted by biologists at Trent University, Carleton University, (USA) and the University of Victoria (Canada) showed that "environmentally relevant" concentrations of several glyphosate herbicides caused developmental problems in a common tadpole. The exposed tadpoles did not to grow to the normal size, took longer than normal to develop and between 10 and 25 percent had abnormal sex organs *(Howe et al. 2004).*

1.1.1.5.1 Chemical Fertilisers

The United Nations MA Report on the environment found that: *"Since 1960, flows of reactive nitrogen in terrestrial ecosystems have doubled, and flows of phosphorus have tripled. More than half of all the synthetic nitrogen fertilizer… ever used on the planet has been used since 1985."* Soluble fertilisers from conventional farming systems are causing the eutrophication of freshwater and coastal marine ecosystems and acidification of freshwater and terrestrial ecosystems. These are regularly creating harmful algal blooms and leading to the formation of oxygen-depleted zones that kill

animal and plant life. The dead zones in the Gulf of Mexico and parts of the Mediterranean are examples *(MA Report 2005)*.

Scientists have recently shown that tropical and subtropical oceans are acutely vulnerable to nitrogen pollution. They stated *"Our findings highlight the present and future vulnerability of these ecosystems to agricultural runoff" (Bemani 2005).* The governments of Germany and France have encouraged conversion to organic farming to improve water quality, particularly in relation to its nitrogen and pesticide content *(FAO 2000).*

1.1.1.6 Organic Farming as Viable Farming Alternative?

Organic production does not use any of these problematic inputs and can be seen as a cost effective solution to ensure that they do not enter the environment. Several peer reviewed comparison studies have found that organic agricultural systems are the most environmentally sustainable and have the least off-farm impact of our current agricultural systems *(Drinkwater 1998, Welsh 1999, Reganold et al 2001, Mader et al 2002, Pimentel 2005).*

1.1.1.7 Definition Organic Farming

For the purposes of this paper the definition of organic farming is the one used by the National Standard for Organic and Biodynamic Produce. This is the standard used as the basis of certifying organic farmers and processors in Australia. It is closely aligned with the standards used to certify organic production systems in Europe, North America and Japan.

The definition in the standard states: ***"organic:*** *means the application of practices that emphasize the:*

- *use of renewable resources; and*
- *conservation of energy, soil and water; and*
- *recognition of livestock welfare needs; and*
- *environmental maintenance and enhancement, while producing optimum quantities of produce without the use of artificial fertiliser or synthetic chemicals (National Standard 2005).*

Organic systems recognize that the health of the soil is directly connected to the health of the food we eat and, ultimately the health of the people who consume it and the environment we live in. *"Healthy soil is the prerequisite for healthy plants, animals and products. With organic farming, the care of a*

living soil and consequently the maintenance or improvement of soil structure, fertility and nutrient cycling is fundamental to all measures adopted" (National Standard 2005).

These farming systems severely limit the use of water soluble fertilisers and do not use synthetic pesticides. They improve the soil fertility using composts, mineral fertilisers, cover crops and organic materials. Cultural and ecological management systems are used as the primary control of pests, weeds and disease, with a limited use of biocides of mineral, plant and biological origin as the tools of last resort.

Can Organic Agriculture Achieve High Yields?

The advent of chemical fertilisers, pesticides, herbicides, improved crop varieties and industrial paradigms are credited with producing the high yields of "green revolution". Because organic agriculture avoids many of these new inputs, it is assumed that it always results in lower yields. As a result, apart from some countries in Western Europe, it is largely ignored by researchers and regulators as a viable solution to many of the problems caused by current farming techniques. An example of this is the current White Paper that the Australian Government is using to guide it on its policy decisions *(Agriculture and Food Policy Reference Group 2006).*

1.1.1.8 Yields

It is essential that farming systems produce good yields to ensure that enough food, fiber and fuel can be produced on existing farmland, so there is no pressure for increased habitat destruction. While many organic systems have lower yields, there are numerous studies showing that best practice organic agriculture can achieve comparable yields to intensive conventional agriculture, including *(Pretty 1995, Pretty 1998a, Welsh 1999, Reganold et al 2001, Parrot 2002, Leu 2004 and Pimentel 2005)*.

The assumption that greater inputs of synthetic chemical fertilisers and pesticides are needed to increase food yields is not always accurate. In a study published in The Living Land, Professor Pretty looked at projects in seven industrialized countries of Europe and North America. *"Farmers are finding that they can cut their inputs of costly pesticides and fertilisers substantially, varying from 20-80%, and be financially better off. Yields do fall to begin with (by 10-15% typically), but there is compelling evidence that they soon rise and go on increasing. In the USA, for example, the top quarter sustainable agriculture farmers now have higher yields than*

conventional farmers, as well as a much lower negative impact on the environment." (Pretty1998a).

A scientific review by Cornell University of a 22 year-long comparison field trial of organic and conventional farming systems, publish in the journal *Bioscience (Pimentel 2005),* found that:

- the improved soil allowed the organic land to generate yields equal to or greater than the conventional crops after 5 years;
- the yield of conventional crops declined substantially during drought years;
- the organic crops fluctuated only slightly during drought years, due to greater water holding potential in the enriched soil.

Professor George Monbiot, in an article in the *Guardian*, 24th August 2000, wrote that wheat grown with manure has produced consistently higher yields for the past 150 years than wheat grown with chemical nutrients, in trials in the United Kingdom (*Monbiot 2000).*

The study into apple production conducted by Washington State University compared the economic and environmental sustainability of conventional, organic and integrated growing systems in apple production and found similar yields. *"Here we report the sustainability of organic, conventional and integrated apple production systems in Washington State from 1994 to 1999. All three systems gave similar apple yields" (Reganold et al. 2001).*

In an article published in the peer review scientific journal, *Nature*, Laurie Drinkwater and colleagues from the Rodale Institute showed that organic farming had better environmental outcomes as well as similar yields of both products and profits when compared to conventional, intensive agriculture *(Drinkwater 1998.)*

Dr Rick Welsh, of the Henry A Wallace Institute reviewed numerous academic publications comparing organic production with conventional production systems in the USA. The data showed that the organic systems were more profitable. This profit was not always due to premiums but due to lower production and input costs as well as more consistent yields. Dr Welsh"s study also showed that organic agriculture produced better yields

than conventional agriculture in adverse weather events, such as droughts or higher than average rainfall (*Welsh 1999).*

The editorial of *New Scientist* February 3, 2001 stated that low-tech sustainable agriculture is increasing crop yields on poor farms across the world, often by 70 per cent or more. This has been achieved by replacing synthetic chemicals in favor of natural pest control and natural fertilizers (*New Scientist 2001).*

Professor Jules Pretty, the Director of the Centre for Environment and Society at the University of Essex in the UK wrote: *"Recent evidence from 20 countries has found more than 2 million families farming sustainably on more than 4-5 million hectares. This is no longer marginal. It cannot be ignored. What is remarkable is not so much the numbers, but that most of this has happened in the past 5-10 years. Moreover, many of the improvements are occurring in remote and resource-poor areas that had been assumed to be incapable of producing food surpluses"* (*Petty 1998b).*

Professor Pretty gives other examples from around the world of increases in yield when farmers have replaced synthetic chemicals and shifted to sustainable/organic methods.

- *223,000 farmers in southern Brazil using green manures and cover crops of legumes and livestock integration have doubled yields of maize and wheat to 4-5 tons/ha.*
- *45,000 farmers in Guatemala and Honduras used regenerative technologies to triple maize yields to 2-2.5 tons/ha and diversify their upland farms, which has led to local economic growth that has in turn encouraged re-migration back from the cities.*
- *200,000 farmers across Kenya as part of sustainable agriculture programs have more than doubled their maize yields to about 2.5 to 3.3 t/ha and substantially improved vegetable production through the dry seasons.*
- *100,000 small coffee farmers in Mexico have adopted fully organic production methods, and increased yields by half.*
- A million wetland rice farmers in Bangladesh, China, India, Indonesia, Malaysia, Philippines, Sri Lanka, Thailand and Vietnam have shifted to sustainable agriculture, where group-based farmer-field schools have enabled farmers to learn alternatives to pesticides increased their yields by about 10% *(Pretty 1995).*

Nicolas Parrott of Cardiff University, UK, authored a report, "The Real Green Revolution'. He gives case studies that confirm the success of organic and agroecological farming techniques in the developing world *(Parrott 2002).*

- *In Madhya Pradesh, India, average cotton yields on farms participating in the Maikaal Bio-Cotton Project are 20 per cent higher than on neighbouring conventional farms.*
- *In Madagascar, SRI (System of Rice Intensification) has increased yields from the usual 2-3 tons per hectare to yields of 6, 8 or 10 tons per hectare.*
- *In Tigray, Ethiopia, a move away from intensive agrochemical usage in favour of composting has seen an increase in yields and in the range of crops it is possible to grow.*
- *In the highlands of Bolivia, the use of bonemeal and phosphate rock and intercropping with nitrogen fixing Lupin species have significantly contributed to increases in potato yields (Parrott 2002).*

Farm Income

A viable income is an essential part of farm sustainability. Published studies comparing the income of organic farms with conventional farms have found that the net incomes are similar, with best practice organic systems having higher net incomes (*Cacek 1986).*

A study in the USA by Dr Rick Welsh of the Wallace Institute has shown that organic farms can be more profitable. The premium paid for organic produce is not always a factor in this extra profitability. Dr Welsh analyzed a diverse set of academic studies comparing organic and conventional cropping systems. Among the data reviewed were six university studies that compared organic and conventional systems (*Welsh 1999.)*

The study into apple production conducted by Washington State University showed that the break-even point was nine years after planting for the organic system and 15 and 16 years respectively for conventional and integrated farming systems *(Reganold et al. 2001.)*

1.1.1.9

" When compared with the conventional and integrated systems, the organic system produced sweeter and less tart apples, higher profitability and greater energy efficiency" (Reganold et al. 2001).

1.1.1.10 Environmental Benefits of Organic Farming

Studies show, due to not using soluble fertilizers and pesticides, building high soil humus content and soil conservation techniques, that there is minimal soil and nutrient run-off as well as higher biodiversity on organic farms] *(Reganold et al 1987, Zimmer 2001, Reganold et al 2001, Drinkwater 1998, Welsh 1999).*

A 21-year study by Swiss researchers *(Mader et al. 2002*), published in *Science* shows that organic farming is more energy-efficient than conventional farming. The study found that organic fields have healthier soil and a greater diversity and number of organisms, including earthworms, beneficial fungi, beetles and wild plants.

A long-term study conducted by the Washington State University published in the science journal *Nature* showed that the total environmental impact of conventional farming systems was 6.2 times higher than organic systems *(Reganold et al 2001).*

Biodiversity

Conserving biodiversity is a requirement of certified organic agriculture. All certified Australian organic farms must have at least 5% of the farm dedicated to biodiversity *(National Standard 2005).*

Research conducted in Europe and the United States shows that organic systems have the highest biodiversity in the fields of the farming system *(Reganold et al. 2001, Mader et al. 2002, Pimentel 2005).*

The largest review of 76 studies from around the world comparing organic to conventional agriculture published in the Journal *Biological Conservation* found that organic farming increases biodiversity at every level of the food chain from soil biota such as bacteria to higher animals such as mammals *(Hole et al 2004).*

"It identifies a wide range of taxa, including birds and mammals, invertebrates and arable flora that benefit from organic management

through increases in abundance and/or species richness. It also highlights three broad management practices (prohibition/reduced use of chemical pesticides and inorganic fertilisers; sympathetic management of non-cropped habitats; and preservation of mixed farming) that are largely intrinsic (but not exclusive) to organic farming, and that are particularly beneficial for farmland wildlife" (Hole et al 2004).

An earlier report by the Food and Agriculture Organization of the United Nations (FAO) stated: "*Organic agriculture has demonstrated its ability to not only produce commodities but also to "produce" biodiversity at all levels*" *(FAO 2003).*

1.1.1.11 Erosion and Soil Loss

Soil loss and erosion from farming systems is a major concern around the world *(MA Report 2005).* Comparison studies have shown that organic systems have less soil loss due to the better soil health *(Reganold et al. 1987, Reganold et al. 2001, Mader et al. 2002, Pimentel 2005).*

"We compare the long-term effects (since 1948) of organic and conventional farming on selected properties of the same soil. The organically-farmed soil had significantly higher organic matter content, thicker topsoil depth, higher polysaccharide content, lower modulus of rupture and less soil erosion than the conventionally-farmed soil. This study indicates that, in the long term, the organic farming system was more effective than the conventional farming system in reducing soil erosion and, therefore, in maintaining soil productivity" (Reganold et al. 1987).

1.1.1.12 Greenhouse Gas Abatement

Two published studies *(Mader et al. 2002, Pimentel 2005)*, in peer reviewed scientific journals, of long-term comparison trials (21 and 22 years) of conventional and organic systems have found that the organic systems use less fossil fuels and therefore emit significantly lower levels (around 30%) of greenhouse gases.

The long-term apple comparison trial conducted by Reganold et al. in Washington USA showed that the organic system was more efficient in it energy use. *"When compared with the conventional and integrated systems, the organic system produced sweeter and less tart apples, higher profitability and greater energy efficiency" (Reganold et al 2001).*

A significant tenet of organic agriculture is to build up soil fertility by increasing the levels of organic carbon compounds in the soil. This is primarily achieved by using photosynthesis to convert atmospheric carbon dioxide (CO_2) and using management techniques that covert these plants into soil organic matter. *"Sufficient organic material should be regenerated and/or returned to the soil to improve, or at least maintain, humus levels. Conservation and recycling of nutrients is a major feature of any organic farming system" (National Standard 2005).*

Many of the current conventional agriculture techniques have caused a massive decline in soil organic matter, due to oxidizing organic carbon by incorrect tillage, the overuse of nitrogen fertilizers and from topsoil loss through wind and water erosion *(Handrek 1990, Zimmer 2001, Tilman 2001, MA Report 2005).*

According to Dr Christine Jones, one of Australia's leading experts on carbon sequestration,

"Every tonne of carbon lost from soil adds 3.67 tonnes of carbon dioxide (CO_2) gas to the atmosphere. Conversely, every 1 t/ha increase in soil organic carbon represents 3.67 tonnes of CO_2 sequestered from the atmosphere and removed from the greenhouse gas equation".

"For example, a 1% increase in organic carbon in the top 20 cm of soil with a bulk density of 1.2 g/cm^3 represents a 24 t/ha increase in soil OC which equates to 88 t/ha of CO_2 sequestered" (Jones 2006).

Farming techniques, such as organic farming, that deliberately concentrate on increasing soil organic carbon can make a significant difference to reversing the current increasing levels of green house gases.

Data from the Rodale Institute's long-running comparison of organic and conventional cropping systems confirms that organic methods are far more effective at removing carbon dioxide from the atmosphere and fixing it as beneficial organic matter in the soil.

According to the Rodale Institute, *"U.S. agriculture as currently practiced emits a total of 1.5 trillion pounds of* CO_2 *annually into the atmosphere.*

Converting all U.S. cropland to organic would not only wipe out agriculture's massive emission problem. By eliminating energy-costly chemical fertilizers, it would actually give us a net increase in soil carbon of 734 billion pounds" (Rodale 2003). On a worldwide scale, if we had hundreds of millions of hectares of organic farming it would equate to removing billions of tonnes of CO_2 from the atmosphere.

1.2 Organic Systems Use Water More Efficiently

The United Nations" MA report states: *"The amount of water impounded behind dams quadrupled since 1960, and three to six times as much water is held in reservoirs as in natural rivers. Water withdrawals from rivers and lakes doubled since 1960; most water use (70% worldwide) is for agriculture" (MA Report 2005).*

Research shows that organic systems use water more efficiently due to better soil structure and higher levels of humus. *(Lotter 2003, Pimentel 2005) "Soil water held in the crop root zone was measured and shown to be consistently higher by a statistically significant margin in the organic plots than the conventional plots, due to the higher organic matter content in the organic treated soils" (Lotter 2003).*

The open structure allows rain water to quickly penetrate the soil, resulting in less water loss from run off. *"The exceptional water capture capability of the organic treatments stood out during the torrential downpours during hurricane Floyd in September of 1999. The organic systems captured about twice as much water as the CNV* [conventional] *treatment during that two day event" (Lotter 2003).*

Humus stores 20 times it weight in water so that rain and irrigation water is not lost through leaching or evaporation (Handrek 1990, Stevenson 1998, Handrek and Black 2002). It is stored in the soil for later use by the plants (Drinkwater 1998, Zimmer 2000, Mader 2002). One consistent piece of information coming from many studies is that organic agriculture performs better than conventional agriculture in adverse weather events, such as droughts *(Drinkwater, L. E., Wagoner, P. & Sarrantonio, M. 1998, Welsh R. 1999, Lotter 2003, Pimentel 2005).*

2 . Conclusion

A large body of published science shows that organic agricultural systems are amongst the most environmentally sustainable of our

current agricultural systems. They have the highest biodiversity, do not use the environmentally problematic inputs of pesticides and soluble fertilisers, have the least run off, soil loss, reduce greenhouse gases, have efficient water use and achieve good yields of high quality produce.

Conversion to organic farming is an effective solution to many of environmental problems caused by some of our current farming systems. The United Nations Food and Agriculture Organization stated: "*Organic agriculture should be considered simply as the most appropriate starting point... Its widespread expansion would be a cost-efficient policy option for biodiversity" (*FAO 2003).

The long term comparison study by Washington State University concluded: *"Our data indicate that the organic system ranked first in environmental and economic sustainability, the integrated system second and the conventional system last" (*Reganold et al. 2001).

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Annex 3

Organic Lychee, Rambutan, Star Apple, Mangosteen and Durian Production

Leu, Andre.[28]

Key words: Organic Lychee, Rambutan, Star Apple, Mangosteen, Durian

Abstract

Lychees (*Litchi chinensis* Sonn.), rambutans (*Nephelium lappaceum* L.), star apple (*Chrysophyllum caimito)*, mangosteen (*Garcinia mangostana*) and durian *(Durio zibethinus*) are grown organically in Australia. Organic soil nutrition, weed, pest and disease management allows the farm to produce high yields of quality fruit. The use of insectary plants and other organic control methods has resulted in a significant reduction in insect pests and diseases. IPM scouting surveys show that the organic farm has the least number of insect pest species. Soil tests show that soil fertility is constantly increasing.

Introduction

Daintree Tropical Fruit Orchards is a certified organic 64 hectare farm in Queensland, Australia (145^{o}: 56"E, 16^{o}: 17"S). The climate is wet tropical with an average annual rainfall over 3000mm. The farm currently has 4 hectares producing lychees and rambutans with another 2 hectares under a range of tropical fruits. Quality controlled Lychees, Rambutans, Star Apples, Mangosteen and Durian are produced in commercial quantities.

Description of Farming Operation

Nutrition

Good soil health is the key principle to successful organic farming. Organic carbon, particularly in the form of humus, gives the soil an open friable structure to aid both drainage and water retention and buffers the pH. The

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other key is to have a balanced mineral rich soil. *Handrek (1990) Zimmer (2000)*

Humus and related organic carbon compounds create large complex organic molecules that allow minerals ions to adsorb to them. The plant roots obtain these adsorbed ions through ion exchange rather than uptake through the soil solution. *Handrek (1990) Zimmer (2000)*

This is very important in areas that are inundated with a heavy monsoonal rainfall as these carbon molecules prevent the mineral ions from leaching, keeping these on farm for later use by crops. The carbon colloids act as a storage bank and buffer for these minerals. This is particularly important for anions like boron, sulphur and nitrate that are prone to leaching in tropical soils in high rainfall areas. Clay colloids have very few sites for holding anions, whereas humus colloids do have sites. *Handrek (1990)*

Humic and related acids from the organic carbon complexes help make inorganic minerals available to plants. *Handrek (1990) Handrek (2002) Zimmer (2000)*

The other important function of organic carbon is to encourage beneficial soil microorganisms that make minerals such as nitrogen, phosphorous, potassium and trace elements bio-available. Research by Professor Elaine Ingham and others show that a significant percentage of the soil nutrients are held in the microorganisms and they are steadily released to plants through normal biological activity. Organic carbon complexes also provide a host for beneficial fungi such as T*richoderma sps* that help control pathogens such as *Rhizoctonia, Phytophthora*, A*milleria* and *Pythium. Ingham (1993, 1994, 1998)* Krasil"nikov *(1961) Handrek (1990) Handrek (2002) Zimmer (2000)*

A complete analysis soil test is used to assess the mineral balance of the soil, based on a modified Albrecht system. Most of the required nutrients are obtained as ground minerals such as lime, dolomite, gypsum, rock phosphate, basalt quarry dust, granite dust and naturally mined potassium sulfate. Except for nitrogen these will supply virtually every major element and most of the trace elements. Legumes, manures and naturally occurring free bacteria are used to provide nitrogen, as well many other nutrients. *Zimmer (2000)* Trace elements are applied periodically.

Compost is made every second year using deep litter chicken manure, ground minerals and organic mulch from the farm. The composting process is an important method of speeding up the process of turning insoluble

minerals into plant available forms. *Handrek (1992) Handrek (2002) Ingham (1993, 1994, 1998)*

Soil tests conducted by Australian Perry Agricultural Laboratory show a significant improvement in soil fertility on the long term treated areas of the farm over the untreated areas. Soil organic matter has increased from just over 1% to over 9% in 11 years. The Total exchange capacity has increased from 6.66 to 24.78. Available N from 46 kg/ha to 123 kg/ha. Calcium 534 ppm to 3696 ppm, Magnesium from 101 ppm to 391 ppm, Potassium from 45 ppm to 230 ppm, Phosphorous from 123 ppm to 1561 ppm.

Pest Control.

The first principle in controlling pests and diseases in organic systems is to ensure the soil is healthy. There is very good research that shows that healthy crops are less affected by pests and diseases than crops that are stressed by nutrient deficiencies, drought or water logging. *Handrek (2002)*

Lychees are the only fruit that occasionally receive a few organically allowed sprays at panicle emergence to stop pests damaging the flowers. The Rambutans, Star Apples, Mangosteens and Durians have never been sprayed. Most of the pests are controlled through a number of bio control strategies. Green ants (*Oecophylla smaragdina*), ladybirds (*Cryptolaemus montrouzieri)*, green lacewings (*Mallada spp*), hover flies (*Syrphidae*), spiders and insect eating birds are used as the major bio-controls.

Small flowering plants are encouraged to grow throughout the orchard, as these are essential to the adult stage of beneficial predators such as lacewings, hover flies and Trichogramma wasps. *Pyke (1996) Smith (1997)* It is a policy to never clear all the weeds in the orchard. Strip mowing, based on research from Lincoln University in NZ, Washington State University and University of California, Davis is used. This technique leave pockets and strips as refuges for beneficial insects and other organisms.

These refuges of flowering plants are known as insectories or beetle banks in several texts. Research has shown that these insectories breed thousands of beneficial organisms. *Flint (1998)* The insectories are cut down in a later slashing cycle to stop the weeds from getting out of control, however new areas are left as refuges. By doing this, the weeds are

stopped from competing with the crops as well as allowing them to have a range of useful functions, such as a habitat for beneficials, mulch, soil stabilization, nitrogen fixation, soil carbon dumping and as a nutrient store in the rainy season.

The rainforest has been allowed to regenerate in marginal areas on the farm and watercourses are planted with a range of species to provide habitat for the bird species that spend many hours everyday removing pest species from fruit trees. These marginal areas also host a variety of beneficial insect and mite species that help control the pests in the orchard.

An example of this are predatory mite species that help control the major leaf damaging pest in lychees, the Erinose Mite. Most growers continuously spray for this pest, however it has reached a balance on the trees where it no longer effects their vigour. Wettable sulphur is occasionally sprayed on the emerging flowers to protect them from mite damage. *Bacillus thuringiensis var Kurstaki* is used to protect the lychee flowers from caterpillars when needed. These particular sprays are acceptable to the organic industry and do not harm non-target species. This allows the beneficials to effectively control the pests that were not affected by the sprays.

Data from an insect fauna survey conducted by entomologists from the Queensland Horticultural Institute, over several years showed that this farm had the least insect pests of the five farms surveyed. The other four farms use conventional chemical pesticides and fertilizers. *Astridge (1999)*

Nets and scaring are used to control winged vertebrate pests such as fruit bats and parrots. Spectacled Flying Foxes *(Pteropus conspicillatus*) and Rainbow Lorikeets *(Trichoglossus haematodus)* are the greatest pests and cause major production losses. Throw over nets are only partially effective as they can chew through the nets, crawl under them or enter through any small holes. The cost of fully enclosing the farm with permanent netting is not only prohibitive; it would act as a barrier to prevent the many beneficial species from entering the orchard.

Disease Control

Due to developing good soil health there are very few disease problems in the orchards, with no diseases affecting the Lychees and Rambutans. *Handrek (1990) Handrek (2002)* The major disease is *Phytophthora palmivora*, which can be devastating to Durians. It is successfully controlled using *Trichoderma* species and good quality compost. Correctly made

compost has been shown to suppress a wide range of diseases in plants. *Handrek (1990) Handrek (1992) Handrek (2002) Krasil"nikov (1961) Ingham (1993, 1994,1998)* This method has proved to be very successful. It has also worked for Pinks disease in jackfruit, soursops and citrus.

Weed Control

Only a part of the orchard is strip mowed at one time and other areas are left untouched until later in the season. All of the weeds are never removed from one section of the orchard as they are necessary as insectaries for beneficial insects.

Research from the University of California Davis shows that plant biodiversity is essential to healthy insectary systems. *Flint (1998)* The more complexity built into the system means fewer spaces in that system for pathogens (diseases, insect pests etc) to colonise. This is achieved by having other species out-compete them for space, directly predate them or actively aid the crop species through symbiosis.

The aim is to change the ground cover balance from negatives that compete with crop to positives such as soil stabilisation, nitrogen fixation, habitat for beneficials, mulch and organic matter for trees and soil.

Examples of this are introducing prostrate legumes, such as Pinto Peanut, as a ground cover. This low growing species spreads by runners and adds nitrogen to the soil. It chokes out many of the weed species, stabilises the soil and builds humus.

A tractor and slasher is used to strip mow the rows. Once or twice a year cutting with a cane knife and hand pulling under the trees to clear plants missed by the tractor. This is done just after the North West monsoon season, when there are get cooler days and less rainfall. The slower growth during this season means that once the weeds under the trees are cut, they usually stay that way until the next monsoon season.

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Annex 4

OVERVIEW OF ORGANIC AGRICULTURE IN THE PHILIPPINES [1]

Josephine T. Garcia[2]

Introduction

In the Philippines, present growth of organic agriculture can not be ignored as all sectors of the society are actively participating in the attainment of the Millennium Development Goals (MDGs). One can look at organic agriculture as a farming scheme to achieve MDGs which tend to achieve in year 2015, to wit: food security and safety, poverty alleviation, environment conservation/integrity, enhances global competitiveness and increases productivity. At present, consumers are in search of safe and healthy foods despite of deteriorating environment brought about by climate change. As in many countries, efforts in the development of organic agriculture in the Philippines like development of products, markets and initial formulation of certification standards has been the pioneering efforts of the private/civil society groups than by the government policy and initiatives. However, current efforts of the government is a great support to boost the organic industry as a whole.

Definition of Organic Agriculture

IFOAM (International Federation of Agricultural Movements) defines Organic Agriculture (OA) as “a holistic production management system that avoids the use of synthetic fertilizers and pesticides and genetically modified organisms, minimizes pollution of air, soil and water and optimizes the health and productivity of plants, animals and people”. This working definition of organic agriculture based on IFOAM and FAO/WHO *Codex Alimentarius* was adopted under the Philippine Executive Order No. 481 entitled as “Promotion and Development of Organic Agriculture in the Philippines. This is based on the existing principles wherein organic farmers

Principles of Organic Agriculture

The Principle of Health - Organic Agriculture should sustain and enhance the health of soil, plant, animal, human and planet as one and indivisible practice crop rotation, green manure and the like as a way of utilizing local

raw material inputs to maintain and enhance soil fertility and bring back soil vitality as contrary to the detrimental effects of chemically based inputs.

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[1]Paper presented as Philippine Country Report during the APEC Regional Development of Organic Agriculture in terms of APEC Food System and Market Access held in Ha Noi Vietnam, July 16-18, 2008.

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The Principle of Ecology - Organic Agriculture should be based on living ecological systems and cycles, work with them, emulate them and help sustain them

The Principle of Fairness - Organic Agriculture should build on relationships that ensure fairness with regard to the common environment and life opportunities

The Principle of Care - Organic Agriculture should be managed in a precautionary and responsible manner to protect the health and well-being of current and future generations and the environment

Reasons for Adopting Organic Agriculture

Increasing cist of chemical based inputs

- Increasing resistance of pests and diseases
- Decreasing farm income
- Declining soil fertility
- Ground water contamination
- Health

Government Policy

Government Initiative - Executive Order 481

In December 2005, EO 481 was signed into law leading in the development and promotion of Organic Agriculture in the country.

Executive Order No. 481. The law aims to promote OA as a farming scheme especially in rural farming communities; forge effective networking and collaboration with the stakeholders involved in the production, handling, processing and marketing of organic products, produce foods, prmote environment safely by means of an ecological approach in farming and ensure the integrity of organic products through the approved organic certification procedures and organic production handling and processing standards.

EO 481 provides an integrated and cohesive approach to streamline OA by creating a National Organic Agriculture Program (NOAP) which focuses on the following issues:

- Regulations and Guidelines
- Certification and Accreditation
- Market Program and Networking
- Organic Information for Producers, Handlers and Processors
- Research, Development and Communication

Through EO 481, the National Organic Agriculture Board (NOAB) and its supporting National Technical Committee (NTC) have been created facilitating policy formulation and program implementation Together with the IRR for EO 481, a structural approach for the development of organic agriculture in the Philippines proves to be promising including the current initiatives of BAFPS: Search for Best Organic Farm

Historical Profile of Organic Certification

In the Philippines, initial activities towards the development of national certification program started in 1996 when the FOODWEB (an informal network formed by members of IFOAM from the Philippines who attended the 1995 IFOAM-Asia Conference in Seoul, Korea) drafted the “Philippine Basic Standards for Organic Agriculture and Processing”. The document,

which was based on IFOAM Basic Standards, has undergone a series of sub-national (Luzon, Visayas and Mindanao) and national consultations and workshops.

In 2000, CITEM took the initiative to spearhead the establishment of the Organic Certification and Inspection Program to pursue the development of the organic sector for export. Key organic players from AVDF, OPTA, FOODWEB, MASIPAG, Rizal Dairy Farms, Herbana Farms, Gratia Plena, AGTALON and PDAP composed the Organic Technical Working Committee of the program. Later that year, at the IFOAM Scientific Conference in Bassel, Switzerland, the key players were able to negotiate consultancy support from the Swiss agencies FiBL and Bio.Inspecta for the development of local capabilities and setting up of systems for certification and inspection. FiBL is a Swiss research and training institute on biological agriculture, while Bio.Inspecta is an internationally recognized certifying agency. Hence, in December 2000, the first Orientation Training on Organic Certification and Inspection was conducted in Laguna by FiBL and Bio.Inspecta. FiBL and Bio.Inspecta also reviewed the Organic Certification Standards of the Philippines for harmonization with international standards.

In early 2001, a team of experts drafted the Manuals of Operation and Certification and Inspection. The drafts were reviewed during a workshop held in May 2001. During this workshop, the Basic Standards was renamed “Certification Standards of the Philippines” and the certification body was called “Organic Certification Center of the Philippines (OCCP)”. The manuals were presented and the OCCP was officially launched during the National Organic Agriculture Conference held last June 2001.

The revised version of the OCCP standards for organic agriculture and processing was approved by the General Membership of the OCCP, Inc. during the Special Assembly held at the Philippine Trade and Training Center, Pasay City last June 22, 2003.

Foundation (AVDF) has also set up a certifying body, called “Philippine Organic Guarantee Incorporated (POGI). AVDF claims to have the people's organizations of indigenous people as members, and it is also working with the IFOAM Basic Standards (Briones, 2000).

Recently, the Department of Agriculture has accredited OCCP as the sole certifying agency for organically agricultural products in the country (SAGA, Feb 2005). Until December 2004, OCCP has received 15 firm applications and has certified seven (7) producers/processors (Alleje, 2005).

Standards and Certification

These are important tools used in marketing organic products. Certification is one way of ensuring that products claimed to be organic are actually produced according to organic farming practices. It is a way of protecting consumers, producers, and traders against the use of misleading or deceptive labels. As a marketing instrument, it enables producers to access markets for organic products and obtain premium prices. It also creates transparency as information on certified producing organizations and their products is made known to public.

The National Standards generally used the following:a) the avoidance of synthetic chemical inputs, antibiotics and GMO b) the use of farmland that has been free from chemicals for at least one year c) the provision of the behavioral environment requirement of the animals d) keeping detailed production and sales records (audit train) e) maintaining strict physical separation of organic products and non organic products and f) undergoing periodic on site inspections.

With the formation of the National Accreditation board, selection and accreditation of organic certifying body commenced. The sole accredited local certifier is the Organic Certification Center of the Philippines (OCCP). In order to assist organic producers and processors access the international market, OCCP made a partnership with CERES, a German Certifying Body accredited in the US, EU, Canada, Japan and Australia.

Philippine Organic Farms and Products

The most recent survey, Pearl2 (2007) showed that the average area per farm is 0.40 hectare, an indication that more small landholders are involved in organic production and only producing organic rice. This land area under organic management is 0.12% of the total agriculture area in the country.

On the status of Organic Agriculture in the country, it indicates that most companies in the industry are small to medium size and are spread in various part of the country. At present, there is no reliable lists of enterprises and businesses engaged in the organic and natural products development. The larger and well known farms and shops are published and promoted thorough newspapers, magazines, articles written by

agencies both in the public and private sectors and featured in radio and television.

Types of products.

There are two major types of organic products in the local market: certified and the non certified. Certified organic products refer to those which are certified for export by international certifiers while the non- certified products are those products and inputs organically produced but not certified. Locally grown claimed natural or organic products used to include fruits and vegetables, both fresh and processed like lettuce, cucumber, tomato, bitter gourd, okra, camote, kangkong, mustard, pechay, squash and eggplant; fruits(banana, mango, papaya) and muscovado sugar.Some livestock and poultry, fish, dairy products and fertilizers were also sold as organic products. At present, coffee, aloe vera juices, papaya, horticultural pest and repellent sprays, coconut and its by products, processed fruits and root crops (ube and yacon), cereals and beverages,bread, soya milk, and herbs can be found in farms and markets. Inputs available for organic production include compost, vegetable seeds, botanical pesticides and micro-organisms.

Markets and Processing The organic market in the country has been described as a “niche market”. Products were available in "weekend markets” catering to urban, upper middle class and elite shoppers, health and wellness consumers, those with ailments and people who are advocating pro nature or eco friendly practices. In the late 1990"s, organic products were increasingly sold in major supermarkets in Metro Manila with a price premium of about 30 -5-% higher compared to non-organic products.

First to market organic produce was established by the Organic Producers Trade Association (OPTA) at greenbelt, Makati in 1994. Their organic market expanded to Alabang, Katipunann, SIDCOR in Cubao and TESDA in Bicutan. Now organic products have penetrated the mainstream markets. Supermarkets such as ShoeMart, Rustan"s, Shopwise, Robinson"s and Landmark now carry shelves of organic products, both locally produced and imported, certified and uncertified. Local organic products sold in supermarkets include fresh vegetables, fruits and rice. Imported organic products include milk, soya milk, venigar, honey, tea, coffee and spices. Spealty shops can be found in different parts of major cities including Market One in Lung Center of the Philippines, K-organics, Green Daisy, My Goodness!, gourmet Farms, Delifresh/Ever Rich Farms/Delifresh Restaurant. Back to basics, many other restaurants and health and specialty shops. Products are also available at annual events like Bio-Search Exhibition, coordinated by CITEM, Agrilink by Department of Agriculture and others that provide opportunity for organic producers to promote their products.

Technologies

The following are the technologies developed by the National Agriculture and Resources Research and Development Network for the period 1995-2005. Technologies are categorized under organic agriculture and organic based agriculture

Organic agriculture - these are the R&D activities that meet the requirements of the international and local standards for organic agriculture.

Pest and disease management

- Control of "bugtok" disease in "saba" banana
- Integrated fruit fly management based on sterile insect release method
- Potential botanical pesticides against insect pests of mango
- Predatory mite to control cassava red spider mite population
- Integrated control of diamondback moth (DBM) in crucifers
- Fungicidal effect of *Jatropha* oil extract derived from physic nut against banana anthracnose

- Neem extracts as potential biocontrol for mango hopper
- Sawdust trap boxes control coconut rhinoceros beetle

Organic-based agriculture - these are the R&D activities that use materials that are categorized as "restricted" in the Philippine National Standards for Organic Agriculture, or those activities that do not yet fit into the standards

Pest and disease management

- Efficient production and release of Trichogramma to control sugarcane borers
- Improved insect pest management package of technology for corn
- Technologies and practices for the control of peanut bacterial wilt disease
- Efficient production and release of Trichogramma to control sugarcane borers

Soil and Nutrient management

- Rapid composting using *Trichoderma* sp.
- Bio-N as supplemental fertilizer for corn
- *Rhizobia* for high legume yield
- UPLB Trichoderma Biotechnology Farmers' Benefit through R&D
- UPLB Trichoderma Inoculant Reduces Use of Fertilizer by Half
- *Indigofera tinctoria* as a green manure crop in rainfed lowland rice-based cropping systems
- Common table salt as coconut fertilizer
- Kakawate" hedgerows for improved soil fertility and crop yield
- Utilization of N-enriched bio-organic fertilizer and microbial inoculant in cotton production

Postharvest practices

- Lagundi leaves as effective control against storage pests of garlic

Conclusion

Organic Agriculture offers a production system that adopts the principles and practices of sustainable agriculture. While we see the potential of this system in our country, lots of challenges are on our way to boost the organic movement. A partnership undertaking of both the private and government sector should address the following issues/program: 1) market development program which combines commercial marketing and social marketing 2) research/development on organic production and processing and the dissemination of R&D findings 3) establishment resource information centre which keep and enhance information on organic sector and ensure information are available and accessible to stakeholders 4) human resource development or capacity building in the areas of marketing, and technical of organic production 5) financial sustainability program which will build up funds for the development of the organic sector

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Annex 5

Promotion of Organic Farming:
Policies and Adopted Measures of Chinese Taipei

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Abstract

The development of organic farming has been listed by the Council of Agriculture as one of the indicator items in the policy measures. It aimed to help farmers in expanding their organic farming operations, improving their technology, strengthening regulations on certification and testing, as well as assisting in opening marketing channels. The goals include doubling the area devoted to organic farming in three years, providing the market with safe and excellent-quality farm products and promoting overall development in Chinese Taipei"s organic farming industry. After years of development, the “Agricultural Production and Certification Act,” “Organic Agricultural Product and Organic Agricultural processed Product Certification Management Regulations,” and “Imported Organic Agricultural Product and Organic Agricultural processed Product Management Regulations,” have been promulgated to serve as basis for government work on guiding and promoting the organic accreditation and certification system. Use of the CAS mark for organic farm products since on January 1, 2006. and it will be shift to use of the OTAP mark for organic farm products began on January 1, 2009. As of June 2008, the Council of Agriculture has accredited four organic certifying institutions, namely: The Mokich Okada International Association, the Tse-Xin Organic Agricultural Foundation, the Chinese Taipei Organic Producers" Association and the Chinese Taipei Formosa Organic Association. A total of 933 farmers have been certified, covering an area of 2,178 hectares.

Key words: organic farming, organic farm products, accreditation, certification

Introduction

Long-term utilization of the farming environment has led to damage on its precious natural resources. For this reason, efforts must be directed towards the development of excellent-quality, safe, and modern farming methods that also emphasize leisure and ecology if we are to maintain natural ecological environment and sustained development in the farming industry.

Organic farming follows the principle of sustained and cyclic utilization of natural resources, and forbids the use of synthetic chemicals. It stresses systematic management of soil conservation and ecological balance with the goal of producing farm products that are both safe and natural. Having such that, organic farming"s major goal is to maintain a healthy ecosystem consisting of soil, plants, animals and humans, such that harmony is achieved between food production and living. Many countries around the world have listed organic farming as an important area for development.

Organic farming has become the Council of Agriculture"s policy to offer guidance services aimed to help farmers in expanding their organic farming operations, improving their technology, strengthening regulations on certification and testing, as well as assisting in opening marketing channels. The goals include doubling the area devoted to organic farming in three years, providing the market with safe and excellent-quality farm products and promoting overall development in organic farming industry.

Organic Farming Certification and Testing System: Current Development Status

Organic farming started in Chinese Taipei in 1986 when the Council of Agriculture invited experts and academics to carry out a feasibility study on possible implementation of organic farming in Chinese Taipei. The preparatory stage took two years to complete. In 1988, organic farming experimentation and long-term observation zones were created in crop improvement farms located in Kaohsiung and in Tainan to carry out organic cultivation observation and research on a comprehensive scale. Through many years of efforts in these experiment and improvement farms, crop organic farming techniques were gradually developed. In 1995, the crop improvement farms assigned farmers to carry out pilot organic cultivation and conducted demonstration, observation and product exhibition and selling activities.

In 1997, the Council of Agriculture started organic certification and logo approval work through its improvement farms. In 1999, regulations such as the "Production Standards for Organic Agricultural Products," "Guidance Pointers for Organic Farm Products Certification," and the "Pointers for Establishment of Organic Farm Products Certification Guidance Committee" were adopted to better regulate private sector handling of organic farm products certification.

With the amendment of the "Agricultural Development Act" in 2003 and in keeping with Article 27 of the said act, the "Operating Guidelines for Management of Organic Agricultural Products," "Review Operating Procedures for Qualifications of Certifying Institutions for Organic Agricultural Products," "Production Standards for Organic Agricultural Products Crops", and "Production Standards for Organic Agricultural Products Animal Products" were promulgated to serve as basis for government work on guiding and promoting the organic certification system. On December 15, 2004, the "Method for Excellent Farm Products Certification Mark and Authentication Operations" was approved to formally introduce organic farm products into the CAS system. Use of the CAS mark for organic farm products thus begun on January 1, 2006

The government of Chinese Taipei has announced on 29 January 2007 the "Agricultural Production and Certification Act". As prescribed in Paragraph 1, Article 5 of the Act, agricultural products and processed agricultural products shall be permitted for sale as "organic" products only when the production, processing, packaging and distribution procedures in the domestic market are fully in compliance with the guidelines for organic products established by the competent authorities in the central government, and properly certified. Also, in Paragraph 1, Article 6 of the Act, it is stipulated that agricultural products and processed agricultural products imported from other countries shall be permitted for sale as "organic" products only when the products have been certified by the countries or the certification bodies accredited by international organic accreditation institutions (organizations), as announced by the competent authorities of the central government; in the meantime have gone through the inspection procedures conducted by the above competent authorities. Both rules are subject to the mandatory certification and mandatory inspection mechanisms. Use of OTAP mark for organic farm products thus begun on January 1, 2009 (See Table 1).

Table 1. Development Timeline of Chinese Taipei"s Organic Certification System

Date	Name of Regulation	Reasons for Legislation
January 1997	Guidelines for Trial Use of Mark for Organic Farm Products	To serve as basis for certification of crop improvement farms and tea improvement farms.
March 15, 1999	1. Production Standards for Organic Farm Products 2. Directions for Establishment of Organic Farm Products Certification Guidance Committee Directions for Guidance of Organic Certification Institutions	To serve as basis for promoting organic farming and guiding private sector groups in handling organic certification work.
March 6, 2000	Amendment of the “Production Standards for Organic Farm Products” and “Pointers for Establishment of Organic Farm Products Certification Guidance Committee”	
June 22, 2000	Operating Procedures for Application and Review of Organic Certification Institutions	To serve as basis for reviewing applications by organic certification institutions.
February 7, 2003	Amendment of Article 27 Item 2 of the” Agricultural Development Act”	To provide legal basis for relevant management regulations governing organic farm products.
September 15, 2003	1. Operating Guidelines for Management of Organic Agricultural Products 2. Operating Procedures for Qualification Review of Certification Institutions for Organic Agricultural Products 3. Standards for the Production of Organic Agricultural Products—Crops	Revised and promulgated in keeping with amendments made in the Agricultural Development Act. Use of the original “Production Standards for Organic Agricultural Products” and other relevant administrative regulations were terminated.

October 31, 2003	Standards for the Production of Organic Agricultural Products—Animal Products	To serve as basis for production of organic Animal Products.
December 15, 2004	Method for Excellent Farm Products Certification Mark and Authentication Operations	Introduction of organic farm products into the CAS excellent farm products certification system
December 30, 2005	1. Review Procedures for Applications to Use CAS Organic Farm Products Mark 2. Standard Specifications for CAS Organic Farm Product Quality and Regulations for Using Labels and Marks 3. Production Standards for Organic Agricultural Products--Animal Products	Established based on the "Method for Excellent Farm Products Certification Mark and Authentication Operations"
2007	1. Agricultural Production and Certification Act. 2. Organic Agricultural Product and Organic Agricultural processed Product Certification Management Regulations. 3. Imported Organic Agricultural Product and Organic Agricultural processed Product Management Regulations.	The Act shall facilitate the establishment of an effective and integrated certification management system for organic agricultural products, and create an all-win situation for the producers, distributors as well as consumers of organic agricultural products.

As of August 2007, the Council of Agriculture has accredited four organic certifying institutions, namely: The Mokich Okada International Association, the Tse-Xin Organic Agricultural Foundation, the Chinese Taipei Organic Production Association and the Chinese Taipei Formosa Organic Association. A total of 936 farmers have been certified, covering an area of 2,013 hectares. These include 843 hectares of land for rice, 438 hectares for vegetables, 258 hectares for fruit trees, 125 hectares for tea and 349 hectares for other crops (See Table 2).

Table 2. Statistical Table of Areas of Organic Farms Over the Years

Unit: Hectares

Year	Rice	Vegetables	Fruit Trees	Tea	Other Crops	Total
1996	62	26	67	5	-	160
1997	238	43	100	16	-	397
1998	302	98	156	22	-	578
1999	466	170	157	22	5	821
2000	596	154	209	37	17	1013
2001	493	171	159	56	19	898
2002	609	174	188	55	22	1048
2003	600	228	159	63	43	1092
2004	744	232	153	76	41	1246
2005	697	343	152	72	71	1335
2006	704	378	207	71	348	1708
2007	843	438	258	125	349	2013

Problems in Developing Organic Farming

The development of organic farming has been sluggish for many reasons, including climatic conditions, difficulty in cultivation management, lack of economy of scale in logistics, pending legislation of organic certification, consumers" insufficient understanding of organic farm products, etc.

Climatic conditions are disadvantageous to the development of organic farming: Chinese Taipei"s subtropical climate, with its high temperatures

and high humidity, easily leads to pestilence difficult to control. This has discouraged farmers from investing in organic farming.

The production and marketing does not have the economical scale: organic farmers have an average farming area of only 1.5 hectares. This small-scale operation leads to higher production costs, difficulty in achieving ecological balance in farms, difficulties in pest control and easy contamination from nearby farms using traditional farming methods.

Poor consumer understanding of organic farm products: Although organic farm production is different from the usual, consumers are not able to visually differentiate products. As there are a large number of organic farm products available in the market, there is a need to rely on a sound certification system assisted by adoption of a certification mark through which consumers can easily distinguish organic products from others. As organic farming related regulations are still in the administrative stage, they cannot effectively regulate producers and market distributors. At this stage, efforts must be directed towards strengthening promotion of the national organic mark for organic farm products among consumers.

Promotion Strategies

Strengthening R&D work in organic farm production technologies and materials through invitation of scholars and experts to form “crop organic farming technology service teams.”

Promoting syndicated farming of organic farm products, with priority given to vegetable farming in Eastern Chinese Taipei"s longitudinal valleys for the farming of organic vegetables and rice, organic rice farming zones and organic villages as a way to expand the areas devoted to organic farming operations.

Establishing of annual sampling and testing of organic farm products, as well as their later operations procedures, and strengthening of product sampling and testing in farms and city markets, so as to implement quality and safety monitoring of organic farm products.

Promoting the accreditation and certification system of marketing traceability on organic products and creating a mechanism for cooperation on product supply to organic stores and supermarkets, so as to assure consumers of product safety.

2.1 Methods of Implementation

Improving farmers" organic cultivation techniques

R&D of crop organic farming key techniques and comprehensive management technologies for pestilence, soil nutrition, weeding, etc.

R&D results must be promoted for adoption among organic farmers.

Lectures and training on organic crop production techniques must be held for the purpose of upgrading production capabilities of organic farmers.

Expanding production acreage

Promotion of syndicated organic farming such that 6-10 new farm locations are established every year.

Expansion of farm lands for planting organic vegetables, rice and for establishing organic villages in Eastern Chinese Taipei"s longitudinal valleys.

Setting the forecast acreage for organic certification from 2006 to 2008 for all crops, as in Table 3.

Table 3. Forecast Growth in Organic Certified Acreage from 2006 to 2008

Area: Hectares

Year	Rice	Vegetables	Fruit Trees	Tea	Other	Total
2006	700	375	180	70	75	1,400
2007	1,050	450	200	100	200	2,000
2008	1,550	650	250	150	400	3,000

Strengthening monitoring work on organic farm products and promotion of organic farm products.

In accordance with the “Agricultural Production and Certification Act”, monitoring work on organic certification institutions" evaluation and

management must be carried out, as well as improving the quality of their inspectors.

The number of product samples taken each year from farms and city markets must be increased. Disqualified producers must be properly dealt with so as to improve the quality of organic farm products.

Exhibition sales of organic farm products must be held, as well as promotion of the national organic mark for organic farm products. Exchange activities involving organic farms, stores, marketing channels and consumers must be held for greater consumer acceptance of organic farm products.

To guide organic farms" participation in local tourism and leisure activities as a way to develop local marketing.

Promoting the production and marketing traceability system of the organic product

On guidance work of the organic product supply in the market which has certified of production and marketing traceability. the promotion in 2006 has reached 220 hectares.

Providing guidance for organic farmers to establish logistics cooperation mechanisms with stores, supermarkets and other channels.

Conclusions

Organic farming covers four areas: excellent-quality, safe, leisure and ecological farming. Organic farming is a three-in-one industry consisting of production, living and ecology. With the rise in people"s consciousness of healthy consumption and environmental protection issues, organic farm products that emphasize quality and safety are bound to grow in popularity. For this reason, Chinese Taipei"s organic farming industry must establish a certification system through joint efforts from the private sector, the academia and governments, as well as develop the necessary production technologies, marketing systems, etc. Through the implementation of organic farm products certification and quality control, expansion of the market for such products can be made possible.

Annex 6

Organic Agriculture in Thailand: Current Situation and Solutions

1. Introduction

For several decades, Thailand has long been recognized as one of major countries in food production and exports worldwide. Along with the increased agricultural production, Thailand has attempted to improve the sustainability of agriculture on a number of areas. Among those are protecting environmental and natural resources, improving food quality and enhancing food security through improved production techniques including organic agriculture. Since 2003, Thai government has launched various national programs on modern organic farming by encouraging Thai farmers to adapt their local organic practices to meet the requirements of international rules in order to produce quality and safety foods for domestic and overseas consumers.

Towards the goal of strengthening organic agriculture in Thailand and to enable it to meet international standards, the National Bureau of Agricultural Commodity and Food Standards (ACFS) has been authorized by the Ministry of Agriculture and Cooperatives (MOAC) to act as an Accreditation Body (AB), being responsible for inspection and certification of agricultural commodity and food products, to assess the competency of government and private certification bodies (CBs). The current national organic standards have been set up in accordance with the 2001"s FAO/WHO guidelines and for the 2002"s IFOAM basic standards for the production, processing, labeling and marketing of organically produced foods or products. Most of organic crop products have been certified by the Department of Agriculture: DOA (an authorized public CB), Organic Agriculture Certification Thailand: ACT (a local private CB) or foreign certification bodies.

Organic farming in Thailand has been markedly growing over the past 3 years. Up to 2007, it is estimated that the total areas of crop organic farms certified are at 17,700 ha with 6,000 farmers throughout the country. About 70% of certified organic farms producing goods is Jasmine rice. Fruits and vegetables e.g. jack fruits, papaya, mango, asparagus, baby corn, is about 20-25%. Domestic sales are mostly at farmers markets, although rapidly changing to specialized shops and supermarkets. Almost all organic

products exported to EU during recent years have been certified by foreign CBs.

It is envisioned that the strong supports of the public and private sectors for organic agriculture will lead to the attainment of the goal of strengthening organic agriculture providing quality certifications with more accessible and affordable to the farmers and producers. In addition, more foreign market channels available for Thai organic products will certainly providing better incentives for a large numbers of conventional farmers towards organic agriculture.

2. History and Development of Organic Agriculture

Rattanawaraha *et al.* (2007) stated that traditional Thai cultivation without using chemical was practiced before 1928. During that period, Thai farmers did not know chemical fertilizers. They did not grow hybrid variety crops and no machinery. But, after the year 1928 Thai farmers adopted the use of chemicals and the application rates are rapidly increased. In 1975, Santi Asoke (a splinter Buddhist Theravada sect) was established and traditional agriculture using no chemical was resumed (Ellis *et al*. 2006). Since then to reduce or avoid the use of synthetic chemicals, traditional agriculture, sustainable agriculture, Good Agricultural Practices, Bio-Dynamic agriculture, alternative agriculture, agro-forestry and integrated agriculture have been more popular among farmers.

In Thailand, modern organic agriculture has developed for almost two decades ago. However, the National Food Institute (2004) stated that if "organic farming was a way of life, principles, and worldview thorough practical use of biological principles for producing food with agriculture", the organic agriculture in Thailand may dated back to a century ago. The modern organic agriculture has been largely arisen due to various problems, caused by the introduction of conventional agriculture, which are the high increase of investment and the contamination of toxic chemicals in the environment**.**

3. Overview on Organic Regulatory Systems

3.1 Accreditation and Certification Systems

The administrative arrangements and the National Standards for organic accreditation and certification systems in accordance with international requirements have been established by the Government since 2002. The

Office of Commodity and System Standards Accreditation (CSSA) under the ACFS, has carried, monitored and assessed the bodies against the Thai Agricultural Commodity and Food Standards: Organic Agriculture Standards of ACFS and other international recognized organic standards. The main objective of implementation of such systems is to ensure that the organic production procedures and their products are fulfilled with the domestic and oversea food safety requirements. In addition, ACFS also conducts and facilitates research on these matters in order to develop certification systems of organic agricultural commodity and food standards (Office of Commodity and System Standards Accreditation, 2007).

Based on ISO/IEC Guide 65, ACFS has stipulated the inspection and certification requirements to approve the Certifying Body (CB). The organic inspection, for example must be conducted annually and reliable, fair and transparent. In addition each accredited CB shall have sanctions for individual certified organic farmer or producer that breaches the rules set in the National Standards for Organic Agricultures. The accredited CBs must also demonstrate a clear division between any advisory or consultative service activities, and actual inspection and certification services. Each approved certifying organization will be audited annually by ACFS authorized assessors to ensure that its operation and administration systems and procedures comply with the administrative requirement of the National Organic Standards.

3.2 National Organic Standards

DOA has been authorized by MOAC to be a CB to certify organic crop farms in conformity with its standards (Organic Thailand logo) since 2000. The National Bureau of Agricultural Commodity and Food Standards (ACFS) has evaluated the DOA Standards for Organic Crop Production in Thailand, and it has been accepted as equivalent to the current ACFS National Organic Standards.

The current National Organic Standards (Thai Agriculture Commodity and Food Standards: Organic Agriculture 2003, Part 1 (ACFS, 2003): Organic Agriculture; 2005 Part II (ACFS, 2005): Organic Livestock) have been set up in accordance with the FAO/WHO guidelines (FAO/WHO, 2001) and the IFOAM basic standards for organic production and processing (IFOAM, 2002). The ACFS 2003 and ACFS 2005 standards were developed and distributed by the ACFS. Beside the basic organic requirements, i.e. the production processes for safety, health and environment protection, major

objectives are also emphasized. To protect the consumers against deception and fraud in the markets is a prime one. The standards ensure that all steps of production, processing and marketing are subject to inspection and meet the least the pre-determined requirement. Furthermore, it provides a harmonization to the national organic requirement for the production, certification, identification and labelling of the organically produces.

The standards provide details of general and specific requirement for primary organic production, including the conversion (transformation) of a farm to organic practices. Farmers must strictly follow the standard requirements, at least 12 months before planting of annual crops and 18 months before harvesting the perennial crop productions. The details of the production, processing, labeling and distribution of organic agriculture are addressed in the Standards. According to the rules of production and preparation, including soil management, plant and plant products (residue), pest control and permitted input in the organic production systems must not be derived from chemical synthetic sources. The Standards provide the appendices of stipulation for organic production methods, a list of allowable inputs (or substances) for use in organic agriculture production and of minimum requirements for inspection and precaution measures under the inspection and certification systems.

The Standards require every operator who produces and processes organic agriculture be certified with accredited certification bodies, either government authorized or private sectors. This is achieved through the inspection and certification services by the accredited CBs. Regarding the production and processing of organic products, the Standards mentioned two specific prohibitions including the application of biotechnology (e.g. GMO materials) in plant, animal or processing materials and that the use of irradiation as a preservation technique. Any operator (farmer/producer) that fulfills the requirements of the Standards could claim his/her produces/products in the markets as organically produced. An organic product must contain pure or at least 95% raw organic materials.

For organic crops standards, prior to the current ACFS standards issued in 2003, Thailand developed the first national standards for organic crops production in accordance with existing international standards. Such standards were drafted in 1999 by Thailand Institute of Science and Technology Research in cooperation with the Department of Export Promotion of Ministry of Commerce and the Department of Agriculture of

MOAC. One year later in October 2000, the standards “Standards for Organic Crop Production in Thailand” were adopted and issued for implementation and owned by the Department of Agriculture. The standards including basis, site selection, permitted and prohibited materials and managements of organic farming based on the international requirements (Department of Agriculture, 2000).

3.3 Certification Bodies

3.3.1 Local Certification Bodies

Until now, there are 4 certification bodies (3 government bodies authorized by MOAC and a private CB accredited by ACFS) which are responsible for inspection and certification of organic production processes, i.e. 1) Department of Agriculture (Government) - for organic crops, 2) Department of Livestock Development (Government) - for organic livestock, 3) Department of Fisheries (Government) - for organic aquaculture, and 4) Organic Agriculture Certification Thailand or ACT (Private) - for organic crops.

3.3.2 Foreign Certification Bodies

Besides a local authorized public CB (DOA) and ACFS accredited private CB (ACT) for certification of organic crops, there have been some foreign international CBs in service on certification of organic produces/products, for example, Bioagricert, Soil Association, Naturland, KRAV and Ecocert. The share of certification of land areas among DOA, ACT and foreign CBs is shown in Table 1. Almost all foreign CBs have certified their organic farms or operators against the EU standards. The organic produces/products certified by foreign CBs have been exported to Europe, largely from those belong to contract farmers.

Table 1 Share of land for organic crops certification in Thailand up to November, 2007 (with a total area of approx. 17,700 ha).

Certification Body	% of Land certified[3/]
Department of Agriculture (Organic Thailand logo) [1/] (2,200 farmers)	40
Organic Agriculture Certification Thailand (ACT - with IBS + others)[2/] (1,150 farmers + 20 manufacturers)	20
Foreign CBs (mainly for export)[3/]	40

Source: www.doa.go.th/organic/index.htm; www.actorganic-cert.or.th/eng/; estimated

3.4 National Organic Logo (A Golden Q logo or Q Mark)

The regulations associated with the Q Mark are based on the rules set out by ACFS under the Guidance of the National Committee on Agricultural Commodity and Food Standards (NCACFS) given on 29 July 2003. Q is as a certification mark for those production process or products complied with National Organic Standards or equivalent Standards. Fundamentally, a golden Q mark indicates such product is organically produced and processed in compliance with the national and international requirements for both domestic and overseas consumers. The code labeling (5 groups of code numbers with a total of 20 digits) appeared below a golden Q Mark is provided to ensure consumers that products put in the markets can be traced back to the farm.

4. Government Policy in Organic Agriculture

Policy and governmental support for organic agriculture has certainly improved in Thailand. The major roles of the Government are to enhance the organic agriculture not only for environmental deterioration protection, but also for farmers" health, self sufficiency and sustainability of agriculture in the country. The Government has paid great attention to the public awareness campaign on no chemical used in agricultural production.

Therefore, policies, strategies, actions and budgets as well institutions and man power are given to concerned government agencies.

The Cabinet announced the “National Organic Agriculture Agenda" in 2004 and allocated a total budget of more than 1 billion Baht for 3 years (2004-2007). The Department of Land Development initially proposed this Agenda with strong aspects in food safety, farmers" safety, the reclamation of ecosystems and natural resources and health of the consumers (Land Development Department, www.ldd.go.th, 2007). Under this agenda, it is estimated that the chemicals used shall be 50% reduction across the country by the end of 2006, and farmers will gain 20% more income and the amount and value of export organic products will be 100% increment annually. There are several strategies and actions developed. Further, to speed up the improvement of organic agriculture, in cooperation with the international organizations, for example, a National Action Plan for organic agriculture development has been developed with the assistance from the International Trade Centre in 2006 with close collaboration between public and private sectors, such as the Thai Organic Trade Association.

As mentioned previously, according to the National Organic Agenda, a large number of government agencies are involved in productions (research and extension), accreditation, certification and marketing of the organic crop products. For example, within MOAC, there are the Department of Agriculture (DOA), the Department of Land Development (LDD), and the Department of Agricultural Extension (DOAE) responsible for organic crop productions, and the authorized CB (DOA only), while ACFS is responsible for accreditation. The Ministry of Commerce is responsible for domestic and international marketing.

In addition to the National Agenda for Organic Agriculture Development and to speed up to the organic agricultural practices in the country, in August 2007 the Cabinet approved additional two strategies for strengthening organic agriculture of Thailand, i.e.

1) Strategy 1: Establishment of the “Organic Agricultural Development Committee. The Committee includes representatives from the National Economics and Social Development Board (NESDB), the Ministry of Agriculture and Cooperatives, the Ministry of Commerce, the Ministry of Science and Technology, Government Universities and Private Sectors. The Committee is responsible for policy planning, controlling and

coordinating amongst concerned National agencies and stakeholders relating to organic production, market development and strengthening accreditation and certification systems towards international requirements.

2) Strategy 2: The organic agriculture shall be developed towards international standards level. Under this strategy, the organic agricultural production area of approximately 3,200 ha shall be developed for organic crops, livestock and aquaculture by 2008-2009. This figure shows 42% increasing from those in 2005.

More recently on October 27, 2007, the Cabinet approved the organic strategies initiated by MOAC providing sufficient budgets including strengthening research and extension and accreditation and certification systems and market development.

Besides organic crops, Thailand has also initiated organic aquaculture and livestock programs. Whilst organic crop or livestock produces/products have been sold in the market for some years, organic shrimp production has just been started to develop and to practice during recent years. Since 1991, Thailand has been playing a leading role in the world market for the production of marine shrimp from aquaculture. Due to the commercial importance of this commodity and the increase demand for organic shrimp, both guidelines and requirements to produce which are conforming to the international standards have been adopted. So far, a small number of pilot organic shrimp farms have been carried out including processing and distributing shrimp to the EU. It is expected that organic shrimp industries will be expanded in Thailand in the near future (www.fisheries.go.th). In July 2007, Sureerath Farm, a black tiger shrimp farm in Chanthaburi province, is the first black tiger shrimp farm organically certified from Naturland in Thailand.

For organic livestock, it seems to be promising system for Thailand. According to Imdramangala (2007), the Department of Livestock Development, MOAC, has launched “The Organic Livestock Development Project” since the beginning of 2006. The project aims to encourage farmers of both mixed crop-livestock and small scale intensive livestock production towards organic farming. However, none of the organic livestock farms has been certified yet.

5. Problems and Solutions

There are many problems faced by the organic industry. Problems and solutions of organic agriculture in Thailand are shown in the table 2 as followed.

Table 2. Summary of problems and solutions of organic agriculture in Thailand

Problems	Solutions
- Majority of farmers strongly believe in the efficiency of chemical use and do not believe in the organic concept and its benefits, which are both for growers" and consumers" health and a better environment.	- Currently, Thai government has released multiple national measures and policies to motivate farmers, especially high and medium holders having stable financial status since changing to organic is required setting up costs, patience, and time.
- High and medium scale farms mostly producing for export must have internationally well-known certification for their product. This process is inconvenient and costly.	Thai government actively cooperates with importing governments such as EU countries and Japan to facilitate the certification process and improve farmers" competitiveness in production stages and marketing perspectives. At the same time, the government has regularly consulted with the governments of trading countries to eliminate all measures affecting the market access matters.
Problems	**Solutions**
- So far, only a few subjects relevant to organic agriculture are taught in Thai universities. It is extremely difficult to build the local consumer knowledge and trust on the organic products without having a strong academic background, especially in public and recognized universities.	- There are a few universities offering similar courses relating to organic agriculture. For example, Thammasat University has offered a sustainable agriculture course for almost 10 years. Sukhothai Thammathirat Open University and Ubon Ratchathani University have arranged similar courses as well.
- The public R&D expenditure on agriculture focuses on serving conventional agriculture. At present, even though there are around 500	- Due to a limit of government budget, MOAC has cooperated with local and private institutes to launch pilot projects on the organic farming, such as the pilot projects between department

agricultural research and experimental stations under the MOAC, including crops, livestock and fisheries, covering all provinces, they have just been assigned to conduct research on the organic agriculture.

of Fisheries and GTZ (Deutsche Gesellschaft fuer Technische Zusammenarbeit).

6. Conclusions

Thailand has taken major steps towards the development, introduction and implementation of organic agriculture in the past 3 years. A large number of national programs on modern organic farming have been implemented by encouraging Thai farmers to adapt local organic practices. As a result, the practice of organic farming noticeably grew over the past 3 years. It is estimated that up to the end of October, 2007, there are over 6,000 certified farms with the total area of about 17,700 hectares across the country. However, this figure is still less than 1% of total cultivated areas.

So far, Thailand has a relatively small organic sector: in 2005 the Thai organic market was estimated at US $23 million only, and almost all organic products exported to the EU have been certified by foreign CBs. However, such certification seems to offer less accessible and less affordable to small scale farmers due to its relatively higher certification fees. Therefore, at early stage, certification has to be carried out by authorized government CB, particularly DOA for crops. To capture the world markets, Thailand has to strengthening organic regulatory systems towards the international requirements as rapidly as possible providing more accessible and affordable to the farmers.

A number of major outputs will be generated from recent initiatives on organic agriculture development. For example, more kinds or varieties of Thai organic products will be available for domestic consumption and for export, through market development such as improved quality management and processing technology as well as preparation for certification and label development. Increase organic productivity through more efficient use of local inputs and low levels of external inputs, and additional income through adapted technologies and efficient organic agricultural methods will be obtained. More importantly, the organic certification and accreditation systems of Thailand are in rapid development to get recognition from major importing countries, particularly the EU.

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