
**INTERNATIONAL WORKSHOP ON URBAN/PERI-URBAN AGRICULTURE
IN THE ASIAN AND PACIFIC REGION**

Days Hotel, Tagaytay City, Philippines, 22-26 May 2006

FINAL REPORT



Venue:	Days Hotel, Tagaytay City, Philippines
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Countries represented:	Indonesia, Japan, Korea, Malaysia, Philippines, Taiwan ROC, Thailand, Vietnam
Participants:	40 (speakers, local participants and observers)
Sponsors:	Food and Fertilizer Technology Center (FFTC) for the Asian and Pacific Region Philippine Council for Agriculture, Forestry and Natural Resources Research and Development (PCARRD)
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Introduction

Half of the world's population is already urban and another 1.5 billion will be living in the cities by 2020. Also by that time, 4.3 billion people will need shelter, food, and employment in urban areas (Prain 2006). This growth in urbanization poses threats to food security and implies a widespread occurrence of poverty. Along with these threats are problems on environmental pollution, health risks and eventually a decline in the people's quality of life.

The need to respond to urban poverty and food insecurity has been the focus of international efforts nowadays. The agriculture sector, for one, is compelled to provide an alternative as most of the country's food production depends on it.

Urban and peri-urban agriculture (UPA) offers great potential for reducing poverty and enhancing food security. This type of agriculture refers to crop, livestock, and fishery production, processing and marketing activities within and around cities and towns. The main objective can be income generation, contribution to urban dwellers' table-food needs, or for urban landscape and environmental sustainability.

What distinguishes UPA from rural agriculture is proximity to a large number of human settlements. This proximity implies opportunities in terms of providing fresh and high value vegetables and ornamentals and the efficiency in marketing and transport of produce. It also means more employment and increased income for the settlers.

While there exist vast opportunities for UPA, the risks that go with it cannot be underestimated. The fact that it's close to human settlements already implies unlikely health effects. Inappropriate agriculture and aquaculture practices may affect the stability of urban ecosystems.

Although nowadays, UPA plays a critical role in sustaining the integrity of the environment and in contributing significantly to the attainment of food self-reliance in many cities, still it has received the least priority in many Asian countries, particularly in the area of development planning.

This workshop was intended to provide a venue for the sharing of recent urban/peri-urban agriculture (UPA) trends, experiences and technologies within the Asian and Pacific region. Moreover, it aimed at enhancing the participants' understanding of the UPA by providing opportunities to discuss and explore the viability and feasibility of sustainable approaches and strategies under urban and peri-urban setting.

Workshop Program

The workshop was organized as a collaborative endeavor of the Food and Fertilizer Technology Center (FFTC) for the Asian and Pacific Region (FFTC) and the Agricultural Resources Management Research Division of PCARRD. Held at Days Hotel in Tagaytay City, Philippines from May 22-26, 2006, the program consisted of paper presentations, discussion and field study tour.

The technical session consisted of a keynote speech, resource papers/case studies, and country paper presentations. Dr. Gordon Prain, Global Coordinator of

the Urban Harvest Program of the Consultative Group on International Agricultural Research (CGIAR), presented the keynote paper, which set the basis for discussion of major issues and concerns related to UPA. Resource papers from Dr. Kunio Tsubota from Japan and Dr. Ji-Hye Moon of South Korea provided information on the latest technologies and innovations and the lessons gained from practicing UPA.

The case studies from the Philippines and Taiwan show the factors leading to the successful implementation of UPA, some policy initiatives, and technology transfer strategies. Country paper presentations provided a clear and concise picture of the status and challenges on UPA in their respective countries.

The field study tour to UPA research and production areas around Tagaytay City provided the participants with some insights on the Philippines' efforts in UPA.

With the pool of experts and country delegates, the workshop was able to realize the following outputs:

- Enhanced knowledge on the status of UPA in the Asia-Pacific region, research and technology trends, and other innovative approaches to UPA;
- Enabling factors that lead to the successful implementation of UPA;
- Identified problems, issues, and concerns related to UPA adoption; and
- Recommendations for enhancing the potentials and opportunities of UPA and in reducing the accompanying risks.

Highlights of Paper Presentations

Global Perspectives on Urban Agriculture

Global urbanization trends show that half of the earth's population may already be living in the world's urban areas. With urbanization come such issues as over population, poverty, food security and other ecological, health and social problems. However, opportunities also exist and here, agriculture can best contribute, for example by converting waste to productive nutrients for farming, provide fresh produce to urban dwellers, creating green spaces, etc.

The Urban Harvest Program of the CGIAR, a system-wide initiative on urban and peri-urban agriculture, addresses problems and opportunities in agricultural systems that are intimately bound to urban economy and ecology. To reach its goals, a research and development (R&D) framework was developed and applied. Its components are:

1. Livelihoods and markets
 - Targets production, processing, marketing, and consumption
 - Identifies technology interventions to enhance income and food security
2. Urban ecosystem health
 - Focuses R&D on feedback systems
 - Links agricultural activities and health
 - Case of Kampala, Uganda: extent of contamination in crop production
 - Cases in Asia and Latin America: heavy use of pesticides
 - Farmer field school used to disseminate information to farmers

3. Stakeholders/policy analysis and dialogues
 - Mechanism to understand stakeholders
 - Develops methods of communication and consensus, integration in policy, planning and regulatory schemes

To illustrate how this R&D framework works, case studies on pig-raising systems in Hanoi, Vietnam (livelihood and markets), use of pesticides in crop and flower production in Asia and Latin America (urban ecosystem health), and employing dialogues to change policy towards urban agriculture in Kampala, Uganda (stakeholders/policy analysis and dialogues) were cited. It was apparent from these studies that urban farmers need farming information/technologies. One approach being tried in the Philippines and Latin America is the farmer field school. This approach uses adult education techniques for agricultural learning and change and is composed of preparation/sensitization, agricultural ecosystem analysis, special topic discussion, and experimentation. The need to address policy aspects so that urban agriculture can contribute to urban livelihood was also emphasized, as well as an interaction and coordination among stakeholders. The case of Kampala was cited, where stakeholder dialogues changed the views and resulted in the revision of ordinances and guidelines on urban agriculture.

Following are some recommendations presented on the global promotion of urban agriculture:

- Continue addressing urban food security issues and strengthen the role of agriculture in diverse urban livelihood strategies.
- Develop productive green spaces or parks and gardens, preferably by the private sector, as population pressure increases.
- Increase food safety and quality control.
- Identify and mitigate health risks.
- Work with policy makers so that agriculture is integrated within urban planning and governance and that it is empowered and recognized as an integral part of cities.

Urban Agriculture in Asia: Lessons and Perspectives

Lessons in urban agriculture development. The development of urbanization and its effects on urban/peri-urban agriculture in Japan can be traced on two ways undertaken to counteract problems in expansion of urban areas: the regulatory or policy measures, and the economic measures under the zoning laws. Urban agriculture-related issues and policies/laws amid changing Japanese economy and urban development are Agrarian Reform, Agricultural Land Law, City Planning Law [which specified the boundaries between urbanization promotion area (UPA) and urbanization control area (UCA)], Agricultural Promotion Law, and Productive Green Land Law.

Farmland in Japan is split into three: the agriculture land use area, urbanization promotion area, and all others. About 1.1 million ha of farmland are in “urban-like” areas and are producing US\$10 billion worth of agricultural products such as vegetables, rice, livestock fruits, and flowers. Agriculture production in these areas is productive because of government support; proximity to cities; and activities can directly cater to the needs of urban consumers.

Cases of farming in three urban areas in Japan were cited, namely: Nerima Ward in Tokyo, Fuchu City, and Osaka Kobe. The trends in urban agriculture in these areas are the following:

- Farmland area and farm households declined but number of part-time farmers increased.
- Production shifted from rice and other products to specialized growing of vegetables, garden trees and plants (protected culture).
- Products are now sold in local places such as shops, nearby restaurants, and schools instead of wholesale markets.
- Income from farming forms only a small portion of family income; it has been replaced by earnings from salaries and from real estate (rents).
- Local government support is important to urban agriculture, especially in providing grants to municipalities for direct sale facilities, citizen's farms, preservation of rural landscape, etc.

Lessons gleaned from the Japanese experience in urban and peri-urban agriculture are the following:

- There is a widening disparity between capital value of farmland and its opportunity price for urban use. Farmers may try intensive farming or may plant in larger areas but they would not be able to pay the land taxes based on prevailing residential land prices.
- Urbanization is sprawling, creating a mosaic urban pattern in peri-urban areas. The local governments and residents bear the cost: water pollution, road congestion, and disruption of irrigation facilities.
- As the number of full-time farming households decrease, farms are separated from each other. This makes collective actions more difficult. Agricultural associations are undermined. Unless municipalities render support, urban agriculture and its positive gains may soon decline.

Newly developed technologies and innovations in urban/peri-urban agriculture.

Urbanization in Korea has been rapid in the past 40 years and urban dwellers comprise 80 percent of its population. Area suited to urban and peri-urban farming decreased as well the number of its farmers and agricultural activities. Some problems associated with urbanization could be solved by urban and peri-urban agriculture especially now that Koreans have accepted the multi-functionality of agriculture. The Korean perspective of urban agriculture includes activities not only in urban areas but also those done by urban dwellers such as visiting rural areas, and experiencing rural and farming life – activities that enhance the quality of life of both rural and urban residents. These include:

- Roof greening - In Seoul, many vacant spaces in parks, roadsides, apartment complex, and rooftops can be used for urban agriculture. The size of rooftops in this city is about 235 sq. km. The government has actively promoted their use for greening activities by enacting a regulation on roof greening and by providing appropriate technology.
- Indoor agriculture - Families grow selected vegetables and ornamental plants indoor. Methods of growing such crops are being developed. The wick irrigation method proved to be suited for vegetable production, especially when combined with slow-release fertilizer or nutrient solution.

- Weekend farming - This type of activity allows urban residents to experience being farmers. Some plots were assigned for growing vegetables and fruits. In 1993, the National Agricultural Cooperative Federation (NACF) launched this program to utilize unused plots in rural areas and help farming households get additional income. There are about 500 weekend farms in Korea under NACF.
- Green tourism – This type makes living enjoyable for urban dwellers by spending their free time in farm villages, natural recreation forest, and fishing villages. It also increases farm incomes, conserves rural environment, and intensively uses rural resources.

Some research and development (R&) activities conducted in Korea for urban agriculture are the following:

- Research on soil and plants for green roof farming, considering climate characteristics;
- Development of adequate methods of growing plants indoor;
- Use of earthworms to dissolve organic wastes of households and make soil fertile for indoor growing of plants;
- Research on the air purifying functions of plants; and
- Integration of information technology (IT) and growing vegetables and ornamental plants indoor.

In Korea, urban agriculture is considered as a countermeasure against some of the country's urban problems. By being people-oriented, environment-friendly, and sustainable, urban agriculture shall benefit both urban and rural communities.

Successful Case Studies

Empowering urban poor communities through vegetable production in allotment gardens. Patterned after the allotment gardens in Germany, allotment gardens were established in Cagayan de Oro City, southern Philippines in 2003 as part of a European Union-funded project. Today, there are five self-sustaining allotment gardens in different areas of the city that give 55 urban poor families access to land for food production. There are also four gardens being set up in the grounds of elementary schools for 36 families. Vegetables, herbs, and fruit crops are grown in the gardens, while small animals are kept and fishponds are maintained in some.

Each allotment garden has its own compost pit where biodegradable wastes are converted into organic fertilizer. Moreover, all gardens are equipped with urine-diverting ecological sanitation (ecosan) toilets. In ecological sanitation, urine and feces are contained, sanitized, and recycled or used as artificial fertilizers. However, feces is used only in fruit tree production and diluted urine (5:1) is applied only in vegetables that are to be cooked (sweet corn, okra etc.) to minimize health risk and not to lessen market opportunities.

The allotment gardens were established following the Asset-based Community Development (ABCD) approach that focuses on the strengths and

capacities within the community. Before establishing allotment gardens, arrangements to use of vacant lots (minimum of 3000 sq. m.) are made and an agreement among the stakeholders is formalized. Urban families will use the land for food production; the local government unit organizes the community; and a local university, in cooperation with a bilateral water and sanitation program, provides information on crop production, composting, and ecological sanitation through a series of workshops and trainings.

After two years of implementation, the perceived benefits from the gardens are: 25 percent of harvest is consumed by families; income is augmented by 20 percent; and community values are strengthened.

Improving environment and economy through urban and peri-urban agriculture. Taiwan is currently promoting leisure agriculture, which has become a booming service industry aimed to achieve harmonious and balanced functioning of production, life, and ecology of agriculture. Though changing traditional agriculture into leisure agriculture is a difficult process, Taiwan has the potential to achieve this; there are now 1102 leisure farms and 50 leisure agriculture areas in the island.

Leisure agriculture integrates agriculture and the service industry. It has several functions that are economical, social, educational, environmental, leisure, medical, and cultural in nature. There are different types of leisure agriculture, namely, plantation experience, forest tour, fishing, educational farm, etc. Its development in the whole of Taiwan started with the sightseeing farm before 1980, while its development in Taipei City consisted of four stages: sightseeing farms, citizen farms, rural village tours, and educational farmland.

The case of the Calla Lily Flower Show in Bamboo Lake, Yung Ming Mountains, showcases the success of shifting from traditional farming to flower cultivation. It promotes scenery, improves income and environment, and promotes romance and happiness. Taiwan now regards leisure agriculture as a good strategy to promote agriculture transformation and countryside mobilization.

Technology transfer strategies and experiences. Philippine government agencies adopt various technology transfer strategies to disseminate urban farming technologies, as follows:

- Establishment of demonstration projects – Member agencies of the urban agriculture program spearheaded the establishment of demonstration projects that showcased various technologies on urban agriculture. Private farms and local government units are also featuring technologies on urban agriculture.
- Conduct of training workshops – Training workshops are conducted to impart knowledge and techniques on the establishment of vegetable and ornamental plant gardens to walk-in visitors and training workshop participants.
- Production and distribution of information, education and communication (IEC) materials – Several publications are produced and distributed such as a manual on Herb and Spices, brochures on urban agriculture models, among others.

- Tri-media - Information on urban agriculture has been aired over the radio, featured in a TV show, and published in magazines.
- Other means/approaches includes: field trips, farm visit, field days; group discussion; and school-based urban agriculture projects

The success of urban agriculture technology transfer is hinged on the support and cooperation of various stakeholders. Strategies involving groups and individuals are best for eventual adoption of technologies while tri-media reach a huge number of clientele.

Country Experiences

The different country papers presented during the workshop described the situation in the major cities of the different countries in Asia. Among the common issues described in the papers are: the increasing urban population, the rapid urbanization and its resulting problems, land use conflict, and declining farming population and labor forces.

Other issues and concerns discussed depicting the status and challenges in UPA in each country includes:

- Varying definitions of UPA;
- Benefit, contributions, risks, and opportunities of UPA;
- Status and challenges depending on country situation;
- Changing/shifting crop cultivation; and
- Inadequate data/statistics about UPA.

Indonesia. In Jakarta, Indonesia, peri-urban agriculture is defined as that performed in urban lands that have been legally planned but not yet used such as real estate, public and private lands, and those near railroads and on riverbanks. Government or real estate developers own most of the cultivated land parcels.

Peri-urban vegetable farming in the city could be considered an intensive production because high levels of inputs are applied and cropping intensity is likewise high. The income from urban gardening also seemed high, but it is actually low when converted to income per family labor daily.

The prospect for urban vegetable agriculture in Jakarta is not clear, mainly because of uncertainty in the use of land. Government intervention is needed to find alternative locations for gardening, and support services such as credit, research, and extension must be provided. Research and extension on integrated pest management are likewise necessary to reduce production cost and negative environmental effects of the current farm practices.

Japan. In Japan, rapid economic development has resulted in increased waste discharge yearly. Hence, the Japanese government has initiated policies to make the country more environmentally sound, enacting laws concerning recycling, reduction, and reuse of wastes. Urban/peri-urban agriculture considerably contributes to the reuse and recycle of food wastes.

In 2003, municipal solid waste in Japan reached 51.61 million tons or 1.106 kg/capita per day. These wastes are disposed in landfill. The remaining capacity of

the disposal sites is 137.08 million cu. meters while the remaining lifetime is 13.2 years. The total amount of discharged industrial wastes is 412 million tons; 48.9 percent is recycled and 43.7 percent undergoes reduction. Thirty million tons are finally disposed.

Wastes that can be used in agriculture are livestock waste compost and food wastes from households, food manufacturing, and other food-related businesses. Some of the recycled food wastes in Japan are used as fertilizer, feed, and effluent of methane fermentation. However, there are constraints in the recycle and use of these wastes such as separation of wastes, the offensive odor and pathogen, and variation in volume and constituent.

Garbage processing machines are sold in Japan and the type of treatment is either dehydration and/or fermentation. Addition of urea to treated waste improves the fertilizer but the utilization in the farms is hampered by the impression that it is made of garbage. Extreme care is necessary when food wastes are used as feeds for livestock. Farmers have to recognize the quality of the waste feeds and control it by mixing with other kinds of feed. The effluent from methane fermentation is difficult to transport and has offensive odor. More studies on the use of methane effluent are needed.

Korea. The historical development and current situation of urban/peri-urban agriculture (UPA) in Korea as well as the recent challenges and various strategies being adopted in the country provide many lessons for other countries to emulate. Agricultural products are cultivated in small scale because farmland in Korea is small. With industrialization, many farmers gave up farming and moved to urban areas to more profitable jobs. Industrialization had a good impact on and favorable conditions for UPA.

Some of the critical factors influencing Korea's UPA are the rising farmland price, declining price competitiveness of peri-urban agriculture, and the farmers' waning interest in agricultural production. The conditions favorable to the development of peri-urban agriculture include the availability of production requisites (labor, land and capital) and favorable market conditions. Even the ill-equipped transportation and communication system during the early economic development had a positive effect. Because of this, fresh vegetables had to be grown in urban and peri-urban areas.

As urbanization developed and expanded, the price of land in the peri-urban area increased. This increase affected the urban and peri-urban agriculture in several ways:

- Farming became more capital intensive, thereby strengthening commercial agriculture;
- Farmers just sustained traditional farming without additional investment; and
- Farmers sell parts of their land to get marginal profits.

There are various challenges facing peri-urban agriculture in Korea. The high price of peri-urban land and the development of transportation, communication and marketing facilities have made rural or remote farming more favourable. In terms of productivity and efficiency, remote area farming has surpassed peri-urban

agriculture. Peri-urban farmers can now easily get other side jobs and are no longer actively engaged in farming. This decreases the quality of available labor for farming.

Some of the strategies implemented in Korea to develop peri-urban agriculture are:

- Re-conceptualization of farming in such a way as to connect environment, green tourism, safety and metropolitan government with agriculture;
- Preparation of a contract between metropolitan city and farmers in peri-urban area for their mutual benefit;
- Connecting green tourism to agriculture;
- Involving agricultural cooperatives; and
- Improvement of the value added of agricultural products.

In the development of peri-urban agriculture in Korea, three points are emphasized, namely, UPA has contributed to the concept of the multi-functionality role of agriculture; development of peri-urban agriculture depends on the interest of stakeholders and by establishing a network system; and the technological requirement of peri-urban agriculture are likely based on the market.

Malaysia. UPA plays an important role in managing urban open areas, providing employment and supplying cheap food in Malaysia. Originally, vegetables were grown in small areas but this eventually developed into commercial farms that grow vegetables and other horticultural crops and raise chickens and other livestock to cater to the needs of urban dwellers. Lately, many vegetable gardens in the peri-urban areas are converted into housing, industrial development, and highways.

Following are the various technologies practiced in urban and peri-urban agriculture in Malaysia:

- Integrated farming, with emphasis on agroforestry and mixed farming, is strongly promoted in the country.
- Trough hydroponics, a system of growing vegetables in water with nutrients, is recommended for farmers as well as city residents. They can be placed in a balcony or patio.
- Rain shelters are used in growing high value vegetables (broccoli, cauliflower), and ornamental plants while netted shelters are constructed to grow leafy vegetables (pak choy, kale).
- Aeroponic farming makes use of greenhouses, results in higher productivity per growing area or better land utilization, requires less volume of water and achieves faster growing cycles.
- Organic farming has now spread in about 131 ha and 27 farms in Malaysia. It is mainly confined to production of vegetables and few fruit crops such as watermelon and papaya.

Up to 90 percent of the vegetables produced are marketed through a middleman, although marketing may be direct, by contract and by consignment.

Major constraints facing urban farmers are access to and/or availability of land and water. Some towns regulate or prohibit food production such as livestock

rearing because of animal odor. Other limiting factors are lack of information about market demands, shortages, and prices.

In general, the contribution of urban and peri-urban agriculture to the local supply of fresh vegetable and fruits in Malaysia is considerable. Information about urban and peri-urban agriculture should be disseminated to local government officials for good policy decisions.

Philippines. In the Philippines, various agencies are working under the Urban Agriculture Program. The said program became a national collaborative initiative in 1998, when the Department of Agriculture included it in its list of priority programs. One district was identified as a pilot area in Metro Manila while another one was selected as a pilot area in the province. In 1999, a model of urban agriculture dubbed as receptacle farming was established at the Central Luzon State University.

In spite of the collaborative efforts by the different agencies, urban agriculture in the Philippines is still underdeveloped. There is a need to create awareness about urban agriculture; to adopt, and support it; and to promote collaboration among stakeholders to make it work.

Taiwan. Adverse environmental effects such as air pollution, water pollution, heavy metals and other pollutants have threatened the viability of urban agriculture in Taiwan where 70 percent of the population live in metropolitan areas. Rice, vegetables, fruits, pork, eggs, fish, and seafood still exhibit high level of self-sufficiency. To understand the urban/peri-urban agriculture situation in Taiwan, issues on water usage of the agricultural sector (70 percent), the polluted irrigation system, the competition in land use, and the declining labor/farming household must be understood.

In the urban area, shortage of farming labor is just a matter of time because of the aging population and the tendency of young people to work in cities. However, people who avoid overcrowded cities seek to live in peri-urban areas and are therefore potential participants in the program on peri-urban farming. The foul smell from animal production is a public nuisance. There should be a designated area for agricultural production to avoid possible health-related and pollution problems. Such changes were brought about the disappearance of related business such as incubation facility and fertilizer stores.

Due to economic growth, the opportunity cost of running agriculture-related businesses in the cities has become expensive. The unit income from agriculture cannot compete for other land use options and related businesses have moved away with the agriculture sector.

An institutional arrangement should be in place to protect the productive environment for agriculture in the urban areas and for the sake of safe food supply. Adopting organic agriculture would be appropriate for the urban environment. Agro-tourism should also be promoted in the urban area. With limited areas, greening might be relegated to the top of the buildings.

Thailand. In Thailand's peri-urban areas, the main agricultural activities are livestock production and aquaculture. Most of the livestock are monogastric such as pig and poultry. The serious problems are the wastes and wastewater from farmlands and their contamination (nitrate and salinity) of surface and ground water.

Wastewater contains lots of nitrate and ammonium. In a research on the use of wastewater from pig farms in urban/peri-urban agriculture as fertilizer and fertigation, it was found that wastewater from stationary ponds and biogas production could replace chemical fertilizers by as much as 80-100 percent of the recommended rate for corn, guinea grass, sugarcane, and cassava. Better yields were generally observed in the combined application of half dose of the chemical N + wastewater.

Another benefit is that wastewater replaces irrigation water by as much as 220,000 to 440,000 liter/ha (corn); 187,500 to 375,000 liter/ha (mustard); and 380,000 to 760,000 liter/ha (sugarcane) in one cropping season. The wastewater should be collected in the lagoon and mixed with irrigation water before applying in the field at a concentration of about 100 mg N/liter if it will be used during the whole growing season.

The Cu and Zn contents of the crops treated with wastewater were not higher than in those treated with the chemical fertilizers. There was no evidence of NO₃ contamination in the groundwater. There were high levels of coliform bacteria and *E. coli* in wastewater but not in the tested crops. No human parasite was observed in the crops but was found in soils untreated and treated with the wastewater.

Vietnam. Aquatic production systems are very popular in lowland parts of the peri-urban areas of Ho Chi Minh City. It is classified into two types, namely, wastewater-fed and non-wastewater systems. The more popular wastewater-fed aquaculture systems (tilapia, fish polyculture, morning glory, etc.) are usually located in lowland areas of the city where all the wastewater from the city is discharged. Morning glory is a suitable species for wastewater environment and gives good income to farmers. The non-wastewater systems (fish monoculture and polyculture) are located in more elevated areas. These systems play important roles in job provisions as well as food supply.

There are however, constraints as the city develops. The wastewater from households and industrial wastes are added to the water supply of the city. Water pollution and industrial wastewater contamination disturb aquaculture activities. The government has been trying to move these industries outside the city and into industrial parks. Flooding is another problem as it causes considerable losses and unmanageable pollution of fishponds. Land use priority is never given to aquaculture when city planners are setting target for urbanization. This leads to the uncertainty of the future of aquaculture in urban areas. Under pressure from urbanization, aquaculture will have to move further out from city areas, which will require more active and constructive efforts from both the government/city authorities and farmers. City labor force/job seekers will enlarge as their source of livelihood moves further out of the city.

Issues and Concerns

Common UPA Concepts in Asia

There are numerous definitions of urban agriculture. It is difficult to find an appropriate and common definition because some are based on its use or application and origin or background of user. In this workshop, the meaning and scope of urban and peri-urban agriculture has expanded from the simple definition of “farming in the city and other highly urbanized areas.” In Indonesia, peri-urban agriculture is growing crops on urban lands that have been initially planned but remain unused, for non-agricultural purposes. In the Philippines, agriculture in the city means growing crops and raising small livestock. The same concept is applied in the allotment gardens in Cagayan de Oro City in the Philippines, but with a good innovation of using ecological sanitation devices to convert wastes into compost and fertilizer for crop production.

Traditionally, urban and peri-urban agriculture covers crop production, floriculture or even raising livestock in these areas. In Malaysia, vegetables were originally grown in small areas but this eventually developed into commercial farms that grow vegetables and other horticultural crops and raise chickens and other livestock to cater to the needs of urban dwellers. In Japan, the reverse trend is observed because farmland area and farm households in urban/peri-urban areas declined and number of part-time farmers increased. Production shifted from rice and other products to specialized growing of vegetables, and garden trees and plants (protected culture).

In Thailand’s peri-urban areas, the main agricultural activities are livestock production and aquaculture. In Vietnam, aquatic production systems are very popular in lowland parts of the peri-urban areas of Ho Chi Minh City. It is classified into two types, namely, wastewater-fed and non-wastewater systems. The more popular wastewater-fed aquaculture systems (tilapia, fish polyculture, morning glory, etc.) are usually located in lowland areas of the city where all the wastewater from the city is discharged. Both Thailand and Vietnam stated that waste and wastewater from households and various industries contaminate surface and groundwater. In Vietnam’s case, pollution of fishponds is unmanageable. In Japan, wastes from livestock waste compost and the food wastes from households, food manufacturing, and other food-related businesses can be used in agriculture. Some of the recycled food wastes in Japan are used as fertilizer, feed, and effluent of methane fermentation. However, there are constraints in the recycle and use of these wastes such as separation of wastes, the offensive odor and pathogen, and variation in volume and constituent.

In Korea, UPA has undergone re-conceptualization to connect it with the environment, green tourism, safety, and the metropolitan government. Korea’s city residents undertake roof and indoor gardening with support from the government. It is not merely growing plants in urban vacant spaces such as parks, schools grounds, along roads, but it is also actively taking advantage of rural resources as in the case of Korea’s weekend farming and green tourism. So, in this country, urban agriculture activities include also those done by the urban dwellers such as visiting rural areas and experiencing rural and farming life. Aside from the traditional food

production activities, agriculture in urban/peri-urban agriculture has also been transformed into leisure agriculture in Taiwan with the main objective of giving urban residents a natural and healthy environment where they can find rest and leisure, and ameliorate the environment and economy at the same time.

Benefits of Urban/Peri-urban Agriculture/Aquaculture

- Ideal for management of open spaces
- Provides employment
- Contributes to food security
- Supplies fresh food such vegetables and fruits
- Serves as sole or additional source of income
- Solves problems brought by urbanization
- Contributes to a natural and healthy environment (recycling of resources; lessening of noise, heat, and pollution)
- Improves quality of life and well-being of people (aesthetic benefits, health condition)
- Caters to the leisure needs of residents
- Ameliorates environment and economy
- Strengthens community values

Constraints in Urban/Peri-urban Agriculture/Aquaculture

Malaysia

- Limited and declining land space; gardens are converted into housing, industrial development, and highways
- Marketing of produce
- Less access to and/or availability of land and water
- Some towns regulate or prohibit food production such as livestock rearing because of animal odor.
- Lack of information about market demands, shortages, and prices.

Korea

- Decreased competitiveness of peri-urban

Taiwan

- Pollution, heavy metal, and other pollutants have adverse effects.
- Polluted irrigation system
- Competition in land use
- Declining labor/farming household
- Foul smell of livestock production is public nuisance
- Income from agriculture cannot compete with other land use options; related businesses have moved away with the agricultural sector

Thailand

- Waste and wastewater contaminate surface and groundwater

Vietnam

- Land use priority is never given to aquaculture when planning city development.
- Under pressure from urbanization, aquaculture will have to move further out from city areas.
- Water pollution and industrial wastewater contamination; unmanageable pollution of fishponds.
- Flooding causes considerable losses
- City labor force/job seekers will enlarge as their source of livelihood moves further out of the city.

Japan

- There is widening disparity between capital value of farmland and its opportunity price for urban use.

Thailand

- One appropriate method of mitigating water pollution from livestock effluent is to use it as fertilizer and irrigation water

Risks

Proximity of agricultural production to crowded, residential areas poses possible health risks because of environmental pollution and contamination from agricultural wastes, wastewater and inputs.

Recommendations

Policy Recommendations

- Continue addressing urban food security issues and strengthen the role of agriculture in diverse urban livelihood strategies.
- Increase food safety and quality control.
- Identify and mitigate health risks.
- Work with policy makers so that agriculture is integrated within urban planning and governance and that it is empowered and recognized as an integral part of cities.
- City ordinances can be enacted to give incentives to landowners who make their land available.
- Prepare a contract between metropolitan city and farmers in peri-urban area for their mutual benefit.
- Involve agricultural cooperatives.
- Improve the value added of agricultural products.
- Information about urban and peri-urban agriculture should be disseminated to local government officials for good policy decisions.
- There is need to create awareness about urban agriculture; to adopt, and support it; and to have collaboration among stakeholders to make it work.

- An institutional arrangement should be in place to protect the productive environment for agriculture in the urban areas and for the sake of safe food supply.
- Consider the agri-food chain instead of individual products or producers.
- Provide farmers with information on the city's development plan
- Control industrial pollution of water supply to maintain its good quality
- Establish data collection and database systems on urban/peri-agriculture

Technology Transfer and Promotion

- Trainings on community building can be conducted.
- The success of technology transfer is hinged on the support of the various stakeholders.
- Strategies involving groups and individuals are best for eventual adoption of technologies while tri-media reach a huge number of clientele.

Research and Development

- Continue research on crop improvement, integrated pest management, plant nutrition, water management, and postharvest handling.
- Conduct research on production of water mimosa and control of its pest.

UPA Livelihood and Environment-related Strategies

- Develop productive green spaces or parks and gardens, preferably by the private sector, as population pressure increases.
- Participatory, GIS-based approaches can be applied to identify areas for expansion.
- Leisure agriculture is a good strategy to promote agriculture transformation and countryside mobilization. The following should be considered:
 - Establish management measures for leisure farms; sustainability is essential.
 - Reform and counsel the organizational system.
 - Cooperation among government, specialist and farmers is needed.
- Re-conceptualize farming in such a way as to connect environment, green tourism, safety and metropolitan government with agriculture. Connect green tourism to agriculture.
- Adopting organic agriculture would be appropriate for the urban environment.
- Promote agro-tourism in the urban area.
- With limited areas, greening might be relegated to the top of the buildings.
- One appropriate method to mitigate water pollution from livestock effluent is to use it as fertilizer and irrigation water.
- Consider aquaculture in planning for city development.

Government Support

- As the number of full-time farming households decrease, farms are separated from each other. This makes collective actions more difficult. Agricultural associations are undermined. Municipalities must help, otherwise, urban agriculture and its positive effects may continue to decline.
- Peri-urban agriculture can be expanded to empty lands. Government support is needed in preparing a list of lands that can be used temporarily for urban agriculture.
- Coordination among various government agencies is recommended.
- Government should look at peri-urban agriculture concerns, especially research, credit, and extension services.

APPENDICES

Highlights of Open Forum

May 23, 2006

- **Treating UPA as a business enterprise** - This is important and how to do it is a challenge. However, the food security issue will not disappear. Parts of urban population may need to supplement their food need.
- **Control and regulation of urbanization promotion area (UPA) and urban control areas** - Zoning worked to check conversion of farmland to urban areas. Control is done through the imposition of tax, a sort of economic trade off in terms of land use. Tax is important but the idea of paying for environmental services (payment by maintaining it) should also be considered. Tax exemption/refund/subsidies can be availed of if one can comply with laws/ordinances.
- **Irrigation and fertilization** - The wick material used in wick irrigation is like cotton fabric. Slow-release fertilizers, hydroponic nutrient solution are used. In home gardens, chicken manure and earthworm casts are applied.
- **Transforming traditional farming** - Traditional farming can be transformed into leisure farming by using the media and other promotional strategies such as flower shows, etc.
- **Sustainability and profitability of UPA in Cagayan de Oro** - Economically, UPA in Cagayan de Oro is sustainable. Part of the profits is used in next season's cropping to sustain operation. Many are interested to use vacant land spaces if the socio-economic benefits are discussed with them.
- **Allotment gardens using ecological sanitation toilets** - This technology may not be suited in other areas. However, in the application of the technology, the advice is to start small and slow. Observe problems in a test area and talk to the community about sanitation and urban gardening. Stealing in UPA gardens is not a big issue; happens only sometimes. UPA as allotment gardens using ecological sanitation toilets is being tried in San Fernando and Bacnotan (DMMMSU) in La Union.
- **Access to quality and safe food** - There was no major discussion in the papers presented about this issue. However, there is concern in Taiwan about the effects of industrial product in terms of chemical residues, contaminants in soil and water.

May 24, 2006

- **Importance of UPA** – UPA (urban/peri-urban agriculture) contributes to the development of poor economies. It can be a response to economic crises.
- **Use of land for UPA** - In Jakarta, there is no formal agreement between the landowner and the farmer on the use of vacant land for gardening. In Manila, a memorandum of agreement is executed between a local government unit and an urban farmer/organization before an idle land can be used in urban farming.
- **Use EM technology** – The use of EM for rapid composting and removal of foul odor is popular in the Philippines. In Mr. Ishioka's paper, it was not discussed because there was no need in his research to add EM to facilitate the rapid decomposition of waste materials.
- **On methane gas** – Methane gas can be collected in tanks and transported in pipes for the direct use in homes.
- **Compost standards** - Farmers hesitate to use compost because there are no standards yet. In Japan, set of standards for compost is being developed. In some places, the use of organic fertilizer is prohibited due to its high metal content.
- **Cost of economic development to the environment** – This can't really be calculated. The cost to the environment of bringing the product to a new area is not considered.
- **Price of organically grown vegetables** - In the Philippines, these vegetables are three times more expensive.
- **Identification of land use** – Satellite-aided GIS can be used. It can identify water sources and idle landmass. It can be used in community planning.
- **Funding issue** – Getting funding for projects is not easy. However, packaging a multi-sectoral and multi-functional project with a sanitation or ecological focus has a good chance getting funding support.
- **Wastewater** – There are 11-12 million hectares of crop production worldwide that use wastewater for irrigation. IWMI considers wastewater as irrigation water. In Nairobi, wastewater is directly applied to agricultural crops as source of nutrients. In Ho Chin Minh City wastewater is in not treated, is dispersed naturally to the river and used directly. Hence people avoid water from the stream especially during low tide, when water contains many pollutants.

- **Wastewater treatment** – Is there a suitable low, cost technology to separate heavy metals/pollutants from wastewater so that it can be used in agricultural production? It may depend on the contaminants. If the contaminant is N-based, it can be used for agriculture. However, heavy metals are very difficult to eliminate and costly. Many experiments have been done on this aspect. In Lima Peru, a small group of farmers prepared a small reservoir lined with plastic. Through a chemical process, pathogens are removed. Tilapia fish are kept in the reservoir.

List of papers presented

Titles	Authors/Presenters
Keynote and Resource Papers	
Urban Harvest: A CGIAR Global Program on Urban and Peri-Urban Agriculture	Dr. Gordon Prain CGIAR-Urban Harvest Lima, Peru
Urban Agriculture in Asia: Lessons from Japanese Experience	Dr. Kunio Tsubota Kyushu University, Japan
Newly Developed Technologies and Innovations in Urban and Peri-Urban Agriculture in Korea	Dr. Ji-Hye Moon National Horticultural Research Institute-RDA, Korea
Case Studies	
Empowering Urban Poor Communities through Integrated Vegetable Production in Allotment Gardens: The Case of Cagayan de Oro City, Philippines	Dr. Robert J. Holmer Xavier University, Philippines
Improving Environment and Economy through Urban and Peri-Urban Agriculture: A Case of Agri-tourism in Taiwan Technology Transfer Strategies and Experiences on Urban and Peri-Urban Agriculture	Dr. Chien Hsien Yen Chaoyang University, Taiwan ROC Dr. Simeon S. Crucido Cavite State University, Philippines
Country Papers	
Peri-Urban Vegetable Farming in Jakarta	Mr. Masjidin Siregar Ministry of Agriculture, Indonesia
Utilization of Food Waste for Urban/Peri-urban Agriculture in Japan	Mr. Gen Ishioka National Agricultural Research Center (NARC), Japan
Challenges and Strategies in the Korean Urban/Peri-urban Agriculture	Mr. Woong Kwon National Agricultural Cooperative Federation (NACF) Research Institute, Korea
Status And Potential of Urban And Peri-Urban Agriculture In Malaysia	Dr. Abd. Razak bin Shaari Horticulture Research Centre, MARDI, Malaysia
Urban Agriculture Program in the Philippines: Its Beginning and Status	Dr. Pedrito S. Nital Central Luzon State University, Philippines

Urban/Peri-urban Agriculture: Status and Challenges in Taiwan

Recycling of Wastewater from Pig Farms in Urban and Peri-urban Agriculture

Peri-Urban Aquatic Production Systems in Ho Chi Minh City, Vietnam

Dr. Wen-Chi Huang
National Pingtung University
of Science and Technology,
Taiwan ROC

**Dr. Supamard
Panicksakpatana**
Kasetsart University, Thailand

Mr. Huynh Pham Viet Huy
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Program of Activities

<u>May 22 (Monday)</u>	Arrival of Overseas Participants	
<u>May 23 (Tuesday)</u>		
Opening Program		
8:00-8:30	Registration	
8:30-9:15	Opening Ceremonies Welcome Remarks	Dr. Patricio S. Faylon Executive Director, PCARRD
	Opening Message	Dr. Hideo Imai Deputy Director, FFTC
	Rationale of the Workshop and Introduction of Participants	Dr. Digna O. Manzanilla Director, ARMRD, PCARRD
	Group Photograph	
	Emcee: Dr. Filiberto A. Pollisco Jr. and Ms. Cristina B. Gloria	
Session 1	Presentation of Keynote and Resource Papers	
9:15-10:00	Urban Harvest: A CGIAR Global Program on Urban and Peri-Urban Agriculture	Dr. Gordon Prain Global Coordinator, CGIAR-Urban Harvest Lima, Peru
10:00-10:20	Health Break	
	<i>Resource Papers: Recent Trends and Approaches in Urban/Peri-Urban Agriculture</i>	
10:20-11:00	Resource Paper 1 Urban Agriculture In Asia: Lessons From Japanese Experience	Dr. Kunio Tsubota Professor, Kyushu University Asia Centre, Japan
11:00-11:40	Resource Paper 2 Newly Developed Technologies and Innovations on Urban and Peri- Urban Agriculture in Korea	Dr. Ji-Hye Moon National Horticultural Research Institute (NHRI), RDA, Korea
11:40-12:00	OPEN FORUM Moderator: Philippines	
12:00-01:30	Lunch Break	

Session 2**Presentation of Case Studies**

01:30-02:10

Case Study 1

Empowering Urban Poor
Communities through Integrated
Vegetable Production in Allotment
Gardens: The Case of Cagayan de
Oro City, Philippines

Dr. Robert J. Holmer
Peri-urban Vegetable
Project, Xavier
University College of
Agriculture, Cagayan de
Oro City, Philippines

02:10-02:50

Case Study 2

Improving Environment and
Economy through Urban and Peri-
Urban Agriculture: A Case of Agri-
tourism in Taiwan

Dr. Chien-Hsien Yen
Department of Leisure,
Recreation and Tourism,
Chaoyang University,
Taiwan ROC

02:50- 03:10

OPEN FORUM

03:10-03:40

Health Break

03:40-04:20

Case Study 3

Technology Transfer Strategies and
Experiences on Urban and Peri-
Urban Agriculture

Dr. Simeon S. Crucido
Cavite State University,
Philippines

04:20- 04:30

OPEN FORUM

Moderator: Japan

04:30-04:45

Introduction to FFTC

04:45-05:00

Introduction to PCARRD**May 24****(Wednesday)****Session 3****Presentation of Country Papers**

08:30-09:00

Peri-urban Vegetable Farming in
Jakarta

Mr. Masdjidin Siregar
Indonesia Agency for
Agricultural Research
and Development,
Ministry of Agriculture,
Indonesia

09:00-09:30

Utilization of Food Waste for
Urban/Peri-urban Agriculture in
Japan

Mr. Gen Ishioka
Organic Amendments
and Fertilizers
Laboratory, National
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Center (NARC), Japan

09:30-10:00	Challenges and Strategies in the Korean Urban/Peri-urban Agriculture	Mr. Woong Kwon National Agricultural Cooperative Federation (NACF) Research Institute, Korea
10:00- 10:15	OPEN FORUM Moderator: Taiwan	
10:15-10:45	Health Break	
10:45-11:15	Status And Potential of Urban And Peri-Urban Agriculture In Malaysia	Dr. Abd. Razak bin Shaari Horticulture Research Centre, MARDI, Malaysia
11:15-11:45	Urban Agriculture Program in the Philippines: Its Beginning and Status	Dr. Pedrito S. Nitural Department of Crop Science-College of Agriculture, Central Luzon State University, Science City of Muñoz, Nueva Ecija, Philippines
11:45-12:00	OPEN FORUM Moderator: Korea	
12:00-01:30	Lunch Break	

Continuation of Session 3: Presentation of Country Papers

01:30-02:00	Urban/Peri-urban Agriculture: Status and Challenges in Taiwan	Dr. Wen-Chi Huang Graduate Institute of Agribusiness Management, National Pingtung University of Science and Technology, Taiwan ROC
02:00-02:30	Recycling of Wastewater from Pig Farms in Urban and Peri-urban Agriculture	Dr. Supamard Panichsakpatana Kasetsart University, Thailand
02:30-03:00	Peri-urban Aquatic Production Systems in Ho Chi Minh City, Vietnam	Mr. Huynh Pham Viet Huy Faculty of Fisheries, Nong Lam University, Vietnam
03:00-03:15	OPEN FORUM Moderator: Malaysia	
03:15-03:45	Health Break	

03:45-04:40	Presentation of Synthesis Final Discussion	Dr. Pedrito S. Nitural Department of Crop Science-College of Agriculture, Central Luzon State University, Science City of Muñoz, Nueva Ecija, Philippines
04:40-05:00	Closing Ceremony Responses from the Participants Awarding of Certificates Closing Messages	Dr. Lutgarda P. Ilagan VP for External & Business Affairs
7:00	Appreciation Dinner	Dr. Hideo Imai Deputy Director, FFTC
<u>May 25 (Thursday)</u> 8:00-4:00	Field Study Tour (Cavite/Tagaytay)	Dr. Siomeon S. Crucido Cavite State University, Philippines Ms. Tita I. Garcia Coordinator, Urban Agriculture Program DA Region IV, Phil. Ms. Adoracion B. Armada PCARRD
<u>May 26 (Friday)</u>	Departure of Participants	

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