

# The Characteristics of Agricultural Practices in Bang Kachao Area, the Bangkok Metropolitan Fringe

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## Abstract

Bang Kachao area, a conserved green zone in the southern part of Bangkok, has been recently well-known as one of the tourist destinations for rural tourism at a short distance to the city, which are mostly based on the tourism resources generated from agriculture. The present study, therefore, discusses agritourism that should be mainly facilitated in four agricultural systems: traditional mixed orchards, monoculture, integrated farming, and agroforestry. These systems have applied “sufficiency economy” for reconstructing farmlands, which features four characteristics of agricultural practices: small-scale farms in traditional agricultural landscapes, diversified agricultural products, conservation of the environment, and the interaction of rural and urban communities. These characteristics should be utilized for promoting agritourism in the area.

## I. Introduction

Since Thailand encountered the economic crisis in 1997, H.M. King Bhumibol Adulyadej proposed a “sufficiency economy” philosophy for sustainable development to face the emerging challenges of globalization (NESDB, 2007). It has been applied in agriculture as the “new theory,” a set of principles of the proper management of lands and water resources to benefit small-scale farmers (Chaipattana Foundation, 2012). The advocacy of the principles in agriculture is broad, even in Bang Kachao area, a conserved green zone of the Bangkok metropolitan fringe. The agricultural area of Bang Kachao has dramatically disappeared because of urbanization since the 1960s. Even though it has been protected as a conserved green zone since 1977, the agricultural area has still decreased. Since the economic crisis in 1997, some of the abandoned orchards have been recovered and have increased in importance in the local economy.

Because of the economic crisis in 1997, some villagers working in factories and companies were laid off. The Bang Nam Phueng sub-district headman gathered unemployed villagers to revitalize the abandoned orchards and generate income from agriculture. Nearly 20 (19.2) hectares of the abandoned orchard area, were thus recovered as farmlands and divided into 17 plots managed by 50 unemployed households, 10% of the unemployed villagers. This project was called “the community farms on new approaches,”

which applied the new theory farming system based on sufficiency economy by growing various crops and raising fish as integrated farming. Even though only a few villagers were involved at first, this project was later successful in establishing the Bang Nam Phueng floating market (a traditional type of market at which the commodities are sold on boats or nearby the waterfront; in 2004, they were mostly found in central Thailand, although the original ones are rarely seen today) for distributing their agricultural products, and they attracted close to 75,000 tourists per month (Caichompoo, 2011). As a consequence, the floating market encouraged other farmers in other types of agricultural systems to participate in the project. It also attracted villagers to establish several community-based enterprises producing local commodities for the floating market.

Although the floating market is famous because of its local products, which are mostly made from agricultural products, the agricultural practices in the area have not fit well with agritourism. The agricultural practices that are attractive tourism resources that support the formation of rural enterprises, and agritourism activities such as pick-your-own farms, farm shops, and farm-based accommodation (Robinson, 2012), should be utilized to promote agritourism. Krul (2012) has divided the agricultural practices in the Bang Kachao area into three categories: traditional fruit orchards (e.g., coconut, mango, and rose apple), decorative plants (e.g., lipstick palm), and a mixed pattern of agricultural practice (varieties of species in one area, complemented with fish/frog ponds). However, the information on agricultural systems and products is still

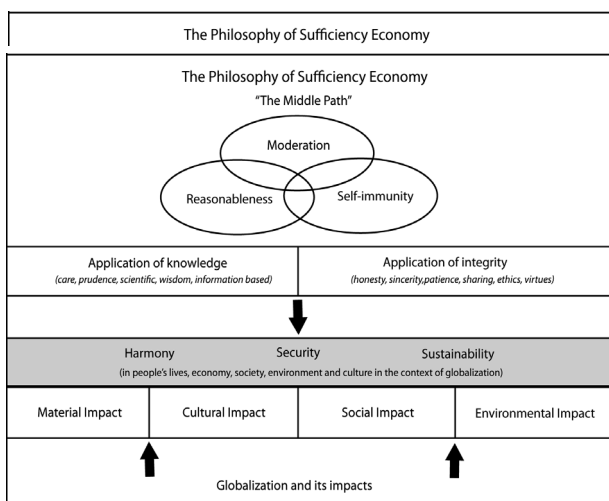
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limited. In order to promote agritourism, therefore, this study aims to clarify the agricultural systems with products and tourism services, and the fertilization of farms, to identify the characteristics of agricultural practices that should be evaluated for their contributions toward agritourism.

## II. Sufficiency Economy in Agriculture

The sufficiency economy is a philosophy for moderating the forces of globalization that comprises three elements: moderation, reasonableness, and self-immunity, and it requires two conditions: knowledge and integrity (NESDB, 2007). Moderation is a way to avoid suffering from unreasonable situations. Reasonableness entails planning for causes and effects of relationships in advance. Self-immunity refers to personal approaches to unexpected shocks. Knowledge means accumulating information, local wisdom, and technology for the improvement of human capital, and integrity refers to ethics and virtues, patience, honesty, and greed control (Calkins, 2012; Jitsanguan, 2012). Reasonableness indicates moderation, and moderation builds self-immunity, and self-immunity is a requisite for reasonableness (Fig.1). Sufficiency economy practices on the middle path to withstand internal and external changes regarding economic, social, environmental, and cultural factors (Mongsawad, 2009) and that can be applied in any fields at all levels, but particularly in agriculture (the new theory); these practices allow farmers to become self-sufficient, self-reliant, and frugal in a three stage process.



The first stage is aimed at securing adequate food by optimizing farmland in a ratio of 30%:30%:30%:10%. The first 30% is designated for a pond to store water and raise aquatic animals. The second 30% is for rice cultivation. The

third 30 % is set aside for growing fruits, perennial trees, vegetables, field crops, and herbal plants. The last 10% is reserved for housing, animal husbandry, and other activities. The second stage entails that the farmers pool their efforts and resources in groups or cooperatives for production and marketing. The third stage involves networking and coordinating to establish social capital (Chaipattana Foundation, 2012).

## III. Study Site and Methods

Bang Kachao is a part of the Phra Pradeang district, in Samut Prakan province, which comprises 6 sub-districts; Song Kanong, Bang Yor, Bang Kra Sorb, Bang Nam Pheung, Bang Kor Bua, and Bang Kachao (Fig.2). The area is close to the southern fringe of Bangkok, covering an area of 1,891.04 hectares. The entire area consists of 67 villages with 11,018 households and 41,428 habitants (as of December, 2010) (Caichompoo, 2011), of which 820 are farmer households (Krul, 2012). The area has considerable ditches and mangrove forests because it borders on the Chao Phraya River and is located only 20 km from the Gulf of Thailand (Krul, 2012). Thus, the agricultural area consists of three kinds of aquatic environments: fresh water, seawater, and brackish water, which contributes to the unique taste of fruits (Caichompoo, 2011).

This study addresses the agricultural practices. It is conducted through in-depth interviews with farmers and through field observations in 33 sample farms in 6 sub-districts (4 farms in Bang Yor, 5 in Bang Kor Bua, and 6 each in Bang Kachao, Bang Namphung, Bang Krasorb, and Song Kanong). These farms were selected from a number of outstanding farms recommended by the Biodiversity-Based Economy Development Office (Caichompoo, 2012) as agritourism farms, which practice agriculture based on one of the three categories of agricultural practices identified by Krul (2012). The interviews focused on agricultural systems and products, tourism services, and the sizes and fertilization methods of farmlands. Agricultural systems were classified by considering the practices of sustainable agriculture in Thailand: integrated farming, organic farming, natural farming, agroforestry, and New-Theory farming (Suksri et al., 2008). Agricultural systems were described by the details, frequency, and percentage of products, services, and farm fertilization.

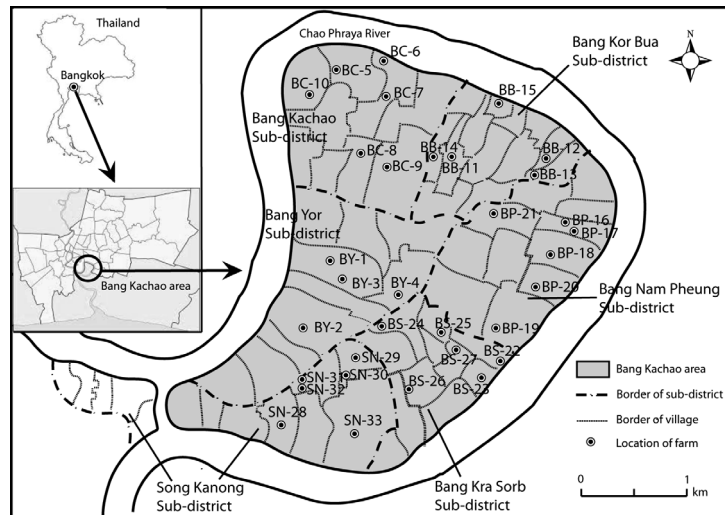


Figure 2: Bang Kachao area and the locations of 33 farms.

A code follows the abbreviation of the sub-district where each farm is located: SN = Song Kanong; BY = Bang Yor; BS = Bang Kra Sorb; BP = Bang Nam Phueng; BB = Bang Kor Bua; BC = Bang Kachao.

#### IV. Results: Agricultural Practices in Bang Kachao

Agricultural practices in Bang Kachao can be categorized into four systems: traditional mixed orchard, monoculture, integrated farming and agroforestry.

##### 4.1 Agricultural Systems and Products

Many farms were managed as traditional mixed orchards (15 farms, 46%) followed by integrated farming (10 farms, 30%), monoculture (6 farms, 18%) and agroforestry (2 farms, 6%).

###### (1) Traditional mixed orchard

The traditional mixed orchard is the oldest agricultural system in central Thailand, dating from ancient times. It is characterized by an agricultural landscape of ditches and dikes that normally connect with natural or man-made canals. The uniqueness of traditional mixed orchards is the cultivation of various kinds of fruit and other crops in the same dike. The traditional main crops are coconuts, betel nuts, bananas, lemons and oranges. The term *Benchaphun* refers to the cultivation of five crops.

To date, the five crops have been grown continuously except for oranges because that crop was damaged by floods during the late 1960s. Instead of oranges, hybrid mangoes, rose apples, and ornamental plants (i.e., cordyline leaves) have been grown.

Furthermore, another unique trait of traditional mixed orchards is that they produce coconut sugar for both self-consumption and sale. However, the expansion of urbanization has led to a gradual decline in coconut sugar

production, only two of 33 farms were producing coconut sugar during my survey (BY-1 and BP-17). The well promoted authentic one was in BY-1 (Fig3). Many traditional mixed orchards produced fruits (53%), and some produced garden crops (27%) and value-added agricultural commodities (20%).

###### (2) Monoculture

Because of floods in the late 1960s and economic growth between 1970 and 1997, the agricultural system that relied on subsistence farming changed, and the cultivation of commercial crops began. Some traditional mixed orchards have been converted to monoculture systems that produce solely a main crop for market but are still cultivated in the traditional agricultural landscape of ditches and dikes. Coconut, lipstick palm, and hybrid mango are main crops cultivated in this system. Coconut, which once produced coconut sugar, came to be planted in large amounts for producing coconut juice from fresh and boiled coconut. The cultivation of coconut in monoculture was found in SN-29 (Fig. 4). Lipstick palm was also once favored owing to the high price it commanded. Meanwhile, hybrid mango, called *nam dok mai*, is the most cultivated fruit and will be supported as an important agricultural commodity of Bang Kachao in the near future because of its unique taste. The main agricultural products of monoculture are fruits (50%), garden crops (33%), and value added commodities (17%).

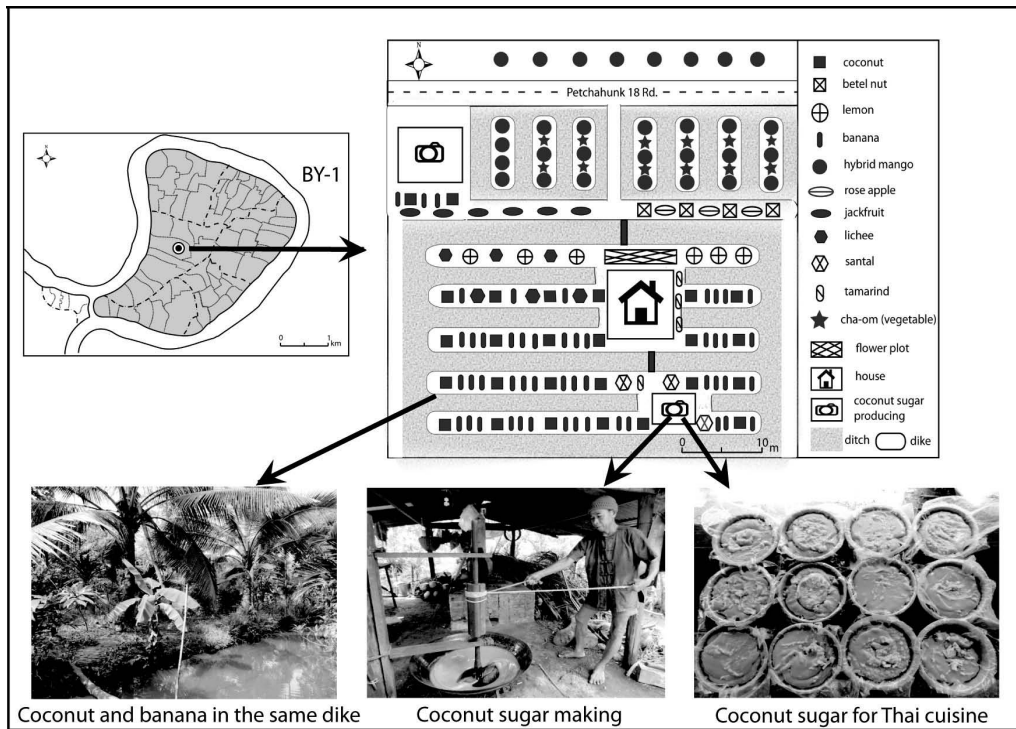


Figure 3: Agricultural system of a traditional mixed orchard (BY-1, a coconut sugar farm)

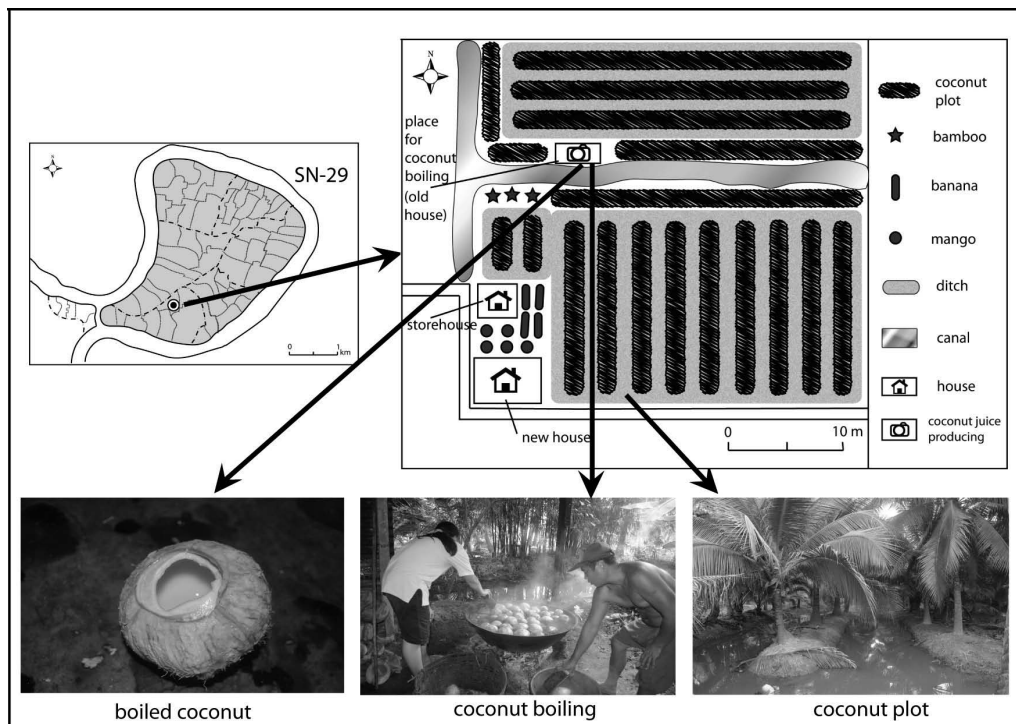


Figure 4: Monoculture agricultural system (SN-29, a coconut orchard)

### (3) Integrated farming

Since the economic crisis in 1997, agricultural practices have been modified to the system of integrated farming based on the new theory farming system. This system aims to help small-scale farmers gain the highest benefits by dividing their land into four parts: 30% for pond, 30%

for rice, 30% for fruits, vegetables, herbs, and perennial trees, and 10% for residences and animal husbandry. Because the Bang Kachao area is limited in scale for rice growing, this ratio has been adopted as integrated farming, which normally cultivates fruits, vegetables, herbal plants, and perennial herbs such as bamboo and includes raising

animals such as fish and frogs. For raising fish or frogs, the agricultural landscape was modified by extending the ditch to a pond. Mushroom farming (BB-13) is a good example of this system of dividing farmland into four parts (Fig.5). The first part is for growing mushroom and other vegetables. The second part is a pond, modified from the surrounding ditches, for raising fish and frogs. The third part is the area around the pond, used for cultivating fruits and perennial herbs such as jackfruits and bamboo. In addition, the fourth part is for housing and demonstration of mushroom growing for tourists. Integrated farming in Bang Kachao produced fruits (50%), vegetables and herbs (40%), and animals (10%).

#### (4) Agroforestry

Agroforestry in Bang Kachao has been implemented in abandoned traditional mixed orchards owned by the government. It was created following the king’s advice of “three forests, four benefits,” meaning growing a mixed forest with three kinds of trees for fruit, for fuel, and for timber with the additional benefit of increasing humidity

and soil retention (UNDP, 2007). Thus, government lands in this area were developed as a forest park where people were allowed to cultivate crops by growing forest trees and preserving the fruit trees left in the former orchards. The crops on the government lands were mostly herbs and vegetables for community utilization and consumption.

According to a farm survey, two pieces of government land are being used for these purposes. One (BP-21) is the forest park of the Bang Nam Phueng floating market, where herbs and vegetables are cultivated by a group of Thai medical physicians working at a Thai medical learning center at the Bang Nam Phueng community hospital (Fig.6). The other (SN-30) was established as an urban community forest called *Suan Pa Ked Nom Klao* in the Song Kanong sub-district. This government land plays a significant role in forest conservation by having set aside a large area of herbal plantation as an ecotourism site for local people, urban dwellers, and tourists. Both of these agroforestry farms produce vegetables and crops.

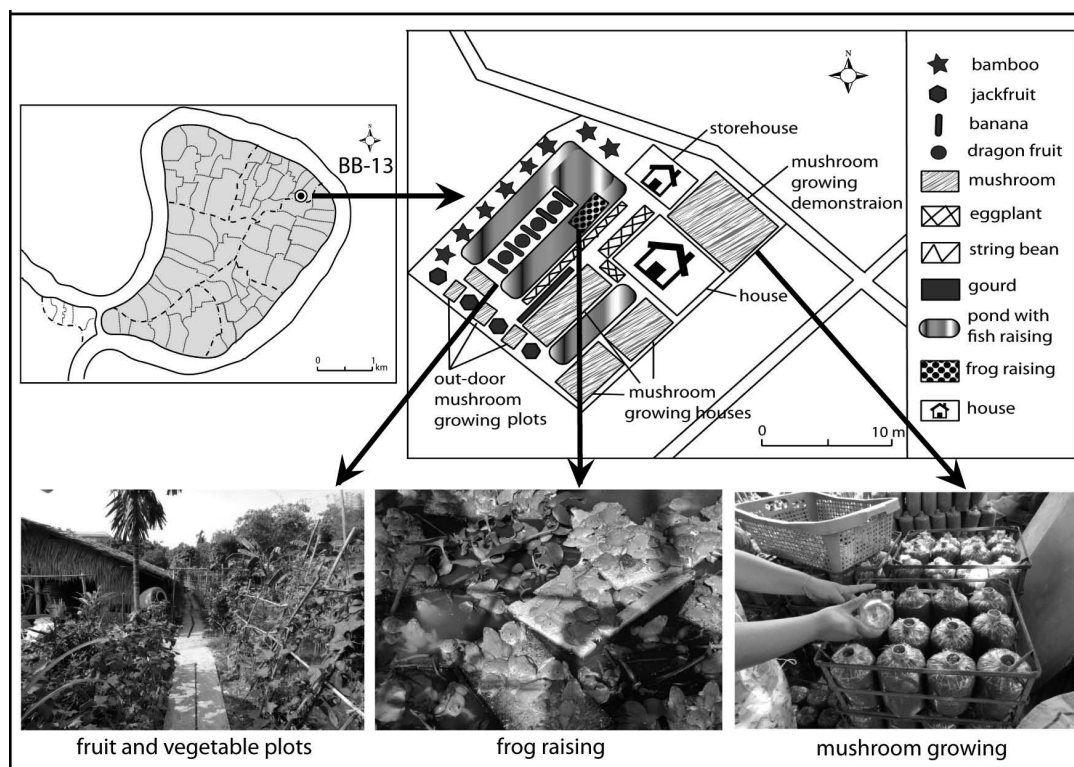


Figure 5: Agricultural system of an integrated farm (BB-13, a mushroom farm)

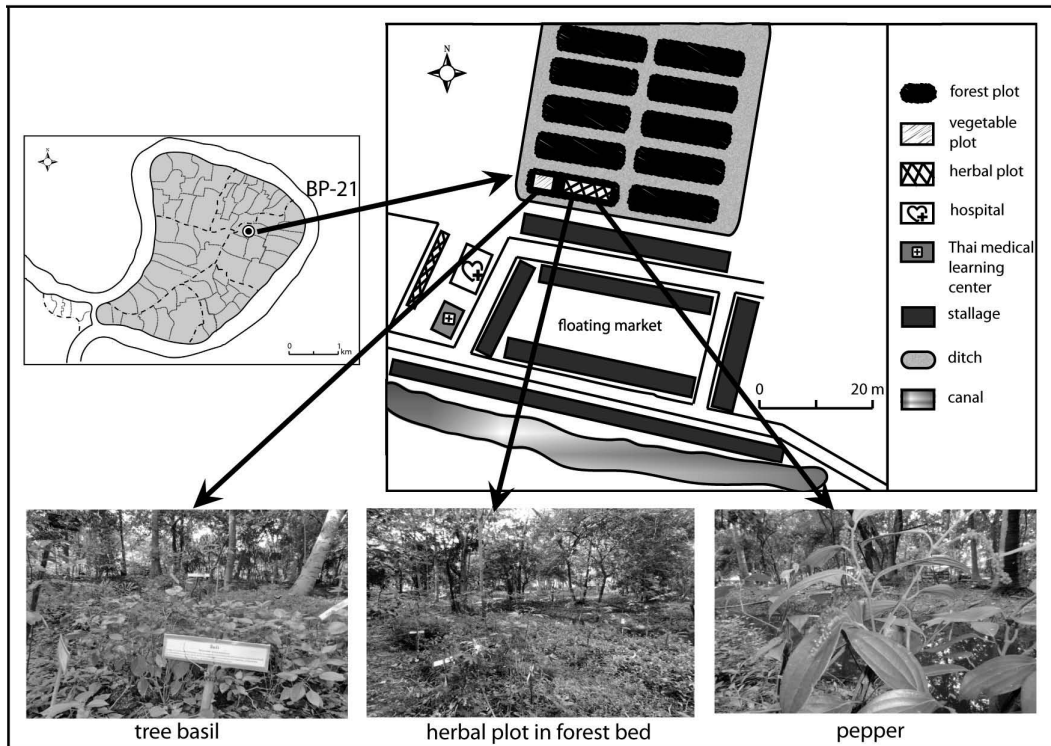


Figure 6: Agricultural system of an agroforestry-type farm (BP-21, a public forest land use)

#### 4.2 Tourism Services

In addition to producing agricultural products, the four agricultural systems also provide services for the promotion of rural tourism in the area. They are classified into three groups: accommodations, health services, and agricultural learning activities.

Accommodations were seen in farm stays (BP-18 and BS-26) and rental houses (BC-7 and SN-31). Health services are forms of health tourism and food tourism activities. Health tourism activities include herbal massages (BY-3 and BP-21) and bicycles for rent (SN-30). Food tourism offers a Thai cooking tour for foreign tourists (BP-16). Agricultural learning activities are found in product making and crop cultivation training. Product making was shown by demonstrating the production of coconut sugar (BY-1). Crop cultivation training was seen at the mushroom farm (BB-13), in the hybrid mango orchard (BB-14), and in the *gat* fruit orchard (BP-19). Even though the number of farms offering tourism services was a considerable proportion of total (12 out of 33 farms, or 36%), the number is still low if we consider that most of the surveyed farms were recommended as agritourist farms that would provide agriproducts, services, and activities (Sznajder et al., 2009).

#### 4.3 Fertilization of Farmlands

The approaches to increasing farm productivity to obtain higher benefits from crop cultivation and resource management on small-scale farms (the average land area was roughly 1 hectare) can be classified into four groups: chemical substance use, organic substance use, both chemical substance and organic substance use, and other approaches. Twenty-four farms (73%) were using organic substances following new knowledge and local wisdoms. The most practical techniques are EM (Effective Micro Organisms) and compost made from the garbage that can be found in any type of agricultural system. Farmers have recently been encouraged to make EM and compost through garbage sorting and compost making projects, which had been initiated by communities and were transferred to the agricultural technology transferring centers in each sub-district. However, the distinctive local wisdom is the maintenance of bed with mud from the bottom of the ditch, which is quite rarely seen in traditional agricultural landscape in recent years. In addition, recycled materials were used for cost reduction and productivity increase. The best practice of this approach was found on a very small lease farm (BP-20) where crops were cultivated on a used boat and in other old containers.

## V. Discussion: The Characteristics of Agricultural Practices in Bang Kachao Area

According to the results of this study, the agricultural practices in the Bang Kachao area can be classified into four characteristics as follows:

### 5.1 Agricultural Systems in the Traditional Agricultural Landscape on Small-Scale Farms

According to the study by Krul (2012), agricultural practices in the Bang Kachao area were characterized into three groups: traditional fruit orchards, decorative plants, and a mixed pattern of agricultural practice. In the present study, those agricultural practices were classified into four agricultural systems: traditional mixed orchard, monoculture, integrated farming, and agroforestry, which remains in the vernacular orchard characterized by ditches and dikes (Homhuan, 2007).

The findings from this study are both similar and different from those of Krul's study. The similarities are two systems: traditional mixed orchards and integrated farming. Traditional mixed orchards mainly produce fruits, so they are traditionally fruit orchards, whereas integrated farming, a modified system to generate various kinds of crops and animals, is a mixed pattern of agricultural practice. The difference is the decorative plants, which can be found growing in the traditional mixed orchards (i.e., cordyline leaves) and in monoculture (i.e., lipstick palm). Thus, decorative plant cultivation cannot be categorized as an agricultural system. However, Krul did not include monoculture and agroforestry in his study. The new findings from this study are two systems that conform and contrast with the sustainable agricultural systems of Thailand (Suksri et al., 2008).

Agroforestry in the Bang Kachao area is considered a sustainable agriculture system because it is practiced along with the principles of "three forests four benefits," but monoculture is not included because growing a single crop in a large area has numerous negative effects on the environment (Zorach, 2013; Polifroni, 2010), soil function, and sustainability (Liu et al., 2006). However, monoculture in the Bang Kachao area is implemented within the principles of the sufficiency economy on small-scale farms (i.e., avoid using chemical substances and practice in the vernacular orchard of ditches and dikes to keep the abundance of soil and ecosystems) as "natural monocultures" (Wood, 2000). Thus, this study includes

monoculture as a sustainable agricultural system. Therefore, the agricultural systems in the traditional agricultural landscape of Bang Kachao are apparent in the four agricultural systems (Fig. 7).

The traditional mixed orchard was the basis for other agricultural systems for which it was modified. The landscape is sustained by the seasonal inundation of natural and man-made water channels (Askew, 2000) connected from the Chao Phraya River to the narrow ditches in the orchards areas, which is one of the unique characteristics of peri-urban agriculture in the Bangkok metropolitan fringe. These ditches will always catch water to feed the crops (Phillip, 1995) and keep the soil fertile to nourish plants and aquatic animals. Ditches influence other agricultural systems in the same traditional way even in modified landscapes. Monoculture cultivates a single crop in previously traditional mixed orchards. Integrated farming produces diversified crops and animals in modified traditional mixed orchard landscapes on rationed parcels of land, based on new theory farming. Agroforestry combines various kinds of trees with vegetables and herbs in the abandoned traditional mixed orchards. However, these agricultural systems have been mostly practiced on small subsistence farms (approx. 1 hectare). This finding corroborates the notion of Polak (2008) that small farms (smaller than 5 acres or 2 hectares) in rural areas occupy 85% of the farmlands around the world and play an important role in the agricultural productivity of the planet.

### 5.2 Diversified Agricultural Products for Local Consumption and Economic Revitalization

The diversification of agricultural products will contribute to local food supply and economic revitalization. Agricultural products, mainly fruits and vegetables, from traditional mixed orchards, integrated farming, and agroforestry, based on subsistence farming or small-scale farming, can revitalize the local economies in rural and urban communities. Meanwhile, crops from monoculture or off-season commercial cultivars such as the Nam Dok Mai mango can strengthen macroeconomic systems. The importance of monocropping is increasing as volume of export fruits grew by 8% in 2011, with 2,163,149 tons and 2,296 million USD for all fruits, and 59,691 tons and 56 million USD for Thai mango.

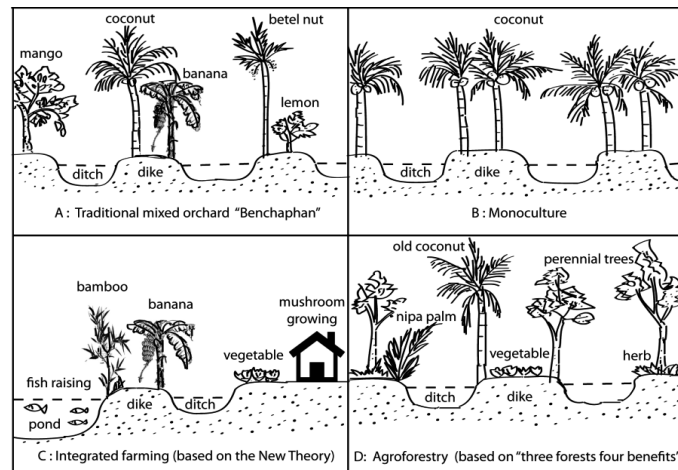


Figure 7: Agricultural transect featured by ditches and dikes

Even though its true amount is relatively smaller than that of other commodities, Thai mango can expand the amount of Thai food exports, which increased by 20% from 2010 owing to strengthened economic performance among major food importers such as the US, Japan, and the ASEAN countries (BOI, 2012).

### 5.3 Conservation of Cultural and Natural Environment

The approaches to fertilization on the farmlands in all four agricultural systems are in line with the principle of sufficiency economy. Namely, farmers are on the middle path of balancing their lives with nature and local wisdom. For instance, they have learned ways of reusing land year after year without destroying its fertility by avoiding chemical substances and using bio-fertilizers instead. This practice aligns with the moderation practice of producing crops without greed; making reasonable efforts to reduce cost production; producing diversified crops to ensure self-immunity against uncertain prices; and practicing wisely with right knowledge and without ethical dilemma. Farmers have been using natural resources in clever ways to create more resources for sustainability (Phillip, 1995), which is the target of sufficiency economy. Generally speaking, farmers of traditional mixed orchards have wisely used mud to moisten beds, and they have modified the traditional orchard landscapes into integrated farming, either by combining crop cultivation with raising animals or by growing mixed crops on the same plots without chemical use. Similarly, many abandoned orchards have been transformed into government forests with some parts allowed for cultivation as agroforest.

Even though monoculture may generally be in contradiction to sustainable agriculture, some of its

advantages can be taken advantage of with the flexible principles of sufficiency economy. For example, an appropriate way of coconut planting is necessary to reduce plant competition for nutrients, space, and solar radiation. Similarly, other crops cannot thrive well in the dense coconut plots because the soil is covered by strong coconut roots. However, monoculture in this area is still based on the former traditional mixed orchards, which combine the old and the new management of cash crop production through environmentally friendly cultivation for trading, particularly in hybrid mangoes. Because the export of Thai mango has to meet international quality standards, export mangoes, particularly for Japan, are quite strictly measured for the use of agrochemicals (Chomchalow and Na songkhla, 2008). The international standard of quality products encourages the development of mango growers' groups to avoid the over use of chemical substances.

### 5.4 Interaction of Rural-Urban Communities

The interaction of rural and urban communities has been identified from the consideration of tourism services that corroborate all types of rural tourism including farm-based holidays, special-interest holidays, nature-based and ecotourism holidays, sport and health tourism, educational travel, and food tourism (Melsen, 2012). In the Bang Kachao area, some farms offer services to generate income from tourism, these services facilitate all types of rural tourism on farms. For example, farm stay service supports the promotion of agritourism, Thai cooking tour programs promote food tourism, bicycle rental services support sport tourism and ecotourism, agricultural learning activity encourages the



importance of educational tourism, herbal massage promotes health tourism, and even rental house enhances long-stay tourism. This phenomenon indicates that rural tourism in this area has entered the involvement stage of the tourism area life cycle because there are interactions between locals and tourists that will become more commercial services (Garrod, 2012). In addition to the interaction of locals and tourists, working people in urbanizing areas may work part-time on farms or start a recreational farm including retirement business (Heimlich et.al., 2001).

## VI. The Contributions of Agricultural Practices toward Agritourism in Bang Kachao Area: Suggestions and Conclusions

The four agricultural systems in the Bang Kachao area that produce various kinds of organic agricultural products characterize the unique agricultural practices. These characteristics lead to the formation of the identity of urban-rural communities in the Bangkok metropolitan fringe that was strengthened by the sufficiency economy. The application of the sufficiency economy in agriculture, called “the new theory,” has been adopted in integrated farming for recovery of sustainable community agriculture, which provides the products to the Bang Nam Phueng floating market on weekends.

The floating market revitalizes local economies by attracting both domestic and international tourists. Although the floating market has been well-developed to facilitate rural tourism activities such as shopping and cycling, agricultural practices in the four agricultural systems have not been facilitated in terms of agritourism.

The four characteristics of agriculture practices, therefore, should be considered to promote the unique agricultural systems. Agricultural systems in the traditional agricultural landscapes on small-scale farms are the special characteristic of agricultural practices in Bang Kachao, which may attract agritourists. Thus, the four types of agricultural systems should be linked along a community-based agritourism route by cycling, which has been recently promoted. For example, learning how to produce coconut sugar in a traditional mixed orchard, drinking coconut juice, or eating hybrid mangoes on a monoculture farm; growing trees in an agroforest farm; or cooking or staying overnight on an integrated farm.

The community-based agritourism route may help to distribute diversified agricultural products, which is one of the characteristics of agricultural practice to agritourists on weekdays via farm shops or agritourist restaurant directly.

Another characteristic of agricultural practices in the Bang Kachao area is the conservation of the cultural and natural environment, which should be used for promoting organic crops and local products, including agricultural activities on farms such as picking organic local vegetables and making compost or EM. For promoting organic crops such as hybrid mangoes, farmers should create unique labels on their products. This suggestion conforms with the notion of Krul (2012) that the Bang Kachao label should include four characteristics: sustainability, healthy, green, and tasty.

The promotion of cultural and natural conservation also strengthens the relationships of local people and urban dwellers, which manifests the importance of the interaction between rural and urban communities. Promoting the relationship between local people and urban dwellers (mostly tourists) should be campaigned for as an agritourism strategy through exchange activities. For instance, working vacations on farms known as Willing Workers on Organic Farms (WWOF) make a shift in the engagement with local communities around the world (Lipman and Murphy, 2012).

In conclusion, appropriate rural community revitalization should also be addressed with agritourism in agricultural areas, including both agricultural production activities (e.g., fruit cultivation, coconut sugar production) and non-farming activity (e.g., food and beverage services, accommodation service). These activities may attract tourists to farms, lead them to buy agricultural products at reasonable prices, and yield income to farmers on weekdays. Accordingly, agricultural activities would support various rural tourism activities that generate benefits to farmers and local people all year round.

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