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ANALYSIS

Economic appraisal of profitability and sustainability of peri-urban agriculture in Bangkok

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ABSTRACT

Promoters of urban and peri-urban agriculture generally stress its positive role in terms of food security, income, employment and improvement of the urban environment. Unfortunately, competition with agricultural and non-agricultural uses of peri-urban farm land often translates into intensive farming systems that are detrimental to the environment. Based on two original surveys of peri-urban farms in the area of Bangkok, this paper ranks four cropping systems (fish, shrimp, rice, and fruits) according to their economic profitability. A second step of the analysis aims at taking into account the cost of water into the analysis, so as to assess whether the hierarchy formerly established is modified. Although all environmental costs are not introduced and environmental benefits are ignored, this work paves the way for further research in the area of taking into account the environmental impact of farming activities.

1. Introduction

Peri-urban agriculture refers to farming activities – horticulture and crop production, animal husbandry, aquaculture and forestry – carried out within, or at the periphery of, the cities. These activities draw on a set of existing resources (land, water, labor, waste, energy, etc.) that can be used for either agricultural or non-agricultural uses, and generate food and non-food flows towards the urban centers (Moustier and Mbaye, 1999). They may be either exclusively oriented towards the market, or part of a household's strategy to meet its basic needs. Although peri-urban agriculture may be considered as a temporary activity (van den Berg, 1984), its positive and lasting role has been highlighted (Mougeot, 1994) and is increasingly taken into account by policy-makers and urban planners around the world.

Indeed, peri-urban agriculture is encouraged in poor countries, mainly as a means of improving food security (Armar-Klemesu, 2000), by helping poor households cover an important share of their food consumption (thereby allowing them to save their money for other needs) and by improving the urban population's nutrition status (greater freshness of the products, better access to vegetables considered as a major source of vitamins and micro-nutrients). This is all the more true as inefficient transportation and storage facilities in most poor countries make it safer and less costly to locate the production of perishable products near the main consumption areas (Argenti, 2000). Thanks to the diversity of crops and to low barriers to entry – low surface requirements, possibility of using vacant land, recycled waste, waste water – peri-urban agriculture is likely to provide jobs and incomes to various groups of city dwellers,[1] be they poor and landless urbanites, middle-income housewives, retired civil servants officers or wealthy farmers (Nugent, 2000). It must also be noted that urban and peri-urban agriculture may be carried out for other

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[1] "There is no such person as the 'average urban farmer'. He or she may come from any portion of a city's population spectrum… Urban farmers include the wealthy and the poor, recent immigrants and landed gentry" (Smit and Nasr, 1996, p. 71).

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purposes such as cultural or community involvement (Ruel et al., 1999). The possibility of carrying out intensive production on small plots of land is often quite well adapted to the urban environment where water and land are scarce. Furthermore, the temporary leasing of urban land may optimize the use of vacant plots. Finally, peri-urban agriculture may help recycle waste (Smit and Nasr, 1996) and provide an improved environment for city dwellers (less noise, water and air pollution, green areas).

However, peri-urban agriculture also suffers from its proximity to the city. The use of improperly treated waste water or solid waste and the contact with polluted air are risky for both consumers (through the contamination of food products) and producers (Birley and Lock, 1999). Moreover, peri-urban activities may be jeopardized by the highly uncertain environment in which they are undertaken (most farmers suffer the constant threat of losing the land over which they have no property rights). Finally, peri-urban activities may further aggravate existing pollution problems, through the excessive use of chemical products and the production of agriculture-related toxic waste (e.g. pesticide or fungicide residues). The final consequences of agriculture-induced pollution may be the contamination of drinking water resources and food products, the eutrophication of water systems, increased air pollution and the transmission of infectious diseases where livestock is involved.

The main objective of this paper is to assess the economic profitability of a number of agricultural systems located in the periphery of Bangkok and to balance the picture obtained by taking into account some of the environmental problems related to those systems, based on a survey of farmers. Peri-urban agriculture has been pictured as a potentially profitable activity, especially in Asia (Jansen et al., 1996; Midmore and Jansen, 2003), hence the idea to question this image in the case of Bangkok. The paper is organized as follows: Section 2 introduces the challenges faced by peri-urban farms in the area of Bangkok and stresses the importance of water related issues. Section 3 presents the main features of the farms surveyed (size, yields, income, costs, etc.) and ranks them according to their level of profitability. Section 4 focuses on two major environmental issues faced by the farmers in the course of their activity, i.e. the quality of water and the use of chemical inputs. Section 5 summarizes the main results obtained.

2. Area of study, materials and methods

2.1. *Bangkok suburbia, a challenging environment for farming*

Bangkok has always concentrated Thailand's wealth (Mounier et al., 1995). From the mid 1960s onwards, factories and the middle class started settling at the fringes of the city (Dixon, 1999). The share of the population engaged in agricultural activities inside Bangkok dropped dramatically. As the city grew, land was kept for speculation, while workers switched to industrial jobs. Since 1980, the provinces close to Bangkok have been growing faster than Bangkok itself. Soaring land prices and wage rates and aggravated traffic problems have pushed the industries to the fringes of the capital. This expansion of the urban and industrial fabric towards the provinces has been both uncontrolled and uncoordinated: the lack of an official city plan until the early 1990s translated into a chaotic pattern of land use, whereby residential houses are mixed with commercial buildings, factories and farms (Lo and Yeung, 1996). The city's built-up area mushroomed from 67 km^2 in the late 1950s to 426 km^2 in the early 1990s (Falkus, 1993). During the 1990s, Bangkok continued to expand in a fairly uncontrolled way: urban concentration and regional urbanization led to very high growth and to the emergence of complex patterns of land use, commodity flows, population flows and life-styles. This evolution went hand in hand with a high pace of industrial and urban growth, the proliferation of motorized vehicles and uncontrolled development, resulting in numerous conflicts. As a consequence, the population, the total area of cultivated land and the size of farms and plots have been declining in the southern part of the delta since the 1960s. The extent of such decline is greater the closer the area is to Bangkok. Within urbanized areas, the concentration of farm land along canals enables an easy access to free surface water for irrigation and transportation. The decline of agricultural activities within the Bangkok Metropolitan Area (BMA) can be explained by the fact that today, land is used for speculation, rather than for agricultural purposes:[2] around Bangkok, land prices are much higher than anywhere else in the delta, inducing dramatic changes in the organization of space.

The Chao Phraya delta covers over 2 million hectares in Thailand's Central Plain and is crossed by four main waterways connected together through a dense network of tributaries and canals. Bangkok is located in the southern part of this delta. In the Chao Phraya delta, the monsoon period extends from May to October. The average monthly and daily temperatures (25–33 °C) allow for year round rice cultivation, while the average rainfall reaches 900 to 1400 mm/year (Adeel et al., 2002). The land is very flat in this area – the slope hardly ever exceeds 1% – inducing rural expansion to occur along artificial and existing canals used as irrigation, drainage and communication facilities. As a consequence of declining drainage conditions, the effect of the tide can be felt in the canals and rivers up to 60 km from the coast during the dry season, causing saline intrusions south of Bangkok and great damage to agriculture, while at the end of the rainy season, villages located in low-land areas east of Bangkok are likely to be flooded (Gillet and Ollivier, 2000). Conversely, water shortages during the dry season may cause the farmers to use reservoirs and pumps to bring water to the fields.

2.2. *Is the "Venice of the East" drying out?*

Once a water-abundant country, Thailand has lately been experiencing water shortages. Indeed, very rapid growth has triggered considerable demands for water. According to the

[2] Inside Bangkok, many plots of land are kept for speculative purposes because the system of property or land taxes is too weak to have any deterrent effect. However, farming activities can be carried out on land saved for speculative motives (Lo and Yeung, 1996).