Distance to the City and Performance of Food Chains in Antananarivo, Madagascar

Little is yet known about the quantitative importance of urban agriculture in Antananarivo. Yet several recent studies on chains, such as those for rice, tomato, cauliflower and leafy vegetables, provide insights into the contribution of agriculture to the capital city’s food supply, and the comparative advantage that urban locations provide.

This study examines the difference in performance between food-processing chains in urban, periurban and rural areas. It analyses the relationships between location; availability and access to production factors; the structure of marketing channels; and the cost, distribution and performance of production. The study shows that these chains constitute contrasting economic environments at very short distances from one another.

Rice is the main staple food in Madagascar and the main market is Antananarivo. Providing 15 to 25 per cent of the total rice supply to the capital, urban rice production is the third largest contributor after imported rice and rice coming from Lake Alaotra, the country’s largest rice granary. Harvested earlier than most rice in Madagascar, urban rice helps supply the market and stabilise prices during the lean season (December-February/March) thus reducing the need to import rice from April to June, before the large harvests come in from Lake Alaotra.

Tomatoes, due to their perishable nature, are grown predominantly around Antananarivo. They are the most common market crop consumed in the capital (ahead of potato, carrot, onions and leafy vegetables) and more than 90% comes from urban agriculture. Farmers who previously grew only rice have started to diversify by growing tomatoes, which are regarded as a “year-round” product by consumers in Antananarivo. Farmers in different locations use their differences in agro-climatic potential (including altitude) to create a complementary marketing calendar.

Sites at varying distances from the city centre

A comparative analysis was made on rice and tomato, the two dominant products in the intra-urban, periurban and rural agriculture areas close to the capital of Madagascar, based on data collected in 2005. The sites for the study were chosen on the basis of the following criteria: 1) strong market integration of the farmers; 2) strong orientation of the chains towards markets in Antananarivo and; 3) similarity of farming systems, equipment and soil.

The sites compared for rice were Analamahitsy Tanana, an urban area; Ambatomainty, a periurban area 12.5 km from the city; and Ankazoandrao a rural area located 85 km away. The tomato sites were Ambohimarina, a periurban area 15 km from the city (referred to as close); Ambohonidrazana, a periurban area 20 km away (referred to as far); and Ambatomoina a rural area at 102 km distance from the capital.

Ten farmers per site (60 in total) were interviewed, as were several experts and agents in the main marketing channels towards Antananarivo. The farmers practise mechanised farming in the periurban area and more traditional techniques in the intra-urban and rural areas. Tomato yields range from 2.7 tons (rural area) to 3 ton per hectare (periurban). In the rural area, tomatoes are grown in the rice off-season, and in the periurban areas they are grown in the rainy season in the rice producing foothills. The yields for rice vary from 16 tons (close periurban area) to 22 tons per hectare (rural area).
Number of participants in chains is not distance dependent

Farmers sell on average about 25 per cent of the rice they produce. After processing it manually, the intra-urban rice farmer sells 80 per cent of the produce that he markets directly to consumers in the capital and 20 per cent to a district retailer. The production marketed by the peri-urban rice farmer passes from small-sized paddy collectors/processors or processing factories to collectors of processed rice, wholesalers and retailers before reaching the consumers at the big daily markets in Antananarivo. The produce marketed by rural rice farmers passes along several channels, some of which are fairly short: local sales at rural weekly markets no further than 50-60 km away account for 50 per cent of marketed produce. Other channels take longer for the rice to reach urban consumers, as it passes through paddy collectors, processors, collectors of processed rice, wholesalers, and retailers at several markets.

Tomatoes must be sold immediately after harvesting. Most of the harvest is sold, only a small part is being retained for domestic consumption. Paradoxically, of the three sites, the marketing channel for the two peri-urban sites is much longer (i.e. is composed of a larger number of intermediaries) than that for the rural area. The collectors/wholesalers buy about 88% of their tomatoes from the close periurban area and use a rented car to transport them to the wholesale market. The semi-wholesalers then transport them by taxi (minibus), rickshaw, or sometimes on their backs, to retail markets. The channels are similar for tomatoes from the far periurban area. The differences are that there are two types of collectors (collectors for the wholesale market and collectors for the local market) and produce flows not only towards the capital but also outwards, towards the provinces. Collectors do not approach nearby rural producers because the area is enclosed. These farmers therefore have to transport their tomatoes at their own expense by taxi and rickshaw to the major markets (wholesale and retail) of Antananarivo.

There is demand for different types of tomatoes on the Antananarivo markets. For example, large, good quality tomatoes are sold by the kilo at the Petite Vitesse market, while small tomatoes are sold more cheaply by the pile at the Androvoahangy market.

Other products also pass along a variety of channels before reaching their final destination. Watercress is an example, where almost two-thirds of intra-urban produce also goes through long channels (see Box). In the city, this apparent paradox may be because the process of agricultural production is so time consuming, leaving little time for marketing, or because of having to combine several household activities. In the countryside, this may be because farmers can secure a safer return on their work by selling more expensive produce directly to urban consumers, but it may be more difficult to find collectors in the most remote areas.

Reduced costs and comfortable margins for middle-distance production

Processing costs are charged to the rice farmers in the intra-urban site, while they are charged to the collectors in the peri-urban and nearby rural areas. Therefore production costs are relatively higher in the intra-urban area. However, production costs of the urban rice farmer are also higher than those of the periurban rice farmer because of the high labour cost in the city. This means that urban farmers’ profit margins are lower than those of periurban farmers for rice sold at the same price. Collection costs are high for the rural site in comparison to the peri-urban site because they include processing: in fact the rural rice farmer sells paddy and not white rice to the collector, but also pays four times higher transport costs. In conclusion, the periurban rice chain is the most efficient within the comparison (see Figure).

Tomatoes grown during the rainy season in the periurban area offer a higher margin than those grown in the rural area.
because the produce is sold during a period of scarcity on the market. This increases the price, but the maintenance cost of the crop is also higher. Nevertheless, in the far periurban area, production costs are lower than in the rural area because transport costs are charged to the collector/wholesaler. Rural producers pay the transport costs and sell directly in Antananarivo. Production costs are also lower in the close periurban area because the yield is higher (20 t/ha against 16 t/ha) and thus economies of scale play a role. So, the tomato chain of far periurban production is the most efficient, but the differences with the other tomato chains are smaller than those between the different rice chains (see Figure).

Factors of production that follow different rules

The initial assumptions, of a gradual decrease in the availability of inputs and a progressive increase of the prices associated with the remoteness of the town, were confirmed for transportation, unskilled labour, and mode of tenure. They do not always hold, however, for price of land, skilled labour, or situations where there are many stakeholders.

In the city, agriculture is combined with other activities, so the producer of rice or tomato must resort to the use of paid labour from rural areas, or unpaid labour of acquaintances or members of the extended family. For rice, paid labour is expensive in the periurban areas because there is not always enough labour available to cover farming activities, especially during the harvest period. Labour is cheapest at the rural site. For tomato, labour is more expensive in the rural area than in the periurban areas because labourers need to be better qualified to handle farm equipment (plough and harrow).

Land is a complex factor of production, subject to other factors than just the rule of competition and decreasing prices as you move away from very populated areas. Land may be more expensive in the rural area than in the far periurban area; and land on hillsides may be more or less expensive than land in the valley, depending on the site.

Similarly, it is not always the shortest chains, in terms of the number of participants, which perform best. Moreover,

Watercress, an example of growing urban agriculture

Watercress (Nasturtium officinale) is one of many leafy vegetables grown by urban farmers in Madagascar. Produced on small family plots, it grows in spaces left derelict by urban construction and where rice is no longer grown. In 2005, the Department of Agriculture estimated national production to be 1003 tons, 80 per cent of which is grown in the province of Antananarivo. This figure would appear to be a considerable underestimate. A cross-check of production site maps, systems analysis and crop yield estimation, shows that production in the capital city alone is likely to be between 20,000 and 40,000 tons. The majority of the 296 operators are Betsileo, an ethnic group from the central southern Highlands, who maintain seasonal activities in their region of origin and complement this by renting land to cultivate rice and watercress in the capital.

The area occupied by watercress in Antananarivo is growing, in response to increased food demand as the city grows. It expanded from 40 ha in 1973 to 68 ha in 2008. In total there are 41 sites, of which 37 are located in the intra-urban area. Ten have started to decrease in size due to an embankment.

Watercress cultivation is a very profitable activity. For example, annual production in Ambanidia, one of the most important areas, varies between 154,000 and 257,000 ares where it is a monocrop. Differences in economic performance are related to several factors: tenure status (owner or tenant), access to water, the selling price of the product (higher in periurban areas) and the marketing channel.

The competition between development of urban agriculture and other urban activities seems to favour the cultivation of watercress. However, the sustainability of this chain, which lacks organisation and support but is strongly resilient, depends on its capacity to deal with the questions of quality and food safety of the product.
several unexpected parameters have a strong effect on economic performance: the origin of labour used (farmers or employees/paid labour), the type of fertiliser used (no fertiliser, green manure or artificial fertiliser).

Indeed, the most successful systems are the ones which take advantage of the proximity of urban markets for trade opportunities, and, at the same time, minimise the costs arising from the competition between agriculture and other urban activities. In the case of Antananarivo, the optimal systems are situated in the intermediate periurban area between the intra-urban area and the rural area.

Finally, it is important to make a sectoral and spatial analysis of the interactions between food-processing chains, household strategies and territorial dynamics. This dual approach enables space to be taken into account in economic analyses of chains; processes of structural change in the agricultural world that are related to urban areas to be studied; and local development decisions to be supported by actors in the chains concerned.

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References

Notes
1) This text is an excerpt from the Corus1-ADURA research project (Analysis of the sustainability of agriculture in the town of Antananarivo) 2003-07 funded by MAEE.
2) 1 acre = 40 ares