

Community Livelihood and Agricultural Techniques in Peri-Urban Farming in Cameroon

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Abstract

Agriculture is the bedrock of Cameroon's economy as it contributes significantly to food, income and employment. However, the country's agriculture is confronted by a myriad of challenges which include inter-alia issues of land tenure, inadequate finance, weak market information system and use of simple technology. The unprecedented growth in Cameroon's urban population has given rise to peri-urban agriculture. Using survey data of 150 randomly sampled farmers, we assess the socio-economic contributions of peri-urban farming to livelihoods and the constraints faced by farmers in study area, at the periphery of Buea in the South West Region of Cameroon. The study identified some of the agricultural techniques being practiced to include slash and burn, shifting cultivation, crop rotation, farming without ridges, monoculture, and livestock farming. The commonest crops and livestock are tubers, grains, horticultural products, oil palm, poultry, goats and pigs. We found that peri-urban agriculture contributes significantly to household food security and nutrition, income, and employment of farmers. These findings have important policy implications for urban food security and nutrition, and sustainable development.

Keywords: Cameroon, Peri-urban farming, Agricultural techniques, Community livelihood

1. Introduction

In 2008, the world's urban population outstripped its rural population (United Nations Population Fund (UNFPA), 2007). The United Nations (UN) estimates that 60% of the world's population will live in the cities by 2030 (UN-Habitat, 2007), and the estimate is expected to be higher in Asia and Africa (UN-Habitat, 2016a; Orsini et al., 2013). This rapid growth in the urban population which exerts pressure on urban poverty and food systems has promoted urban and peri-urban agriculture (UPA). This has placed the concept of UPA at the centre of the development agenda at the regional, national, and international levels (Van Veenhuizen and Danso, 2007; FAO, 2001). The United Nations Development Programme (UNDP) estimates that urban agriculture is practised by over 800 million people worldwide (UNDP, 2006). Several proponents of urban and peri-urban agriculture can be identified in the literature (DeZeeuw et al., 2011; Van Veenhuizen, 2006; Moustier and Fall, 2004; Moustier and Mbaye, 1999; Smit et al., 1996). According to Mougeot (2000), urban agriculture as "*located within (intra-urban) or on the fringe (peri-urban) of a town, a city or a metropolis, and grows or raises, processes and distributes a diversity of food and non-food products, (re-)uses largely human and material resources, products and services found in and around that urban area, and in turn supplies human and material resources, products and services largely to that urban area.*"

Van Veenhuizen and Danso (2007), assert that "*peri-urban areas tend to undergo dramatic changes over a given period of time, there is an influx of people from both rural and urban areas, population density increases, land prices tend to go up and multiple land use emerges. Such changes affect the agricultural production systems, which tend to become smaller scale with more intensive production, and shift from staple crops towards more perishable crops and animal production (meat, eggs, and milk).*" Table 1 below depicts the different crops and livestock systems and estimations per region of urban-based agriculture, based on the FAO study carried out in 2001.

Table 1: Urban farming per region

| Region | Agriculture Population (% of region) | Principal livelihood | Characteristics |
|---------------------------------|--------------------------------------|---|--|
| Sub-Saharan Africa | 3 | Fruits, vegetables, dairy cattle, goats, poultry; off-farm work | Heterogeneous and dynamic; it is estimated that in some cities, 10% of the population are engaged in UPA |
| Middle East and North Africa | 6 | Horticulture, poultry, off-farm work | Fruit and vegetables; small contribution to income |
| South Asia | 1 | Horticulture, dairy, poultry and other activities | Often seen as a livestock-based farming system |
| East and South East Asia | 1 | Horticulture, dairy, poultry and other work | Milk and vegetables, often commercial |
| Latin America and the Caribbean | 3 | Horticulture, dairy, poultry | Focuses on high-demand perishable products; limited space requirements |
| Eastern Europe and Central Asia | 7 | Vegetables, poultry and pigs | Recently grown in importance; mainly for own consumption, with occasional selling |

Source: FAO, 2001

Peri-urban farming is gaining steam in Cameroon. Overall, Cameroon is predominantly an agrarian economy with agriculture contributing to about 23% to the country's gross domestic product (GDP) and an estimated 65% of the active population is engaged in agriculture and pastoral activities for their livelihood. It is projected that over 70% of Cameroon's population is expected to live in urban areas by 2030 (UN-Habitat, 2016b). The unprecedented growth of Cameroon's urban population is placing enormous pressure on urban food supplies, the environment, urban food security and nutrition. This could lead to growing urban poverty (Ravallion, 2007), unemployment, malnutrition and hunger. About 16% of households (3.9 million people) in Cameroon are food insecure; and about 22% of rural households are food insecure against 10.5% of urban households. In the South West region, 12.8% of households are food insecure. In some food insecure regions, agricultural production and productivity still remains extremely low.

One major challenge for Cameroon is to guarantee food supplies and ensure food security and nutrition of its rapidly growing urban population through sustainable agricultural practices. Hence, the need to invest in urban and peri-urban food programmes as a policy response to address these current challenges faced by cities. The main goal of this study is to assess the socio-economic contribution of peri-urban farming to livelihoods in the South West region of Cameroon. Specifically, the study seeks to identify the current agricultural systems, identify key constraints faced by farmers in study area village, and proffer policy prescriptions to address these constraints. This paper is structured as follows: section two presents brief literature, the materials and methods, which includes the study area and the data source. Section three presents the results and discussion. The concluding section summarises the key findings and proffers some policy prescriptions.

2. Materials and Methods

2.1 Conceptual Framework

This study adopts an operational definition of the FAO which defines urban and peri-urban agriculture as *"the growing of plants and the raising of animals for food and other uses within and around cities and towns and related activities such as the production and delivery of inputs, processing and marketing of products."* Peri-urban agriculture has been widely recognised to provide fresh food products, livestock products, and non-food products to the rapidly growing urban populations in developing countries such as Cameroon. In addition, it generates employment, income and contributes to household food security and nutrition. De Bon et al. (2010), assert that *"urban agriculture is one of the traditional activities conducted by African households as a risk-sharing strategy, but also as a significant part of their culture and tradition of urban gardening."*

The practise of urban and peri-urban farming in Cameroon has galvanised interest within policy and academic circles. Most research is based on survey data from selected city case studies. Essougong (2017) postulates that UPA has a broad range of multifunctional roles for urban dwellers ranging from food supplies, income, employment, and the provision of environmental services. According to Gockowski and Ndoumbé (1999), the consumption of fresh leafy vegetables contributes significantly to the diet and income of the urban poor. Similarly,

Gockowski et al., (2003) used an expenditure model of demand of a 1998 survey of 150 urban farmers in Yaoundé, Cameroon. They found that traditional leafy vegetables is a major source of nutrition and employment of urban and peri-urban households, constituting a greater share of nutrients for the urban poor. Moreover, an estimated 32,000 households were engaged in urban farming with the majority being women.

The FAO defines agricultural practices as “a set of principles, regulations and technical recommendations applicable to production, processing and food transport, addressing human health care, environment protection and improvement of worker conditions.” Different agricultural techniques tend to impact the environment and human health in different ways. For example, organic farming enhances soil fertility through the use of organic inputs and reduces environmental and health risks, as opposed to conventional farming systems which rely heavily on the use of agrochemicals and other synthetic inputs that are not environmentally friendly and sustainable. Gomiero et al. (2011) undertook a comparative review of the environmental impact of organic farming systems and traditional farming systems, and assert that organic agriculture is more environmentally friendly as it reduces soil loss and enhances soil organic content.

Studies on peri-urban agriculture in Cameroon have concentrated more on the environmental consequences. Endamana et al. (2003) examined the reuse of waste water for urban and peri-urban agriculture in Yaoundé and found that, water used for crop irrigation in the peri-urban areas met the required bacteria and parasitic standards of the World Health Organisation (WHO), in contrast to the urban districts which exceeded WHO required levels. This constitutes a serious health risks for both the agriculturalists and consumers of these agricultural products. Similarly, Monkiedje et al. (2005) analysed the effect of land uses in peri-urban agriculture on soil health in the humid forest zone of Southern Cameroon. The results suggest that the selected soil health indicators were sensitive to the cropping system and the agrochemicals applied.

The pressure for more peri-urban agriculture in countries like Cameroon may increase further in the years ahead, following challenges with respect to low public sector investment in agriculture. Development assistance for agriculture has declined over the last two decades, leaving many poor countries more vulnerable to hunger and poverty. In sub-Saharan Africa in particular, agriculture has been plagued by low productivity and low investments, making it difficult for Africans to feed themselves and earn an income from farming. Cameroon, like most African countries have failed to invest at least 10% of their GDP in agricultural sector in line with the Maputo Declaration. The spike in food prices in 2008 jeopardised even more people in poor countries as the price of imported foods such as rice, wheat, and corn peaked. This, coupled with the global financial crisis, resulted in a devastating economic impact on urban poor families, who often spend at least half of their income on food. It is estimated that in 2009 the number of hungry people around the world exceeded 1 billion. Although the number declined slightly to 925million in 2010, it is now poised to go up again as world food real prices keep rising, an increase that analysts forecast could drive millions into poverty and hunger.

2.2 Study area

The study was carried out in Fako Division in the South West Region of Cameroon. The Division has two major cities namely, Buea, and Limbe. The area is characterized by fertile volcanic soils, favourable temperatures, sunshine and rainfall. An estimated 80% of the population practice peasant farming and about 70% of the land mass is under cultivation for food crops. Traditional agricultural practices have led to the destruction of vast rich ecosystem and deterioration of soil fertility as a result of high erosion. An agricultural and pastoral activity is mainly subsistence usually characterised by low yields and the use of basic technology.

2.3 Nature and Source of Data

Our investigation was based on a random sample of 150 agriculturalists. The sample of 150 household's heads was representative of the population in the key farming communities. Structured questionnaires were administered to the respondents. Through long standing trust relationship with farmers in the study area, we were able to collect reliable data on the personal and socio-economic characteristics of the farmers, the different agricultural systems, the socio-economic contribution of peri-urban farming and various challenges faced by food crop farmers. This was supported by personal observations in the field and focus group discussion with farmers. Table 2 is a summary of the typology of the socio-economic profiles of the agriculturalists.

Table 2: Typology of urban agriculture and socio-economic profile

| | Home Subsistence Farmers | Multi-cropping peri-urban farmers | Family-type commercial farmers | Entrepreneurs |
|-----------------------------|--|---|--|--|
| Location* | U | P | UP | P |
| Outlets | Home consumption | Home + urban markets | Urban markets for income | Urban market + export |
| Objective | | Home consumption and income for subsistence | subsistence | Additional income & Leisure |
| Size | Usually < 100 m ² | Usually > 5000 m ² | Usually < 1000 m ² | Usually > 2000 m ² |
| Products | Leafy vegetables, cassava, Plantain, maize, rice, goats and sheep, poultry, fruits | Staple food crops, local vegetables | Leafy vegetables, temperate vegetables, poultry, sheep, milk | Temperate vegetables, fruits, poultry, livestock, fish |
| Intensification (inputs/ha) | 2 | 1 | 2 to 3 | 4 |
| Gender | F | F+M | F+M | M |
| Limiting factor | Size | Access to inputs; Fertility | Size, land insecurity, access to inputs, water and services, marketing risks | Technical expertise, marketing risks |

Note: * U: within the urban districts of the city; P: in the peri-urban districts of the city. Source: Moustier and Danso (2006)

3. Results and Discussion

3.1 Agricultural System

Five main farming systems could be distinguished, namely: shifting cultivation, slash and burn, farming without ridges, crop rotation, and plantation agriculture or monoculture. Most agriculturalists are involved in slash and burn, farming without ridges and crop rotation. As shown in figure 2, about 43.3% of the farmers are engaged in farming without ridges, largely due to the topography of the area which does not favour the use of ridges due to high surface run-off and soil erosion. About, 26.6% practice slash and burn, 20% crop rotation while 6.6% practice shifting cultivation. Shifting cultivation is becoming unpopular in the study area mainly because of lack of access to farm land and a rapid population expansion. Production is mainly for home consumption with the excess taken to the main urban markets of Limbe and Buea. About 3.3% of farmers are into monoculture plantations for commercial purposes. Plantation agriculture takes place on small family farms, typically 2-15 hectares in size. The main plantation crops include palm and banana plantations. The level of mechanisation still remains extremely low in these plantations. The most common food staples cultivated in the area are tubers and root crops such as sweet potatoes, taro, cassava, and yam. Maize is also widely cultivated. Intensive horticultural products such as fresh leafy vegetables and fruits that are highly perishable and have high value are also grown. These horticultural products together with animal production (poultry, goats and pigs) are important sources of nutrition, employment, and income for urban and peri-urban households.

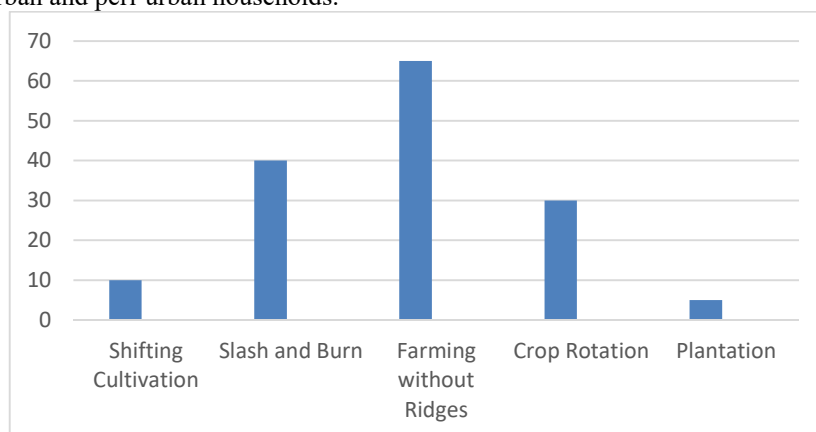


Figure 2: Agricultural techniques used by farmers (Source: Field survey, 2017)

Table 3 captures the socio-economic characteristics of the farmers. It is observed that 24.67% of the farmers are between 21 and 30 years, 43.33% fall between 31 and 40 years, 32% are above 40 years while none is below 20 years. This result indicates that more than 65% of the respondents fall within the range of 21-40 years, suggesting that the majority of the farmers belong to the economically active working population. Therefore, they

can put in more labour hours in order to increase yield and productivity. It also strongly suggests that no child labour was employed. Their age may also influence their farm decision making. It is also observed that 73.33% of the farmers are female. This suggests that most of the peri-urban farmers are women. The results corroborate with the findings of Gockowski et al. (2003), that farming represents a major source of employment and income for women. They are involved in both the cultivation of crops and the rearing of animals. They play a pivotal role in household food security and nutrition.

Table 3: Socio-economic characteristics of farmers

| Variables | Frequency | Percentage (%) |
|---------------------------------------|------------------|-----------------------|
| Gender | | |
| Male | 40 | 26.66 |
| Female | 110 | 73.33 |
| Education | | |
| No formal education | 62 | 41.33 |
| Primary education | 20 | 13.33 |
| Secondary education | 38 | 25.33 |
| Tertiary education | 30 | 20 |
| Age | | |
| Below 20 years | 0 | 0 |
| 21-30 years | 37 | 24.67 |
| 31-40 years | 65 | 43.33 |
| Above 40 years | 48 | 32 |
| Household size | | |
| 3-6 persons | 25 | 16.66 |
| 6-9 persons | 97 | 64.66 |
| Above 9 persons | 28 | 18.66 |
| Farm Size | | |
| Below 500m ² | 98 | 65.33 |
| 501m ² -1000m ² | 22 | 14.66 |
| Above 1000m ² | 30 | 20 |
| Monthly Income | | |
| Below 50,000CFA | 20 | 13.33 |
| 50,001-100,000CFA | 77 | 51.33 |
| 101,000-150,000CFA | 32 | 21.33 |
| Above 150,000CFA | 21 | 14 |
| Membership of Association | | |
| Yes | 122 | 81.33 |
| No | 28 | 18.66 |
| Marital Status | | |
| Single | 38 | 25.33 |
| Married | 86 | 57.33 |
| Divorced | 26 | 17.33 |
| Land Tenure | | |
| Renting land | 47 | 31.33 |
| Inherited land | 68 | 45.33 |
| Purchased land | 45 | 30 |
| Application of Inputs | | |
| Chemical Inputs | 110 | 73.33 |
| Organic Inputs | 40 | 26.66 |

Note: Exchange rate; 500 FCFA = 1 US\$. **Source:** Field survey, 2017.

A significant majority of the respondents were married; 25.33% are single and 17.33% are divorced. This suggests that the majority of agriculturalists (57.3%) are likely to make use of family labour for their farm activities. Furthermore, our results showed that most farmers had no formal education (41.33%) which may hinder them from adopting modern agricultural techniques. The implication of this is that these farmers are likely to readily adopt new technology and innovation. From Table 3 above, the modal household size of 6-9 persons suggests that agriculturalists are likely to employ family labour, thus reducing expenditure on hired labour.

The majority of agriculturalists (65.33%) had farm sizes below 500m² while 20% had farm sizes above 1000m². This suggests that the farm sizes are generally very small, although the farmers may cultivate more than one farm plot, in order to increase yield and income. Also, majority of the farmers (81.33%) do not belong to an agricultural co-operative society; thus, they may fail to reap the windfall benefits and advantages which

membership of co-operative may offer. However, some farmers indicated that they belonged to informal small community groups and associations, where they pool their resources together for a common purpose. Access to the land is paramount. The analysis revealed that about 45.33% inherited the land they were using, 30% bought the land, while 31.33% rented the land. About half of those who bought and rented land have had to deal with land tenure disputes, which resulted to court litigations. Common land tenure problems include the sales of a single farm plot to more than one person.

The study equally found that 73.33% of farmers applied chemical inputs such as fertilisers, pesticides, insecticides, and fungicides in their farms. The main issue of concern with the high adoption rate and increased usage of these synthetic inputs is the fact that most farmers apply excess fertilisers and pesticides. This has led to a growing concern over issues of food safety and quality and its associated environmental and health risks. It may affect the soil quality and cause environmental pollution. About 26.66% of farmers admitted using organic inputs such as poultry droppings and pig manure. The use of organic inputs is being popularised and encouraged through different education and training programmes.

The spearman's rank correlation is employed to test the degree of correlation between the method of farming and the output that is realised. A coefficient of 0.4 shows that, there exists some positive correlation between the methods of farming and production levels.

3.2 Socio-Economic Contribution of Peri-Urban Agriculture to Livelihood

We found that peri-urban agriculture contributes significantly to food security and nutrition of urban dwellers and households engaged in it. Food security entails the availability as well as economic and physical access to nutritious food for a healthy and productive life. The urban poor mostly obtain their protein, vitamins, and other micronutrients from the consumption of fresh leafy vegetables, fresh dairy products, and other leguminous crops grown in peri-urban areas such as Study area. The proximity of the peri-urban farmers to the major cities of Limbe and Buea enables the poor and middle-class urban consumers to have access to fresh food products of high nutritional value from the main city markets at competitive prices. For households engaged in peri-urban farming, the consumption of fresh vegetables, and food staples such as cocoyam, cassava, banana, plantain, sweet potatoes, and livestock products such as chicken, eggs, pork, represent a major source of carbohydrates vitamins, and protein.

In addition to the food-supplying role of peri-urban agriculture, it also contributes to the alleviation of poverty. It represents a major source of income and employment for many households. The large majority of households in this area are engaged in agriculture, and production is usually for subsistence and commercial purposes. By producing their own food, they are able to reduce expenditure on food, which can lead to increased savings. Secondly, the surplus production is sold to urban markets to generate income, complementing income from non-farm activities. Other households would earn income by being employed in other agricultural activities in the value chain such as processing, transport, marketing, and land preparation.

3.3 Challenges Faced by Farmers

The challenges faced by farmers in study area are enormous. Amongst the challenges reported in the focus group discussion include: limited access to agricultural inputs (e.g. fertilizers, improved seeds, pesticides etc.), poor market information system, low access to credit, lack of irrigation systems, limited access to farm land, and poor post-harvest handling technology. High post-harvest loss and food spoilage was identified as a major constraint. The farmers cultivate fresh food products such as vegetables and fruits that are highly perishable and have a short shelf-life. The majority of the farmers' produce is usually lost due to poor post-harvest handling and the lack of modern storage facilities. As a result, there is high food spoilage and a great deal of the produce loses its nutritional value before reaching the market centres. Another major challenge identified is access to agricultural finance. Most farmers have limited access to formal credit from financial institutions. Formal financial institutions usually require collateral securities which smallholder farmers can't provide. Consequently, farmers have opted to informal financing as an alternative source of capital to finance production, which is still very inadequate. Quality agricultural inputs such as fertilizer and improved seeds are vital in agricultural production. Access to these inputs remains a major constraint for many poor smallholder peri-urban farmers. The limited access to these inputs can be at the institutional and/or financial level. At the institutional level, this can be attributed to the weak linkage that exist between research institutions, extension agents, and farmers' organisation, and at the financial level, it can be attributed to financial constraints faced by farmers to purchase these inputs.

The market information system is observed to be very poor. Agricultural marketing and distribution is a very vital component of agricultural production. A well-functioning market information system is very important in agricultural production and marketing. It keeps farmers attuned to changing consumer tastes and preferences and provides vital information on agricultural prices to enable both buyers and sellers make sound decisions. It creates consumer awareness on product standards, grading, labelling, packaging, and quality, and enables farmers sell their produce at competitive prices. The lack of irrigation systems implies farmers tend to practice rain-fed agriculture which depends on nature for its water supply. This also implies that farmers are unable to produce fresh

horticultural products in a calendar year. Consequently, during the dry season, there is shortage of fresh leafy vegetables in the major market centres and not everyone can easily afford, since they are more expensive. Limited access to farm land is seen by many farmers as a major constraint to agricultural production. Even though the majority of the agriculturalists are women, cultural beliefs and tradition prevents them from owning or inheriting farm land. Issues of land tenure and property rights have often resulted to court litigations and expulsion of those renting the land for agricultural production.

4. Conclusion

Agricultural investments can be transformative, especially for farmers in developing countries such as Cameroon, where the sector employs nearly two-thirds of the active population and accounts on an average for one-third of the national income. These investments will help the most vulnerable people earn their way out of poverty. In addition to stimulating growth, investment in agriculture also ensures food security and nutrition to the urban poor and enable them withstand future shocks from changing global food prices and weather patterns. Access to modern technologies, agricultural inputs, and a well-functioning market information system is urgently needed to help peri-urban households to produce enough to attain food security and nutrition. Safety-nets like cash-for-work programs are also needed to ensure that the poorest families do not descend further into poverty. In the long-term, food security and nutrition will require significant investments in agriculture and rural development. Municipal authorities must incorporate urban and peri-urban farming in urban development plans. With better infrastructure, education and training, modern storage facilities, and access to agricultural finance, farmers could benefit from increased crop yields and stronger connections to domestic, regional, and international markets.

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