ORIGINAL ARTICLE

MULTIFUNCTIONAL ANALYSIS OF PERI-URBAN AGRICULTURE IN RABAT: ITS PRODUCTION SYSTEMS AND ITS RELATIONSHIP WITH ECONOMIC DEVELOPMENT AND ENVIRONMENTAL CONSERVATION OF THE METROPOLIS

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ABSTRACT

Background: Peri-urban agriculture is of vital importance for food security in Africa as in the world because of its role in supplying cities with agricultural products and in combating unemployment. However, this agriculture is confronted by a myriad of challenges which include legal constraints mainly the absence of laws regulating this activity and the obligation of some farmers in the peri-urban area to pay housing taxes and technical constraints such as insufficient workforce and high labor costs, difficult access to irrigation water, lack of training and technical supervision and support from the concerned body. **Objectives:** The study aims to assess the socio-economic contributions of peri-urban farming to livelihoods and the constraints faced by farmers in study area, at the periphery of Rabat Metropolis. **Methods:** Using interviews, field observations and surveys, data were collected from 50 randomly sampled farmers. **Results:** According to the major findings of the study, the main types of peri-urban farming practices in the study area includes: horticulture or production of fruits and vegetables, crop farming and some livestock rearing such as beef farming, sheep farming and poultry farming. We found that peri-urban agriculture contributes significantly to household food security and nutrition, income, and employment of farmers and enhances economic use of land and environmental beatification of the city. **Conclusion:** The findings of this study have important policy implications for urban food security and nutrition, and sustainable development.

Keywords: Rabat, Peri-urban farming, Agricultural techniques, Sustainable development, Food security, Morocco.

1. INTRODUCTION

In almost every city in the world, peri-urban agriculture area is under the pressure of urban growth not only in terms of space consumption but also in terms of loss of its own agricultural coherence. It therefore experiences a change of nature, which forces it to fall back or even to disappear if its space continues to decrease.

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 [1]. 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)."

In Morocco the percentage of urban population increased from 43% to 55% between 1982 and 2004 [2] and will probably reach 70% in 2050. This urbanization is increasing mainly at the expense of lowland areas with high agricultural potential already irrigated or easily irrigable, phenomenon observable in most of the coastal plains of Morocco but also in the other countries around the Mediterranean.

The annual agricultural area consumed in Morocco by the different forms of urbanization is estimated at 4,000 hectares, 2/3 of which for real estate operations [3], despite the town planning law 12/90 advocating the principle of the preservation of highly productive agricultural land, and its translation into local planning and urbanism documents.

Like most major cities in the world, the metropolis of Rabat embodies the three challenges: urbanization, population growth and food security. Over the past 20 years, the metropolis has experienced significant urbanization during the 2000-2020 period to the detriment of rural / agricultural space. This phenomenon is mainly attributed to the demographic growth of the urban population of the Rabat-Salé-Kénitra region and to the rural exodus.

Few systematic studies have been carried out on peri-urban agriculture in Rabat and in Morocco in general. However, the continued growth of the metropolis indicates that a broader and more systematic understanding of the peri-urban agriculture is necessary to determine its importance and to help determine the best way to develop this type of agriculture in order to contribute to sustainability and food security for the city and the country in the future. Specifically, the study represents the first known analysis of peri-urban agriculture on the fringes of the metropolis of

Rabat, it seeks to identify the current agricultural systems, identify key constraints faced by farmers in study area, and proffer policy prescriptions to address these constraints.

2. MATERIELS AND METHODES

2.1 Study area

The study area was delimited to a radius of 40 km from the urban core of the city of Rabat in order to remain within the peri-urban perimeter while ensuring the presence of farms with the majority of existing speculations in the region (Figure 1). The region's climate is temperate and semi-arid, favorable to agricultural activity despite the relatively low rainfall. It has a Mediterranean climate with a cold and rainy winter and average temperatures ranging between 0 and 5°C at night and can reach 17°C during the day. Rainfall in the region generally varies between 900 mm and 300 mm.

Figure 1: The figure presents the location of the surveyed farms within the study area.

2.2 Nature and source of data

Our investigation was based on a random sample of 50 farmers. Structured of a series of 83 questions was 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.

2.3 Statistical analysis

Data used in analysis were systematically organized, summarized, processed and interpreted using appropriate data analysis techniques to make them meaningful and to draw sound conclusion based on the research findings. The data collected through questionnaire are quantitatively tabulated, interpreted and presented by using statistical methods such as frequency distribution, Chi-square test, Tests of normality and homogeneity of variances, means comparison test and Principal component analysis (PCA) were used for the analysis of the data collected. All analysis and calculations were performed on the SPSS version 26 (Statistical Package of Social Sciences, V26.0) and Ms Excel.

3. RESULTS AND DISCUSSION

3.1 Agricultural system

Peri-urban agriculture takes place on small family farms, typically 0-5 hectares in size. Four main plantation crops could be distinguished, namely: vegetable crops, arboriculture, field crops and fodder crops.

The most dominant speculation in the peri-urban area in the metropolis of Rabat is vegetable crops, with 56%. While arboriculture, field crops and fodder crops represent 44% of total food production. About 60 % of the total production is for commercial purpose taken to the main urban markets of the metropolis. Food crops represent 12% and are mainly fodder crops intended for animal feed. Both cash and food crops are mainly vegetable crops and cereals such as common wheat, potatoes, tomatoes, etc.

The survey result reveals also that livestock is a practice less regarded by farmers in the region: 54% of respondents do not practice livestock while 46% who do it have only a small herd. In general, the most common types of livestock farming practice in the study area includes: beef farming, sheep farming and poultry farming practices. Such types of farming activities are kept in both peri-urban and rural areas of the country for various uses including milk and milk products, meat, eggs, food, cash and various cultural uses [4]. Vegetable products together with animal production (poultry, beefs and sheep) are important sources of nutrition, employment, and income for urban and peri-urban

households. Peri-urban agriculture therefore allows job creation in the fringes of the metropolis. Permanent workers are mainly hired for livestock labor and arboriculture, which require regular work. Seasonal labor is required in all types of crops, whether market gardening, arboriculture, field crops or fodder crops. According to some farmers, women are hired mainly during the harvest season, while men are employed for other technical operations requiring a certain force.

It is observed that 34% of the farmers are between 51 and 60 years and 30% are above 61 years. This result indicates that more than 64% of the respondents fall within the range of 51 years and above, suggesting that the majority of the farmers belong to the elderly population (Figure 2). Their age may also influence their farm decision making. The results corroborate with the findings of Dongmo et al. (2005) that peri-urban farming represents a major source of employment and income for households and play a pivotal role in household food security and nutrition around and in the cities [5].

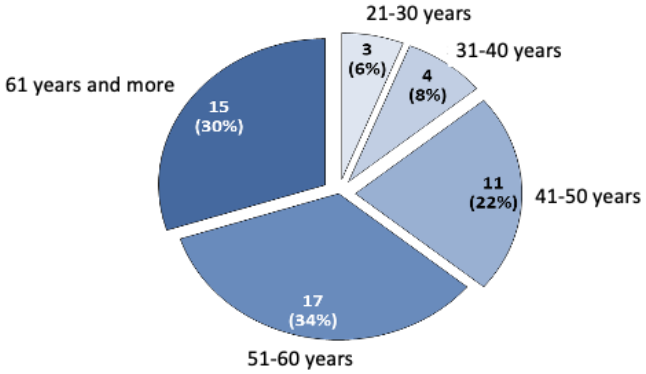

Figure 2: The figure presents the proportion of the respondents according to the age class.

The majority of agriculturalists (48%) had farm sizes below 3 hectares 32% had farm sizes between 3 and 5 hectares. 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 (Figure 3).

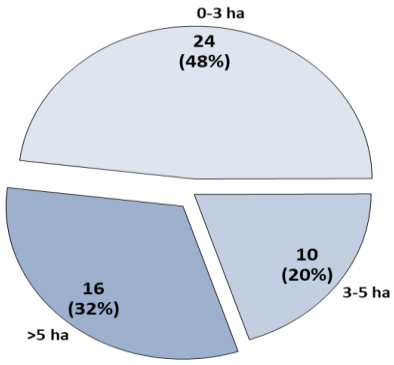

Figure 3: The figure presents the proportion of farmers according to the cultivated area.

The analysis revealed that about 90% inherited the land they were using, 6% bought the land, while 4% rented the land. All farmers declared using organic inputs such as beef manure. The use of organic inputs is being popularized and encouraged through different education and training programs to reduce the employment of synthetic inputs (Figure 4).

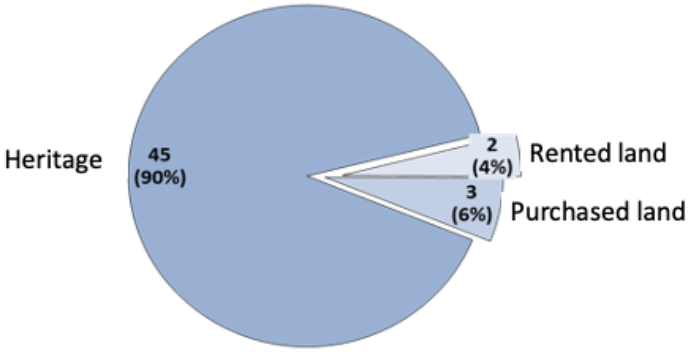

Figure 4: The figure presents the proportion of farmers according to their land acquisition mode.

In addition to improving food security and providing economic opportunities, peri-urban farming has additional environmental benefits: reduces the urban heat effect, thereby lowering temperatures; increases carbon sequestration; improves water quality; prevents erosion; and reduces the severity and recurrence of floods by providing buffer zones and storing excess water [1-3].

Results of the survey indicate that peri-urban agriculture in the metropolis of Rabat has a significant environmental impact that must be taken into account when implementing policies concerning this activity. It participates in the development of open spaces that are difficult to build, thus contributing to the creation of a beautiful landscape for urbanites. It limits the building pressure and maintains green belts for the urban population seeking green spaces for relaxation. Peri-urban farming also has an important role in the recycling of livestock products by using the organic manure in the agricultural production process.

3.2 Socio-economic roles 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. The proximity of the peri-urban farmers to the metropolis 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 vegetables, fruits, and livestock products such as meat, eggs, milk, 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. Many households in the study 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 nonfarm activities. Other households would earn income by being employed in other activities such as functionary, taxi drivers, carpenters and grocers (Figure 5).

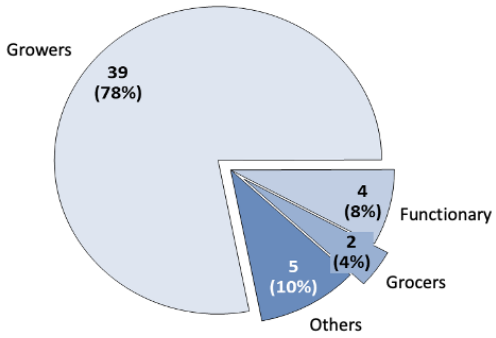

Figure 5: The figure presents the main activity of the respondents.

3.3 Challenges faced by peri-urban growers in the Rabat metropolis

The challenges faced by farmers in study area are enormous. According to the major findings of the study, peri-urban agriculture in the metropolis of Rabat faces several constraints such as: legal constraints mainly related to the absence of laws regulating this activity at the national level and the obligation of some operators in the peri-urban area to pay housing tax. It is also subject to a certain number of technical constraints: insufficient workforce and high labor costs, lack of technical supervision and support from the concerned body and it mainly suffers from difficult access to irrigation water. The presence of arid and semi-arid conditions in disparate locations such as the West African hinterland, northwest India, coastal Chile, the Middle East, and North Africa endows peri-urban agriculture in such regions with certain shared characteristics that make water supply a more crucial issue than in most other regions. Consequently, water availability, access, usage restrictions, and cost all tend to play a greater role in the decisions of property owners and farmers [6].

For all these reasons, municipal authorities must incorporate urban and peri-urban farming in urban development plans. With better infrastructure, education and training, and access to agricultural finance, farmers could benefit from increased crop yields and stronger connections to local, regional, and international markets.

4. CONCLUSION

Peri-urban agriculture is indeed multifunctional, ensuring both a food production function (fruits and vegetables) intended for sale in the metropolis of Rabat, a socio-economic function and an environmental function. It allows the creation of employment for the benefit of the region's youth and the generation of income for farmers. Peri-urban agriculture contributes also to the recycling of livestock products and the development of open spaces thus contributing to the creation of a beautiful landscape for urbanites.

The economic and social roles of peri-urban farming need to be better understood in order to integrate peri-urban agriculture into urban planning. This study does not only help us to characterize the peri-urban systems, but also to identify the potential growth and limitations of these systems. It is hoped that such evaluation of resources, constraints and opportunities of the peri-urban systems will help policy makers to meet the food needs of megacities in general and Rabat in particular, without damaging the natural resource base of peri-urban areas.

Improving the political and institutional framework now observed in recent years to drive change is encouraging. To maintain this positive dynamic, the actors of urban and peri-urban agriculture: namely researchers, development agencies, decision-makers and the local community must work together to reach a coherent consensus for its development. Provide a platform sharing experiences and discussions of important problems is a step in the right direction.

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