
Assessing Multifunctionality and Sustainability of Peri-Urban Farming: A Case Study in The Casablanca Metropolitan Area (Morocco)

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Abstract—Considering the increase in urban population and land consumption in the last decades, sustainability in peri-urban areas is a priority. Farming multifunctionality is the integration of different functions and activities that produce beneficial effects on local economy, environment and society. Recently, in many countries around the world, increasing support for and promotion of urban and peri-urban agriculture has been made, but in Morocco few research investigates its multifunctionality and its sustainability in relation with the future development of Moroccan cities. This research aims to contribute in this sense. Therefore, it underlines the potentials and challenges of peri-urban farming in the outskirts of Casablanca metropolis. Hence, the study is based on qualitative methods such as literature review, observation, subjective viewpoints, mapping and interviews. The research findings show a diversification of peri-urban production systems (vegetable crops, arboriculture, cereals, leguminous, fodder crops and cattle, sheep and poultry farming). Peri-urban farms are medium to large, mostly family owned and managed by elderly-experienced people. It is a multifunctional agriculture: it contributes to the economic development of the metropolis by creating jobs and generating income for farmers. It contributes to the food supply and the environmental beatification of the city. However, farms are facing several constraints that hinder their management, in particular strong urban pressure and its consequences, the insufficiency and high cost of labor, water shortage following the effects of climate change and the overexploitation of groundwater, the lack of technical support for farmers and the need to define the place of peri-urban agriculture in the city's sustainable development projects.

Keywords—Morocco, multifunctionality, sustainability, sustainable development, Urban and peri-urban farming.

I. INTRODUCTION

In recent decades, urban expansion has caused a great impact on the consumption of land and agricultural resources [1,2]. Unlike the situation in the developed countries at comparable stages of development, the process of urbanization in the third world countries appears to be more a function of rural push factors than the urban pull factors [3]. It is also common that as the population increases in urban areas, urbanization expanded to rural areas. Today's rapid rate of urbanization of the world is

higher, particularly radical urban growth predicted in developing countries [4]. Many scholars define understandings of peri-urban (Table 1). Following those definitions, we can say that peri-urban landscapes are areas where low-density residential settlements are intertwined with agricultural systems that have been modified and occasionally reduced by urbanization [5]. The role that urban and peri-urban agriculture can play in pursuing the Millennium Development Goals (MDG), and more specifically the ones related to poverty reduction, food security, and environmental sustainability, has been

extensively discussed. Urban and peri-urban agriculture is a mechanism that plays a role in enhancing access to and distribution of food in urban areas, thus filling the hunger gap [6]. Urban agriculture is the producer, processor and market for food, plant- and animal- sourced pharmaceuticals, fiber and fuel on land and water dispersed throughout the urban and peri-urban areas, usually applying intensive production methods [7]. Main definitions of urban and peri-urban agriculture focus on its potential to become the entry point for the successful transformation of agriculture as it is closely linked to urban, ecological, social and economic systems. Moreover, as a mean of providing economic benefits for urban

farmers and their communities and cities, it can enhance the living environment, being essential to the economic and nutritional security of urban residents [7]. Maintaining agricultural landscape's sustainability in peri-urban areas is a priority and a challenge, because it represents a major part of the cultural landscape in urbanized areas [8,9]. The growing urban needs for multiple agricultural goods and services create opportunities that integrate agricultural activities in urban policies concerning food security, poverty reduction, waste recycling, and land use planning [7; 10, 11, 12] (Fig.1).

Table 1: Peri-urban Definitions

No	Sources	Peri-urban Definitions
1	Andreas (1942)	The peri-urban region is the mixing zone of characteristically agricultural and characteristically urban land use structure [13].
2	Garnier and Chabot (1967)	Peri-urban is an area where the continuous built-up town ends [14].
3	Singh (1967)	The peri-urban region is a rural land with urban phenomena [15].
4	Wehrein (1942)	Peri-urban represents an area that is forced by the urban development [16].
5	Dickinson (1967)	The peri-urban region is an area where housing, industries, and offices have become urban orientation [17].
6	Pryor (1971)	The peri-urban area is an area of rural-urban fringe. It is characterized based on the settlement's density, the existence of commercial functions, industrial, the level of land conversion, and the existence of commuting [18].
7	Yunus (2006, 2008)	The peri-urban area is an area in between urban zone and rural zone. According to Yunus (2008), there are 4 zones of peri-urban, namely: (1) town frame; (2) urban-rural frame; (3) rural-urban frame; (4) rural frame [19,20].
8	DirektoratJenderalPenataanRuang–PU (2006)	Peri-urban area is located outside the core of metropolitan/urban. It forms as a supporting line of facilities and urban mass transport, and an urban extension from its core in random growth (sprawl) for 40-50 kms outside. DirektoratJenderalPenataanRuang-PU (2006) classifies the peri-urban region into three categories based on its land use and economic activities, i.e: (1) Predominantly Urban;(2) Semi Urban; and (3) Potential Urban [21].

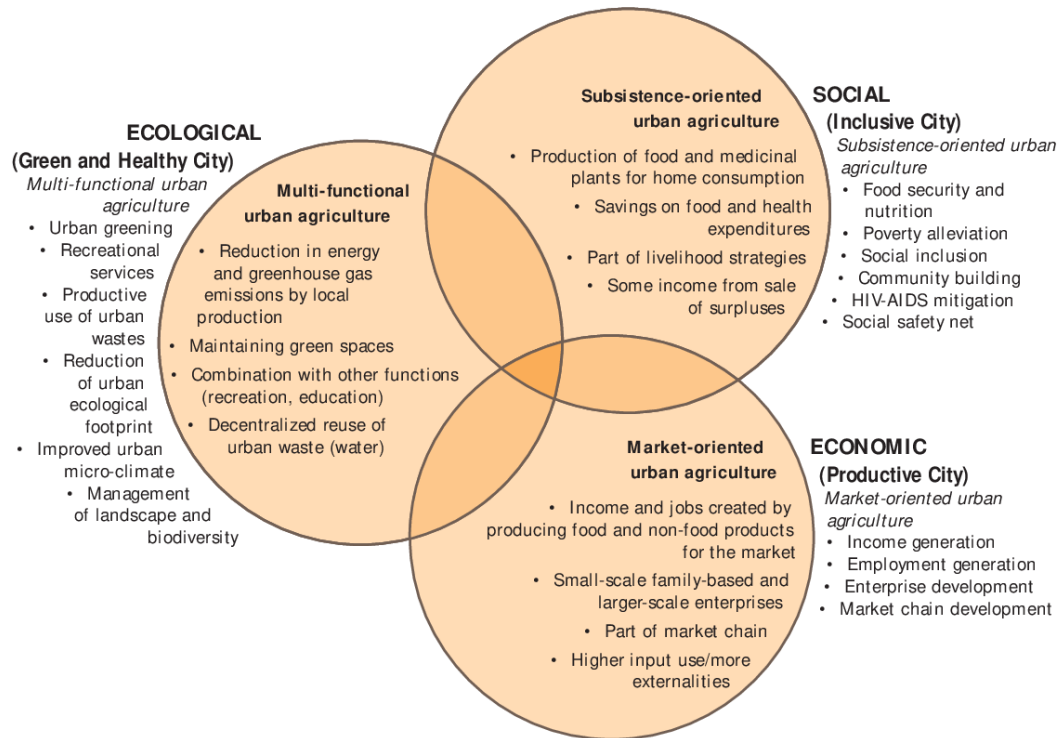


Fig. 1: Main policy perspectives on urban agriculture [22]

In Morocco, urban and peri-urban farming is not very much considered by public agricultural and urban policies, despite a few insufficient and very timid initiatives showing a slight change of outlook on the functions of agriculture in city, the country remains largely marked by a fairly clear separation between urban and agricultural issues, which leaves the question of “peri-urban agriculture” unthought. In this sense, this study aims to characterize the multifunctionality and the sustainability of peri-urban agriculture in the metropolitan area of Casablanca. It has allowed an identification of the main potentials, opportunities and constraints specific to Casablanca urban farming. To unravel this process, fifty case studies have been selected and analyzed through a combination of qualitative and participatory research methods.

II. MATERIAL AND METHODS

The study was conducted in six zones located within a radius of 40 km from the center of Casablanca metropolis, the largest city of the Kingdom of Morocco. The Casablanca region is located in the center-west of Morocco on the plain of Chaouia and about 80 km south of the administrative capital of Morocco (Rabat). Spread on the Atlantic coast for nearly 50 km, it is the main economic, financial, and urban center of the country. Its total surface area is 1615 km² or 0.16% of the national territory [23]. Figure 2 shows the location of Casablanca.

The population of the region is approximately 4,270,750 inhabitants, according to the general census of the population of 2014. It encompasses about 12.6% of the population of Morocco. The city of Casablanca covers 386.14 km² and comprises 3,359,818 inhabitants [24]. It contributes 11.4% of the national employment, and the service sector is the largest provider of jobs in the region, amounting to 64.5% of the total number of jobs. The industry and crafts sector supplies 26.3% of jobs, and the rest is divided between the buildings and public works sector (7.6%) and the agriculture, forestry, and fishing sector (1.3%) [25].

Using selective and stratified random sampling methods, and within the six study zones 50 farmers were selected. Data collection from respondents was based on observations, interviews and field surveys. For this, a questionnaire of a series of 85 questions was administered to the selected farmers. The data collected through questionnaire were interpreted using appropriate data analysis techniques. They were 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). The analysis is made by using SPSS V26.0 (Statistical Package of Social Sciences, version 26) and Ms Excel.

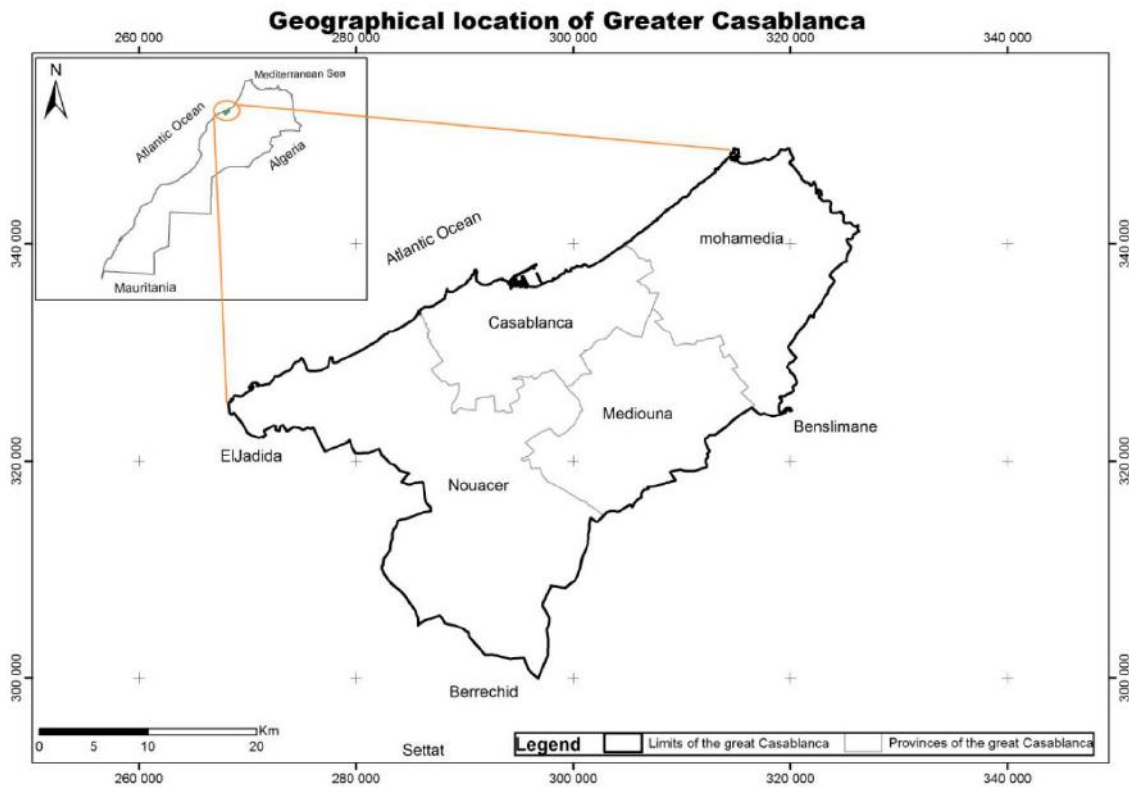


Fig. 2: The geographical location of Casablanca.

III. RESULTS AND DISCUSSION

In peri-urban farms, many production systems were thus defined across the six study zones: vegetable crops, cereals, leguminous, fruit trees as well as livestock which is traditionally practiced by 62% of respondents (Fig.3). In general, the most common types of livestock farming practice in the study area includes: beef farming, sheep farming and poultry farming practices. A farming type like horticulture persists close to the cities to gain higher economic revenues through proximity to the markets. Farmers even dare to take a risk by investing higher capital, particularly for renting the land for farming. Even so, these types of farming are particularly vulnerable to urbanization [26]. According to the exploratory analysis of socio-demographic data, all respondents are men and 74% of them are aged 51 and over. The study shows that the 64% of the farmers have 20 years of experience and above. Therefore, the agriculturalists in the six study areas are mostly very experienced elderly people. Regarding the motivation of farmers to do peri-urban agriculture, 56% of them practice this agriculture because of poverty and unemployment. These are mainly farmers from the most disadvantaged segment of the population whose level of education does not exceed secondary education and who have inherited the land from their families. Other studies confirmed that peri-urban farming activity could be motivated either by access to markets, economic revenues,

socio-demographic factors or land tenure [27,28]. The survey results reveal that peri-urban agriculture is the main income source for almost 68% of the households

interviewed, which indicates its important role for urban livelihoods as well as for employment opportunities. Theory and experience of different countries suggest, urbanization creates job opportunities, improve life standard, cost advantage, increase wage rate, and increase productivity [29,30,31,32,33,34]. However, most of the peri-urban dwellers of low-income groups who are originally resided in the area before the urban encroachment and have the rural background. Some of these groups depend to some degree on agricultural livelihood for the living. The interaction of rural-urban interface determines community in peri-urban areas to build or enhance in adapting various livelihood strategies and fulfill their needs [35].

Regarding the analysis of variables relating to the mode of land acquisition in the six study areas, the survey result indicates that about 72% of farmers own their lands and 56% of the visited farms are small familial ones (0-5 hectares).

All surveyed farmers affirm that agricultural land in the outskirts of the metropolis has been declining continuously for the past two decades. While urban expanded to peripheral rural land, expropriation of peri-urban farmers

is continual and undeniable fact on the ground in Casablanca. However, expansions at the expense of surrounding farming communities are damaging and loss of farming communities' livelihood. Currently, most farmers are aware of the cost and impacts of losing their land. Some farmers argued comparing losing of their land is equivalent to losing of their livelihood because land is the fixed asset which can be inherited from generation to generations. The peri-urban farmers in Casablanca metropolitan area are highly vulnerable to negative externalities of urbanization. The land needs to meet urban socio-economic demand have made it very difficult to exercise agricultural activity and have led to a decline in agriculture in peri-urban areas [36]. In such a situation, there is a need to better reflect on the solutions to be adopted to preserve this activity.

As practices and experience of different countries and cities shows that urban and peri-urban agriculture offers enormous numbers of benefits [29,30,31,32,33,34]., our study confirmed the multifunctionality of peri-urban farming in the outskirts of Casablanca since it contributes to the economic development of the metropolis by creating jobs and generating income for farmers, it also contributes to the food supply and environmental beautification of the city. However, peri-urban farms are facing global challenges in terms of the significant expansion of urban spaces, insufficient and high cost of agricultural labor, lack of technical support and acute water scarcity.



Fig.3: Peri-urban farms in Casablanca metropolitan area.

IV. CONCLUSION & RECOMMENDATIONS

In conclusion, the current multifunctionality of peri-urban agriculture in Casablanca will become crucial for the sustainability of food city supply in the future, thus it has to be adopted and promoted by the local institutions and authorities. In our view, agriculture should be considered as an element of urban land use and its value should be

fully recognized in supporting food, alleviating poverty, creating jobs, generating income, and improving environmental quality as well as reducing the risk of natural hazards and climate changes.

Based on the analyzed data and conclusion, the following forwarded recommendations are suggested:

- Local authorities should integrate peri-urban agriculture in urban policies and sustainable development plans as well as the legalization and official recognition of this activity.
- The municipality should promote peri-urban agriculture and sensitize the community on its roles, its potentialities and its socio-economic and ecological implications.
- The municipality and local authorities should enhance training and supervision of peri-urban farmers.
- The results and data collected in this study can be taken into account during the implementation of future schemes and urban plans for the metropolis of Casablanca. This could contribute to a participatory and sustainable management of agricultural and natural spaces on the outskirts of the metropolis and therefore to the sustainable development of the country.

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