

DYNAMICS OF “CROPPING SYSTEMS” IN GREATER BEIRUT AND ALONG THE NORTHERN COASTAL AREA OF LEBANON

PROSPECTS FOR SUSTAINING DIFFERENT TYPES OF AGRICULTURE.

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KEYWORDS

urban agriculture, cropping system, sustainable agriculture

INTRODUCTION

Agricultural production in and around cities is integral to Mediterranean cultural landscapes and has been a long-standing traditional practice in the MENA-region (Nasr and Padilla, 2004). The Middle East has one of the highest urbanization rates in the developing world, but, despite the increasing demand for land and water, crop cultivation and animal husbandry remain common throughout the region's cities. Fertile agricultural areas are still considerable and are expected to remain productive for years to come. Nevertheless, land-use and zoning plans do not include agriculture as an activity in urban development, although city greening is accepted as part of city beautification and landscaping. Today, conventional interactions cities, open spaces, and agriculture are being reshaped. Governing urban open spaces sustainably is crucial to ensure food security for the growing urban populations. Urban agriculture (UA) is hence progressively being valued as a tool for attaining urban food security (Sanyé-Mengual et al., 2016). UA takes many forms, varying from rooftop gardens and community farms to urban orchards, and can be productive assets of cities, providing significant environmental services (Lin et al., 2015).

In cities across the United States, UA is gaining recognition as a productive use of degraded vacant land. Municipal governments and others are promoting it and seeking its sustainability. UA should be recognized as a provider of ecosystem services, food security and urban resilience; it requires integrated planning across sectors.¹ In the MENA-region, Urban Agriculture still plays an important role; however, it lacks a policy and institutional framework and recognition by city planners, agriculturists, policymakers and researchers. City planning and architecture that consider food production a fundamental requirement of design result in more edible landscapes that can be tended by institutions and residents (Irvine, 2012).

INSTITUTIONAL FRAMEWORK FOR URBAN AGRICULTURE

Policymakers have seen UA as incompatible with urban development, and because of their dominant view on urban planning, policies on UA were mainly restrictive, and agriculture was temporally tolerated as a reserve area for future urban expansion. However, an increasing number of national and local authorities have come to understand the role urban farmers can play in various urban policy areas, such as in local economic development (production, income, enterprise development); health (food security and nutrition, food safety); urban environmental management (urban greening, climate and biodiversity, waste recycling; reduction of ecological footprint of the city); and social development (poverty alleviation, social inclusion of disadvantaged groups, recreational functions) (Van Veenhuizen, 2006).

Although UA occurs under varying sociopolitical conditions and policy regimes (Bakker et al., 2000), urban policymakers and support institutions, both governmental and non-governmental, can substantially contribute to the formal acceptance of UA as an urban land use, hence creating a conducive policy environment and enhancing access to vacant open urban spaces.

Many local and national governments are formulating or reformulating policies that facilitate and regulate UA through the involvement of direct stakeholders in the analysis of problems and the joint development of workable solutions. Multi-stakeholder efforts are needed to find effective ways to integrate UA into urban sector policies and urban land-use planning. It is particularly important since it integrates a great diversity of systems and related actors (e.g. input providers, producers, entrepreneurs, middlemen and traders) and touches on many urban management areas (e.g. land-use planning, environment, economic development, public health, social and community development...). Adequate information on such issues and transparency in decision-making are crucial (Dubbeling and de Zeeuw, 2006). To facilitate this, institutional frameworks at the national,

municipal and local levels must be created to give UA a formal framework, and ensure the active participation of direct and indirect stakeholders in the formulation and implementation of urban agriculture policies and action programs to enhance food production in urban settings.

Amman, Jordan, offers an example where governments and communities have successfully addressed urbanization and food security through an approach that focuses on UA (Tohmé Tawk, Abi Saïd and Hamadeh, 2014). The participatory multi-stakeholder process, involving governmental institutions and the community, proved to be successful in mainstreaming UA, bringing it to policy level and finding solutions to meet varied needs. Consequently, UA was institutionalized through a specialized bureau at the municipality and was integrated in the development strategy of the city from 2000 until 2015 (Tohmé Tawk, Moussa and Hamadeh, 2015). This led to the financing and implementation of an array of development projects. The change in municipal governance and the impact of the Syrian crisis have slowed down the efforts.

TYPES OF CROPPING SYSTEMS AND THE FACTORS INFLUENCING THEM: THE CASE OF GREATER BEIRUT AND THE NORTHERN COASTAL STRIP OF BEIRUT

A study was conducted on the belt around Beirut and the extended northern coastal strip of Lebanon to identify and locate different “cropping systems” where the urbanization is high and related factors change rapidly (Tohmé Tawk, 2004). A cropping system is mainly characterized by the type and sequence of crops grown on one field. A production system at farm level designates the combination of one or more cropping systems and or animal production systems.

The study was based on quantitative and qualitative data and GIS mapping. The selected area has a double geographic gradient: one is the distance from the city of Beirut, and the other, orthogonal to the first, is the altitude. The region was divided into three main sectors according to the degree of urbanization, and into homogeneous sub-regions defined according to the morphology of the land (plain, slope, and valley) and their degree of urbanization. Twenty-four production zones were identified (Figure 1).

The results showed that there is a large diversity of crops at the regional level but a specialization at the farm level. The identified cropping systems are annuals and perennials, such as vegetables grown under plastic houses, open field crop production, fruit trees, or ornamental plants. Pine forests were excluded from the study.

The factors influencing the presence of those systems consist of two categories: (i) physical and economic factors related to the geographical location/space; and (ii) demographic and economic factors related to the farmer.

The typology of farms was defined by grouping them according to their dominant crops. Despite the combination of several crops for the same farm, a dominant crop rotation or sequence could be found in most farms. By grouping the most specialized farms, having the same crops occupying more than 75% of their exploited surface, seven production systems were identified: tomatoes and cucumbers in greenhouses (39%), fruit trees (19%), open field vegetables (17%), ornamental plants (12%), strawberries (7%), bananas (3%) and cut flowers (3%).

Using a principal component analysis, the types of farming systems were crossed with eight variables: the past evolution of the exploitation surface, future strategy, the nature of income, the family strategy, land tenure, the age of the farmer, the permanent workforce and the total cultivated area. The factors related to land tenure (ownership, price and duration of lease) appeared to be the main factors to determine the choice of cropping systems. Results showed that orchards are associated with farmers being owners of the land, involving low labor and large farms (3.1-6 hectares); they are also associated with the highest age group (65 years and above). The strawberries and tomatoes and cucumbers under greenhouses are mainly associated with tenants and independent of age group, but involving a high rate of labor. They belong to the class of medium farms (1.1 to 3 hectares). The main factor influencing the choice of production system is the duration of lease, where short-term lease induced less investment in equipment such as greenhouses, in addition to the adoption of seasonal crops rather than fruit trees.

Religious communities, who are major owners of agricultural land, and individual landowners tend to reduce the duration of lease as they speculate on more profitable investments than agriculture; this has discouraged investment in long-term agriculture and, in some cases, the abandonment of cultivated plots. The study revealed a strong link between landownership and the presence of orchards: the latter is mainly present on owned land. In addition, farm systems, their evolution and dynamics depend on the objectives of the farmer and his family and their resources. The issue of farmers being mostly tenants makes farming precarious and investment in fruit trees unfeasible; however, the study showed that agricultural production remains an important economic activity for all categories of age.

The sustainability of agriculture in this region is based on the presence and logic of actors such as religious communities who determine the lease and its duration. Regulation and zoning also exercise influence. This seems to be the case in the Choueifat area in Beirut,

where industrial zoning has kept the land vacant, as industry is low, which sustained agriculture in these areas. The area of Tabarja remains an agricultural region because the land belongs mainly to a religious community. The land policies of religious communities, along with a regulatory framework, can thus play an important role in maintaining agriculture in these areas.

The study helped identify spatial and demographic factors that influence agriculture and pointed to the ways these factors – and agriculture – change over time. Despite the increase in urban sprawl, many urban spaces remain partly devoted to agricultural activity. Land policies, the formulation and/or re-formulation of laws, regulations and decisions on the use of land belonging to religious communities as major landowners can therefore play an important role in maintaining agriculture in the studied urban region. Access to credit and advisory services remains a weak component in urban areas and needs to be strengthened once agriculture is recognized as part of the urban economy and fabric.

In order to integrate agriculture in urban land management, cropping systems and production or farm systems should be classified into different types according to the crops grown, the scale of production, the equipment needed, water requirements, marketing channels, and the short-term or long-term investment strategies. Moreover, to preserve the environment, sustainable agricultural practices are to be adopted.

The different factors determining and influencing production systems should be taken into consideration to propose appropriate systems when rehabilitating and restoring abandoned and idle land. This would ensure the socioeconomic sustainability of any proposed agriculture system. Moreover, identifying farmers who are willing to tend the land, understanding their objectives, would ensure the adoption of proposed interventions in both rural and urban contexts.

CONCLUSION

Green spaces and agriculture spaces are becoming scarce, especially in urban settings. There is a need for public policy commitments to include them in planning and to protect their sustainability. Hence, to develop appropriate policies for integrating agriculture into an urban and peri-urban land-use plan, it is useful to assess the possibilities of maintaining the various agricultural holdings and vacant plots in the current context of land tenure on the one hand, and to have residents or farmers willing to tend the land on the other hand. Therefore, a solid participatory strategic planning and a GIS database mapping are needed to support such commitments concerning the availability, the functionality and the sustainability of such spaces at the local neighborhood level, and their contextualization on larger regional and national levels.

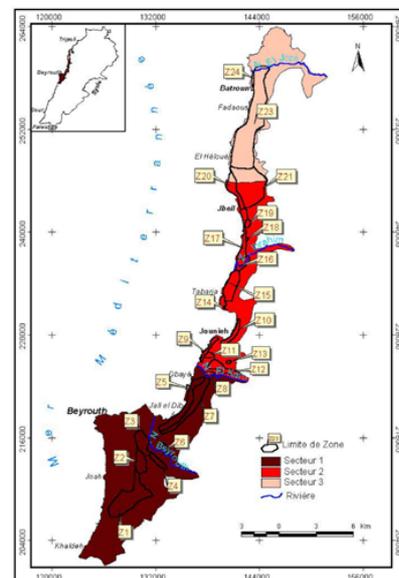


Figure 1

FOOTNOTES

Factsheets: Urban agriculture: landscapes connecting people, food and biodiversity. Factsheet 7 Urbes-project. Available at:

https://www.iucn.org/sites/dev/files/import/downloads/urbes_factsheet_07_web_2.pdf.

FIGURES

Figure 1. Sectors and agriculture zones of the study area (sector 1: "high density urban fabric; sector 2: "medium density urban fabric; sector 3: "low density urban fabric). Source: author, based on map prepared by the Lebanese National Center for Remote Sensing.

BIBLIOGRAPHY

Bakker, N., Dubbeling, M., Guendel, S., Sabel Koschella, U. and de Zeeuw, H. (Eds.). (2000). *Growing Cities, Growing Food, Urban Agriculture on the Policy Agenda*. DSE, Feldafing.

Dubbeling M. and de Zeeuw, H. (2006). Interactive policy formulation for sustainable urban agriculture development. *Urban Agriculture Magazine 16: Formulating Effective Policies on Urban Agriculture*. Leusden: RUAF.

Irvine, S. (2012). Carrot city: Creating places for urban agriculture. *Journal of Urbanism: International Research on Placemaking and Urban Sustainability 5*(2-3): 273-275.

Lin, B. B., Stacy, Philpott, M. and Shalene J. (2015). The future of urban agriculture and biodiversity-ecosystem services: Challenges and next steps. *Basic and Applied Ecology 16*(3): 189-201.

Nasr, J. and Padilla, M. (2004). *Interfaces: Agriculture et Villes à l'Est et au Sud de la Méditerranée*. Beirut: Delta.

Sanyé-Mengual, E. et al. (2016). Resolving differing stakeholder perceptions of urban rooftop farming in Mediterranean cities: Promoting food production as a driver for innovative forms of urban agriculture. *Agriculture and Human Values 33*(1): 101-120.

Tohmé Tawk, S. (2004). L'évolution spatiale des systèmes de culture de la bande côtière du Mont Liban. In Nasr, J. and Padilla, M. (Eds.) *Interfaces: Agriculture et Villes à l'Est et au Sud de la Méditerranée* (pp. 313-342). Beirut : Delta.

Tohmé Tawk, S., Abi Saïid, M. and Hamadeh, S. (2014). Urban agriculture and food security in the Middle Eastern context: A case study from Lebanon and Jordan. In Babar, Z. and Mirgani, S. (Eds.) *Food Security in the Middle East* (pp. 161-186). Hurst (UK) and Oxford University Press (US). Available at <http://www.hurstpublishers.com/book/food-security-in-the-middle-east/>

Tohmé Tawk, S., Moussa, Z. and Hamadeh, S. (2015). Mainstreaming urban agriculture in the Middle East and North Africa: A multi-stakeholder approach. *IFSA Proceedings*. The Environment and Sustainable Development Unit, Faculty of Agricultural and Food Sciences, American University of Beirut, Lebanon. Available at http://ifsa.boku.ac.at/cms/fileadmin/Proceeding2014/WVS_2_8_Tawk.pdf.

Van Veenhuizen, R. (2006). *Cities Farming for the Future, Urban Agriculture for Green and Productive Cities*. ETC Urban Agriculture. Leusden, the Netherlands.

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AUTHOR

Salwa TOHMETAWK studied at the American University of Beirut and completed a M.Sc. in Plant Production and Protection; she holds a "Diplôme en Etudes Approfondies" and PhD in Farming Systems and Sustainable Development from the «Institut National de Recherche Agronomique Paris-Grignon France.» She is currently an Associate Professor at the Lebanese University, Department of Agricultural Economy, Faculty of Agriculture, and serves as an associate member of the Faculty of Agricultural and Food Sciences at the American University of Beirut (2005 to present). Her research interests focus mainly on sustainable farming systems in urban and rural contexts and food loss assessment, with a proven track record in the field of rural development. Dr. Tawk consulted and/or trained in various development projects covering countries in the Middle East and North Africa-region (Lebanon, Jordan, Syria, and Yemen). She is a member of the Environment and Sustainable Development Unit at the American University of Beirut, member of the Lebanese NGO "Al Shouf Cedar Society," and a member and former president of the board of the Lebanese NGO "Mada."