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Complexity In Action? Fringe Agro-forest Systems, Demography and Societal Transformations in Mediterranean Peri-urban Areas

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Abstract

Urban expansion and the preservation of fringe landscapes are interconnected issues. This article discusses on the relation between landscape and peri-urban agriculture and the possible implications of sustainable land management for fringe land quality proposing a framework to evaluate the latent nexus between agro-forest systems and human settlements in southern Europe. Eco-sustainable planning integrated with multifaceted research and policy dimensions (e.g. social, economic, cultural and political issues) characterizing Mediterranean peri-urban areas is a relevant approach to urban fringe sustainability. Permanent assessment of these factors allows for the implementation of different development scenarios. The present study contributes to systemic and multi-scaling approaches informing environmental policies, with the aim of achieving an integrated management of peri-urban agricultural landscapes

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1. Introduction

Urban expansion and the preservation of fringe landscapes are complex phenomena with implications for both socioeconomic and environmental issues. Peri-urbanization has been assessed primarily by studying the dynamics of urban settlements through indicators of population dynamics, economic activities, land-use and the evolution of

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regional disparities. The socioeconomic characteristics of peri-urban farms are also important to infer the specificity of suburbanization processes, reflecting conflicts in the use of fringe. The notion of landscape is centered on different issues within a perceptive and subjective dimension and an objective (or measurable) dimension. The former dimension defines landscape as an 'hegemonic' concept related to both environmental sensitivity and aesthetic perception. This concept integrates a broad anthropocentric view, in which the landscape is defined by individual perceptions (Consiglio d'Europa, 2000). The latter issue considers landscape as the product of millenary interactions combined with the joint action of multiple, local and regional phenomena including biophysical factors and long-established socioeconomic dynamics. In both cases landscape is usually seen as a cultural and natural heritage which originates from the ongoing transformation of the ecosystem as a result of events determined by natural and human activities primarily developed for economic purposes (Vallega, 2008). The present contribution debates on the relationship between landscape and peri-urban agriculture and the implications in sustainable fringe land management, suggesting a functional model aimed at summarizing the multiple relation between peri-urban agro-forest systems and (expanding) urban landscapes. Eco-sustainable planning, integrated with the different research and policy dimensions detailed above, is a relevant approach to sustainability. The evaluation of the factors contributing to urban sustainability allows for the development of different landscape scenarios. The contribution finally discusses on measures for the conservation of traditional agricultural landscapes according to specific socioeconomic contexts. The role of multi-scale approaches is demonstrated to be crucial for a spatially-balanced, sustainable management of fringe agro-forest landscapes.

2. Changing landscapes and social science

The evolution of rural landscapes over centuries has been considered as an adaptive process of local communities to the constraints shaping crop production, rural development and urban expansion. Such a continuously adapting process ensures food, energy, building materials and modern lifestyles, consolidating a cultural landscape that preserves a wealth of knowledge in construction techniques and agronomic practices widespread in Europe since the Middle Age (Kostrowicki, 1984). Although local communities have developed continuous actions shaping land on the base of both natural and social changes, the derived landscape was progressively transformed by the evolution of civilization through historical events. With regard to the relation with the natural environment, Western societies have developed an anthropocentric attitude based on an optimistic outlook to ensure a sustainable social progress

and quite unlimited economic growth. Needless to say, such a view has poorly stimulated an evaluation of the impact of biophysical constraints on social systems and vice versa. Social science frameworks commonly integrate the concept of natural resources' limits with the important changes observed in the human dimension, among which the 'new ecological paradigm' proposed by Catton and Dunlap (see Beato, 1998) is one of the most relevant. In this framework the concept of ecological and social carrying capacity was considered as a key driver of sustainability. At the same time, it was claimed how the social structure cannot be described and interpreted separately from the local context. In other words, social dynamics and behavior of territorial actors cannot be analyzed without considering their social, historical, political and environmental settings. The understanding of the latent relation between actors and local socioeconomic systems may refine the analysis and, at the same time, it complicates the evaluation of the dynamic dualism between man and nature.

Climate variations, soil degradation, changes in the use of land combined with social changes and the new economic dynamics are probably the most relevant biophysical aspects influencing landscape transformations. These factors impact negatively rural districts and peri-urban areas as well. Managing the natural and cultural resources is thus possible by integrating environmental functions and biodiversity with the conservation and development of specific territorial vocations and productions (Salvati et al., 2010). Owing to economic development and uneven social changes, the abandonment of cultivated land has fostered since World War II in the northern Mediterranean basin stimulating a progressive 'naturalization' of rural spaces and a 'simplification' of fringe habitats, mixing rural landscape attributes and urban functions (Vanier, 2003). These processes caused the progressive deterioration of the traditional rural works and practices previously carried out and the related landmarks being interpreted as a

'sustainable' modification of the landscape. Modernization processes that affected the Mediterranean landscape were thus associated with the growth of urban areas which mitigates the traditional urban-rural gradient and creates

something like a 'third space'. This space is not strictly rural, not yet urban, but changes rapidly re-configure themselves in a mixed and confused land-use regime. Examples of changing landscapes in the 'third space'

Mediterranean fringe are reported in Figure 1. While landscape changes - more or less irreversibly - due to the impact of natural phenomena, human activities are shaping the ongoing process of land fragmentation associated with uncontrolled urban expansion. Although important biophysical changes reflect the continuous action of natural forces, the major landscape alterations are undoubtedly caused by the human activity, as already pointed out more than fifty years ago by Sereni (1961) in a seminal work on Italian rural landscapes.

3. Framing rural landscapes: territory matters

Starting from the Conservative Agronomic Practices promoted by the Common Agricultural Policy, measures for soil conservation and prevention of erosion have been traditionally supported through subsidies and incentives for farmers. However, despite rural development policies, agricultural landscapes have often changed their structure, producing deprived and marginal socioeconomic contexts exposed to the risk of abandonment. In these areas, the dominant soil degradation processes (erosion and in some cases, salinization or compaction) is the result of a possibly unsustainable land management driven by the short-term economic perspective. The thorough human pressure on land determined by real estate speculation exalted these processes in peri-urban areas resulting in the abandonment of fertile and traditionally-farmed land. As a matter of fact, the management of agro-forest Mediterranean systems has become inadequate for the aging of farmers and the progressive urbanization of young people. Failures in land management at the local scale can be identified in the uncontrolled growth of vegetation with low ecological quality (and sometimes with higher fire risk) altering the traditional structure and composition of the rural landscape. These processes consolidate the economic impact of land abandonment. The so-called 'naturalization' process - positively perceived by the local community - can produce environmental effects with a negative impact on agro-forest ecosystems in both disadvantaged/marginal areas and in peri-urban regions. In this view, soil and landscape degradation are thus accompanied by a strongly imbalanced social context.

4. Peri-urban landscape complexity: the environmental perspective

Soil and water are the basic natural resources characterizing agro-forest systems and their economic value is subject to market evaluation. On the one hand, the sustainable use of soil and water is problematic in the context of climate change and the demand for natural resources grows in specific contexts, e.g. irrigated crop. On the other hand, the soil capital tends to decline, both in the physical and the biological components, experiencing a deterioration that appears difficult to reverse in certain socioeconomic contexts. This is particularly true in peri-urban areas affected by high human pressure, soil sealing and habitat fragmentation. It is well known how the urbanization of flat areas has impacted the most fertile soils for agricultural production replacing agriculture with more viable activities (Salvati et al., 2010). A sustainable management of water use in all economic sectors and a rational planning of the available soil resources allow achieving a more sustainable development of fringe areas. The close connection between agro-forest systems, landscape quality and natural resources requires efforts for restoring the ecological balance and the prevention of the environmental degradation especially in fragile ecosystems such as the wildland-urban interface. A permanent assessment of the status and changes of natural resources is the basis for any effective strategy aimed at containing landscape degradation (Castiglioni and Ferrario, 2007). The characteristics of soil and water resources should be permanently assessed by defining the degree of vulnerability to the various factors of instability on a spatial scale compatible with planning development. Such information is vital when developing sustainable land management strategies protecting peri-urban agricultural landscapes. While landscape preservation is a new challenge set by the European Union for rural areas, this target is also important for the sustainable development of peri-urban areas. Here, it is necessary to develop a stronger connection between the environmental dimension and the economic dimension, such as the promotion of 'niche' products in local markets assuring food security and fresh products to urban population.

Figure 1. Changing landscapes in the Mediterranean fringe (upper left: mixed rainfed crop in a traditionally dry rural landscape under high human pressure; upper right: pasture lands and woodlots affected by intense soil degradation in a peri-urban area; lower left: suburbanization and fringe land consumption; lower right: forest fires as a threat for peri-urban agriculture). Source: authors' own photographs.



5. Urban-rural interfaces and agro-forest landscapes

According to the specificity of each urban region, the main practices for the conservation and restoring of the peri - urban agricultural landscape involve hydro-geological measures, the 'naturalization' of the waterways, the recovery of abandoned quarries, the containment of illegal dumping and forest fires, together with targeted measures for forestation of the steep slopes and pasture land sustainable management (Figure 2). However, only the increasing awareness of the importance of agro-forest landscapes can be considered as a key word to reconnect - in a rapidly changing society - nature conservation and the economic viability of local development. To preserve traditional rural and cultural landscapes is a hard task in peri-urban contexts due to the complex interactions between the biophysical, social, economic, cultural and institutional elements shaping mixed urban-rural areas. While strictly rural landscapes can be effectively protected and maintained in an ecologically-viable way in the long term because of the moderate human pressure, tools that integrate the 'social' functions provided by the primary sector with environmentally-conscious local communities are especially needed in peri-urban areas. There is indeed an urgent quest for active policies towards management and planning of existing landscapes in connection with a really 'holistic' vision that takes into account all factors composing agro-forest systems and the interactions between them.

This will produce a new paradigm for peri-urban areas and innovative strategies for intervention with special

regards to the recovery of landscapes compromised by unregulated urban expansion or abandonment.

Planning should consider criteria of multi-functionality of the agro-forest systems as a key target for the protection of natural resources and the implementation of conservative agricultural practices on fringe land. Moreover, to achieve a valuable synergy between ecosystem functioning and the aesthetic functions of peri-urban landscapes, it is important to implement multi-objective interventions creating services whose benefits are not restricted to local communities while being available to a wider population inhabiting the core cities. Definitely, appropriate interventions should be identified at the intersection between conservative farming practices, conservation of natural habitats (namely forests and pasture land) and sustainable urban planning. Qualitative analyses will provide details for fine tuning of interventions in the economic, scientific and political fields, thus determining a wide set of policy scenarios. The analytical process may include a thorough evaluation of the peri-urban land with the aim to achieve an optimal balance between measures of degradation prevention and restoration of degraded landscapes. The centrality of landscape in the political discourse for peri-urban agriculture suggests that a unique policy target is a sub-optimal option reconciling environment with local communities. A broader program for the implementation of conservative agricultural practices, the conservation of natural land and the containment of urban sprawl seems to be a reasonable - more 'holistic' - response to landscape degradation in peri-urban areas.

Figure 2. Peri-urban agriculture and landscape degradation (left: mixed uses of land and deregulated urban expansion on fertile agricultural soils; right: compact settlements on the fringe intermixed with urban farms). Source: authors' own photographs.



6. Conclusions

Social changes stimulate the conservation of peri-urban land and the recovery of degraded environments. At the same time, the potential for economic growth and social wealth depends strictly on the quality of the environment, the ecological carrying capacity and urban planning assuring the maintenance of natural capital stocks. The derived model for landscape protection and recovery may have the final objective of rebalancing urban, peri-urban and rural areas into a new urban-to-rural 'sustainable continuum'. By underlying the intimate relation between urban sprawl and the preservation of fringe landscapes, the present contribution proposed a reflection on the management of peri-urban agricultural land. The article highlights that a unique framework suited to managing the multiple relations between agro-forest systems and human settlements in the northern Mediterranean basin could be ineffective when concentrating on single - even if relevant - targets. Eco-sustainable planning, integrated

with the multifaceted economic dimensions and social interests characterizing Mediterranean peri-urban areas is thus a more relevant approach to fringe land sustainability. Permanent assessment of these factors allows for the implementation of different development scenarios. As a concluding remark, the study contributes to systemic and multi-scaling approaches informing environmental policies, with the aim of achieving an integrated management of peri-urban agricultural landscapes.

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