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Integrated Urban Regeneration: the Opportunity of Enhancing the Open Spaces

Massimo Rovai[1,a], Laura Fastelli[2,b], Fabio Lucchesi[3,c] and Francesco Monacci[4,d]

[1]Department of Agriculture, Food and Environment (DISAAA), University of Pisa, Italy

[2]Department of Energy, System, Territory and Construction Engineering (DESTEC), University of Pisa, Italy

[3]Department of Architecture (DIDA) – University of Florence, Italy

[4]Department of of Agriculture, Food and Environment (DISAAA), University of Pisa, Italy

[a]massimo.rovai@unipi.it, [b]laura.fastelli@for.unipi.it, [c]fabio.lucchesi@unifi.it, [c]francesco.monacci@gmail.com

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Abstract. The paper, draws the attention of the debate a reflection on the possibility of developing, in some urban areas, strategies and actions for the regeneration and redevelopment of the city; bringing to the attention not only the improvement of the spatial and functional dimension of the rundown neighborhoods, but also of the social and environmental dimensions. The valorisation of these areas may benefit from the theory of Ecosystem Services [1], which appears to be able to renew the traditional approaches, to land use planning from the perspective of urban metabolism[1] [2]; in this regard are of great interest those forms of planning of degraded urban fringes that take into account the minimal standard of space and/or rural services by to each inhabitant in order to make an area sustainable. The contribution starts from careful analysis of the rural peri-urban areas of Tuscany, polarized between two apparently conflicting dynamics between them (use of land abandonment and agricultural soils), to develop a reflection about the possibility of experiencing urban regeneration processes that include in inside them, innovative forms for the design of open spaces, with the aim both to recover a portion of depressed urban areas both to create new public spaces, modeled according to the forms of multifunctional agriculture and identitarian landscape [3]. An urban regeneration directed not only to the built space, but also to the open space and to the promotion of effective projectuality through proper analysis of services, which could be offered by rural areas and serve needs expressed by residents.

Introduction

In Italy, over 60% of the population lives in urban areas and, in large part, these are composed by a porous fabric and discontinuous urban spaces that are characterized by the alternation of built and agricultural spaces. As a whole, the expansion of the urbanized area that occurred in recent decades, is characterized by an increasing level of unsustainability: the built-up areas abandoned and areas underused that are excluded from processes of real urban regeneration; the new need of urban areas which is accomplished with a steady erosion of agricultural soils, with consequent dissipation of resources and not reproducible environmental functions.

This structure is observable in many urban areas of Tuscany and, in particular, it manifests its critical in the "*ellipse of the polycentric city of Central Tuscany*" [4]. Used for the first time in the Territorial Plan Address (PIT) of the Region of Tuscany in 2008, this definition, indicates the large conurbation that extends between the urban poles of Florence, Prato, Pistoia, Valdinievole, Lucca, Pisa, Pontedera and Empoli. Here the forms of urban sprawl have taken on the characteristics of a continuous densification and artificiality of rural areas that in the past were intensely populated and organized around the urban poles of the historical cities [5].

[1] The set of technical and socio-economic processes that take place in the city with resulting in growth, production of energy, and waste disposal. (Kennedy 2007)

In the observed contexts the soils and their functions are simultaneously subjected to two dissipative dynamics:

- a high consumption of land for the residential purpose, production and infrastructure, in contrast to the demographic and economic trends;
- an increasing abandonment of farming in peri-urban areas due to the loss of competitiveness of the agricultural sector, generated by various factors (aging, land fragmentation, urban sprawl etc.).

These dynamics affecting both agricultural and natural soils, contribute to waterproofing and to the reduction of vegetational cover of land, undermining the resilience of the territory in terms of reproduction of key environmental resources and functions (hydraulic adjustment, landscape, ecological network, etc..). The effects generated on the landscape and on ecosystem are amplified more significantly if they occur in peri-urban context.

According to us the actions of urban regeneration, that have prominent role in the strategic management of urban transformation, should do more than building renewal drawing inspiration from the theory of Ecosystem Services, given even the normative context of reference[2] [1]. In fact such actions, bring into play the totality of resources/functions that relate the metabolism of the city.

They could give more effective responses to emerging needs: problematic housing conditions and related services due to changes in lifestyle/consumption; supply minimum of public spaces; provide qualification and improvement of the conditions of use of existing areas. Therefore, urban regeneration can not disregard the complexity of urban spaces different for their density and level of integration/penetration in the open spaces (natural and semi-natural areas, and agricultural areas subjected to widespread abandonment and decay) in which urban and rural functions coexist in balanced and synergistic way.

In this perspective an adequate approach to urban regeneration should start by questioning the current level of consumption of resources needed to ensure the functioning of a city and find solutions to ensure a sustainable level of growth. Only then will the urban regeneration be understood as resilience [6, 7]. The actions of urban renewal, in line with this objective, in addition to morphologically and functionally regenerate the existing buildings, should also re-draw/re-think the open space (agricultural soils in peri-urban, public spaces, unbuilt space enclosed in cities) fundamental to ensure the provisioning of multiple ecosystem services. At the operational level this could be done through introducing standards of rurality alongside the building standard[3] [8].

The opportunity to use urban and multifunctional agriculture, as a tool to revitalize and regenerate urban spaces, seems particularly appropriate in today's socio-economic context. The current model of agri-food supply is characterized by: growing gap between production and consumption; increased specialization of farms; diffusion of large distribution platforms that operate globally. This model is subject of adverse criticism by consumers because of the environmental impacts (resource consumption) and social impacts(exploitation of farmers), and unlikeness of food security to be reached. Besides this predominant delocalized model, a new model is taking force based on the relocalization of food production and characterized by: small and medium sized farms; production diversificated farms; direct relationship between producer and consumer; production of quality through the enhancement of the local specificities, etc. This new model is aimed at maintaining the added value in the territory, increase employment and produce positive externalities requested by citizens (eg. recovery / maintenance of peri-urban agricultural areas for the provision of social services and innovative environment[4]).

[2] The region of Tuscany is completing the process of approval of the proposed law 282/2013 (Reform the L.R. 1/2005 on the rules of governance of the territory) which lay down specific rules to support urban regeneration.

[3] The minimum amount of space intended for agricultural and rural services that is up to each resident to ensure that a given area be inhabited in a sustainable manner.

[4] Rural kindergartens, educational farms, care of the land, etc..

In these terms, agriculture can represent a real key to renewal of the city, being able to combine in a synergistic and effective way both the production of quality local food and production/reproduction of neo-rurality[5], land management and landscaping.

The peri-urban areas (Fig.1; Fig.2) (defined as the territories of neo-rurality) are certainly the most suitable areas to experiment models of regeneration, also through multifunctional agriculture [9], which should help to counter the soil consumption and support the supply of ecosystem services that allow an increase in the level of quality life of citizens [10] such as: improving ecological connectivity and level of biodiversity; protection of hydrogeological structure; preserve the identity characteristics of landscape; etc.

Fig.1: Acquacalda (Lucca). Isolated manufacturing area in contact with abandoned agricultural areas.

Fig.2: San Giusto (Pisa). Urban transformation project in peri-urban area of Pisa. Until the sixties in the area there was a gas company distribution. The project has foreseen the residential renovation, the provision of green spaces and parking areas.

[5] Recognition by the society of a renewed meaning of historical role of agriculture as a subject that has regained a new centrality in a position to contribute to the resolution of environmental crises. (Ferraresi, 2011).

Framework and Methodology

The current planning models are still too little attentive to the proportioning between supply and demand for Ecosystem Services[6] (ES) [10, 11, 12], continuing to follow the logic of the functional decoupling between urban and rural areas. A logic that is leading to a progressive urbanization of large areas appointed to the provision of vital ES (eg. energy, water and food) [13] to the citizens.

In this sense the approach of the theory of ES[7], which takes account of the multifunctional nature of environmental resources, allows us to give a central role to the open spaces and agricultural areas, recognizing their value and ability to meet present and future needs. A requirement for the testing of new models is represented by adequate knowledge of the specific functions that the ecosystem of periurban open spaces could provide by virtue of the spatial relationships within the built fabric.

Therefore, the methodological proposal arises to the objective of evaluating the different mix of ecosystem services provided by open spaces in a specific peri-urban context; and the territorial dimension of application for this methodology can vary according to the scale of urban regeneration project.

The evaluation of the ES is a complex process that has the task of "giving value" to very different functions. Therefore, it is appropriate to use for this purpose suitable combinations of instruments such as that between the MultiCriteria Analysis (MCA) [14] and GIS tools. The proposed MCA method is the Saaty's Analytic Hierarchy Process (AHP) [15, 16] that consists of the following stages: a) hierarchical decomposition of the problem; b) pairwise comparison; c) consistency check; d) hierarchical reconstruction. With the combination of GIS and AHP we develop a model of MultiCriteria Spatial Analysis that allows us to:

- assess the ES avoiding both monetary recourse evaluation and to the additive method;
- localize the areas suited differently to provision of ES, and the areas requiring priority actions for the protection and/or valorisation, etc..;
- compare various scenarios, changing the weights assigned to criteria according to the different demands of stakeholders.

Specifically, to evaluate the supply of ES by open spaces is necessary to define a territorial unit in which to each associated ecosystem services(ES) of the specific indicators (criteria) each of which is, in turn, defined by different attributes (Fig.3).

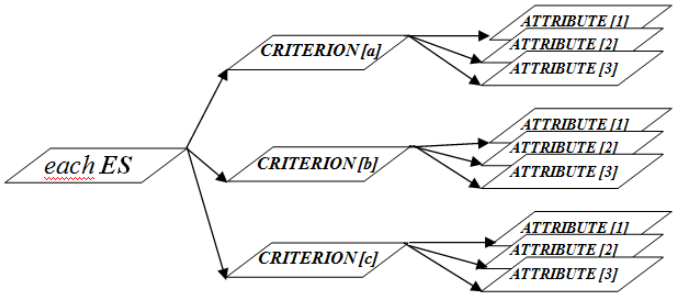

Fig.3: AMC scheme for the evaluation of ES with which to implement the spatial mapping.

The goal is the implementation of maps which give evidence the suitability of a specific open space to provide one or more ecosystem services (Fig.4), in order to make the urban planning and/or design more effective.

[6] Ecosystem services consist of flow of materials, energy, and information from natural capital stocks which combine with manufactured and human capital services to produce human welfare. (Costanza, 1992). The UN Millennium Ecosystem Assessment (MEA, 2005) recognizes the approach of ES as an operational tool to be introduced in the environmental and territorial policies.

[7] The ES can be classified into four categories of services: provisioning services; regulating services; supporting services; cultural services (MEA, 2005)

EG: protective services	groundwater recharge	0,250	recharge	1	1,000
			not recharge	0	-
	capture CO2	0,250	cod. ucs 1	k	k/max(k:z)
			.....	x	x/max(k:z)
			.....	y	y/max(k:z)
			cod. ucs n	z	z/max(k:z)
	ecological connectivity	0,500	core	0,222	1,000
			corridor	0,181	0,815
			connectivity	0,181	0,815
			main core	0,139	0,626
			matrix	0,111	0,500
			secondary core	0,083	0,374
			elementi residuali	0,056	0,252
			no ecological network	0,000	-

Fig.4: Example of choice for weighing of the attributes

Valuation models of ES and available prove in the literature are mainly oriented to the evaluation of protective services (related to reproduction of natural resources and to reduction of risk) and production services (related to the ability to produce food and energy). From this perspective, the construction of an evaluation model adapted to the morphological and functional characteristics (both of contemporary settlements and of open space) should also with attention measure recreational and cultural services related to the improvement of well-being (physical and spiritual, individual and collective) of the urban population. In this respect, the fundamental aspects on which to focus are: the accessibility of the peri-urban areas as a resource capable of bearing the urban crowding; the role of open space as a reserve of public space[8]; the role of the empty space waiting for urbanization in peri-urban areas to define the elements of recognisality of the identitary landscape.

In the field of recreational and cultural services, this paper aims to focus also on the strategic role of peri-urban agriculture (shared gardens, social, urban, etc.). Within the regeneration processes of degraded urban fabric, such practices appear useful for: design of sharing mode of public space; integration of most vulnerable segments of population; development of social relationships; testing of new approaches to didactics; etc.

Designing open spaces must provide the proper tools of urban agriculture, within the processes of urban regeneration. Also it is an interesting alternative to the design of urban green required by town planning. In fact, through some simple precautions we can ensure at the same time both the accessibility of available space and agricultural activities, as well as cost savings for public administration.

Concluding remarks

This paper, starting from observation of periurban rural areas of Tuscany, provides the scientific community a reflection on whether to reconsider in a broader sense the urban regeneration, in order to recover not only urban blight but also open space (agricultural) in peri-urban areas whose management is very difficult. An urban regeneration that is able to link up again city and country, and to plan built spaces and open spaces together, so as to ensure the population an adequate supply of rural services and the rediscovery of a sense of belonging to the places [3].

The key point of our proposal of urban regeneration is in the potential services offered by multifunctional agriculture [17], in those activities that offer a series of design solutions to issues of urban and peri-urban areas, which that are a valid alternative to traditional approaches of ecological mitigation and compensation.

[8] Not thereby intend in legal terms but at relational level as an opportunity to build new forms of sociality.

Only through such an approach to urban regeneration it is possible to overcome a dualistic conception of the territory, effectively it is still considered as divided into build-up areas and unoccupied areas available to the building. In order to return value to the open space, no longer as 'empty' waiting for urbanization but as an area subject to a sustainable multi-functional reorganization useful to the community.

All this is possible only through a thorough prior assessment of the ecosystem services provided by rural areas (food production, regulation of the water cycle, biodiversity conservation, leisure). For this purpose the methodology aims to provide an information base, preparatory to the implementation of spatial planning instruments can that guarantee a correct and balanced development of the territory through the spatial analysis of potential supply of ES. This implementation constitutes an informative support within the cognitive framework, thus going to fit in the survey phase of the plan process. An additional utility can be expressed in the pre-project phase for the formulation of strategies for the plan.

Ultimately, the proposed methodology is designed as an aid to public-private decisions in the adoption of environmental and territorial policies effectively integrated in order to support a more effective urban regeneration that also considers the potential of open spaces.

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