

# Opportunities for urban farming: the case study of San Martino Hill in Naples, Italy

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## Abstract

In the midst of the economic crisis, the management of urban farming represents a key challenge for improving ecological performances within the city. Indeed agricultural areas have a great potential in terms of urban re-generation, fostering a city's resilience and its energy efficiency, even in the perspective of climate change hazards. Further agricultural areas are also crucial for social opportunities and new job creation in the perspective of integrating both ecological and urban services in the framework of more competitive (and attractive) cities. According to the MEA definition of ecosystem services as constituents of well-being (MAE, 2005), this paper presents a case study that addresses the following questions: Can we consider the urban agricultural areas as an ecological infrastructure for the city? And, if affirmative, can we manage it in a more integrated way?

The study is structured as a research case study and focuses on a former agricultural area in the city centre of Naples, Italy. This is an almost three hectares area on the hill of San Martino featured by being an important city's landmark. Despite the abandonment of crops, the agricultural land use is still typical of the hill and it represents a core potential to provide ecological and urban services for the city. The study discusses a demonstration project aimed at assessing comprehensive viability for managing agricultural use in order to protect the natural soils and updating both urban and ecological services (such as waste management, social security, sliding risk reduction) through a non-conventional public service policy.

*Keywords: urban farming, recycling urban soil, socio-ecological system.*



## 1 Introduction

In 2007 world urban population has passed the rural one. People leave the countryside to move to cities, looking for better opportunities in terms of job, youth education, social services and city vibrancy. The demand of further housing and infrastructure for hosting incoming population may lead toward a sprawling, car oriented and poorly planned development, causing the loss of natural soils and farmland. Such “dumb growth” increases city’s vulnerability and reduces the inner resilience of the urban habitat, acting both on the consumption of natural resources and on the access to the urban ecological services. By the other side cities are the engines of innovation, culture and creativity and they represent the main opportunity for facing social and economic challenges acting as catalyst for achieving a more effective – and sustainable – development. The EU report, *Cities of tomorrow* [1], highlights city’s potential in terms of growth and underlines the need of working through more integrated strategies to merge urban challenges with key thematic objectives, focusing specially on the topic of climate change and energy efficiency.

The importance of bypassing sectoral policies and of promoting the specific potential of cities have been clearly pointed out in the EU Cohesion Policy 2014–2020 that states: “the various dimensions of human life – environmental, economic, social and cultural – are interwoven and success in urban development can only be achieved through an integrated approach. Measures concerning physical urban renewal must be combined with measures promoting education, economic development, social inclusion and environmental protection. In addition, the development of strong partnership between local citizens, civil society, the local economy at the various level of government is a pre-requisite” [2].

Starting from this, sustainable urban development can take shape through new models of governance and by promoting innovative use of social capital, increasing the possibility of expanding the green public space for civic engagement, creativity, innovation and cohesion. Further sustainable urban development depends from the ecological capacity of the city to improve social wellbeing and to reduce environmental risks.

From such perspective great relevance is given to the urban soils, especially the evapotranspiring soils and the agricultural ones due to the ecological services provided by these: supporting services, such as soil formation, nutrient cycling, and photosynthesis; provisioning services, such as food, water, timber, fiber; regulating services, affecting climate, floods, disease and waste; cultural services, such as recreational, spiritual, aesthetic benefits [3]. Natural urban soils also represent a key element for improving city’s resilience, so that within the EU Cohesion Policy [2] strategies for recycling urban soils have been developed (urban renewal, redevelopment and/or reuse of abandoned areas). These strategies aim at more green cities and look for a new kind of urban comprehensive land use adaptable to a wide social demand (aimed at ecological services and at the use of green public spaces) and to the need of improving energy efficiency, natural resources and cities flows management (urban metabolism, recycling, local energy



solutions). To make the city “green and healthy” [1] is not enough to reduce CO<sub>2</sub> emissions. For the environment and the energy it is necessary to take a comprehensive approach in which different components of the natural ecosystem are related to social, economic, cultural and political system of the city. Scholars have given scientific evidence that city is a complex, adaptive socio-ecological system in which built and natural environments interact continuously and vary, according to the urban patterns, to the ecological processes and to site features specific [5, 6]. Further studies highlight that the quality of the ecological services depend on the city’s land use and on land cover, even focusing on the urban form as added value in fostering city’s resilience [7–10].

Therefore the paper aims at focusing on urban farming as key strategy for balancing conservation and development, stressing the assumption that maintenance and the upgrade of urban living environment is both a physical and governance matter [11]. Further, the paper discusses the above mentioned topics through a demonstration project in which the urban farm is designed as integrated model for managing urban natural soils, protecting their ecological value and even enhancing their economic and social potential.

## 2 Urban agriculture, overview of international experiences

Urban agriculture is the practice of cultivating, processing and distributing food for people by the aim of supporting and increasing biodiversity into the city environment. Further urban farmlands represent a great chance for integrating land protection, production of ecological services and social involvement [12], here considering the social benefits of producing fresh food in cities, allowing urban population to eat healthy and safe and reducing the ecological impacts coming from the food industry [13]. Indeed farmland located in urban fringe or within urban area also have key economic advantages such as the direct access to the food market, reduced costs of transportation and opportunities of supplying a number of urban services (i.e. recreational, educational activities, commercial uses and the reduced costs coming from the efficient management of environmental risks) [14]. Even in terms of social and economic benefits, some in-directed advantages have been demonstrated as well: the Trust for Public Land of New York stated that the presence of community gardens attract new residents and reduce local crime, while investigation done by the New York University shown that homes located within 300 meters from a community garden increases their value even by 9 percentage points [15, 16].

The first examples of urban agriculture date back to 1800 in the United States, when local and central administration promoted actions aimed at creating urban allotments into vacant lots, especially into the abandoned spaces of the suburban areas for supporting social and economic integration and for providing food for poor people. During the II World War, urban agriculture spread out very rapidly to produce food both for citizens – who still resided in the city – and also to send food to soldiers, occupying spaces in between the ruins produced by bombing. Government initiatives promoted action like the “victory gardens” in the United



States and the “war gardens” in Italy, aimed at supporting economically and psychologically population during the war period.

Most the actual experiences show the potential of the urban farm as complex system organized through the management of the many activities produced. Urban farms, indeed, include recreation and leisure, economic vitality and business entrepreneurship, individual and community health and wellbeing, landscape beautification and the environmental restoration and/or remediation (Fig. 1).

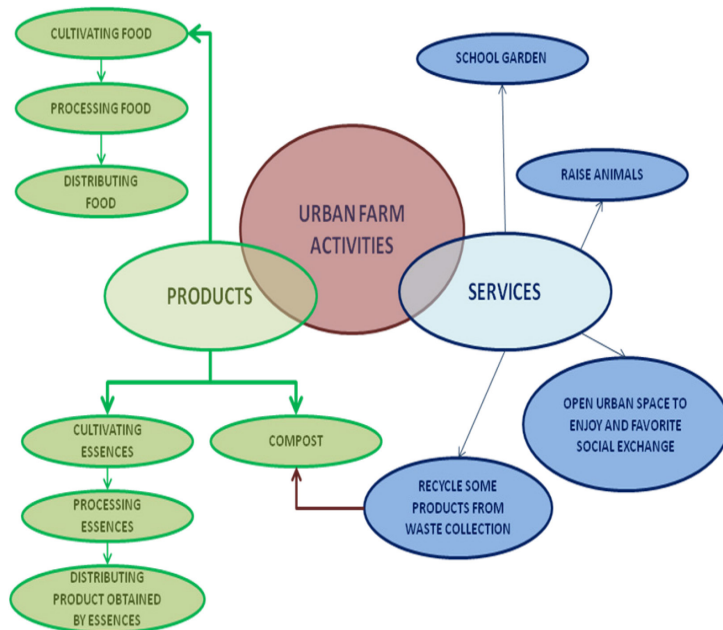


Figure 1: Urban farm activities.

In terms of management, international best practices in urban agriculture show a number of actions aimed at enhancing the public/private partnership even in terms of economic investment. In the US, a group of volunteers are committed to occupy and manage the lots according to the rules and laws that regulate the production and distribution of food products to the public. Furthermore, some successful initiatives have been set with the collaboration between institutions and non-profit organizations which manage public and private areas and funds. In the US there are many networks of associations that deal with urban agriculture at the local level, including the system of government agencies and non-profit organizations. In Canada, the Region Conservation Authority and the Public Health of Toronto, promoted the community gardens in the framework of the public planning initiatives such as the Community Garden Action Plan of Ottawa and the Grow-To of Toronto. In terms of public/private management, one more example is the “Community Greening Resource Network (CGRN)” in Baltimore, USA that collects more than 26 different organizations and collaborates with the

Baltimore City Office and with the University of Maryland. This great network is a model of interaction between institutions, universities and organizations who care about the community gardens and urban farms (Fig. 2).

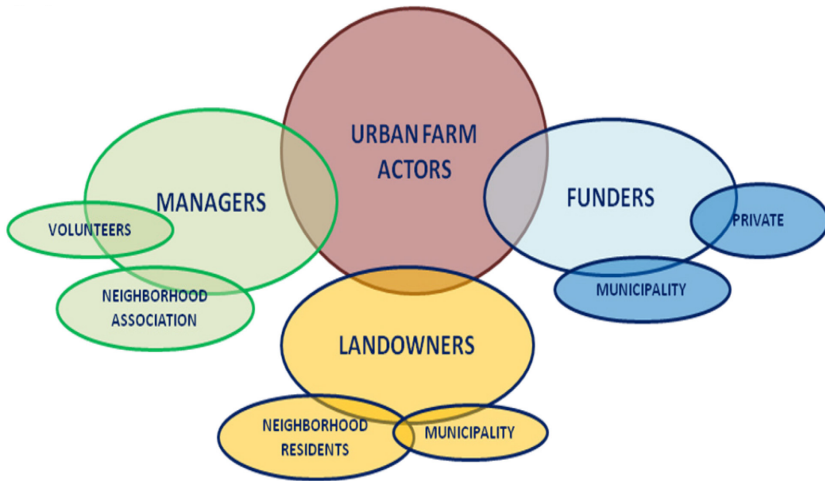


Figure 2: Urban farm actors.

From these US experiences, urban agriculture has spread out to Australia and Europe. Here, specially, the location of the community gardens and of the urban farm arose in suburban vacant lots. The management system works on participatory process in Europe, according to the French model, lots are occupied, parceled and managed by neighborhood associations who design the urban garden according to the common rules. The financial support comes from local governments and regional organizations.

The phenomenon of urban agriculture has also present in Africa, Latin America and Caribbean supported by the FAO's Programme for Urban and Peri-urban Horticulture (UPH) that encourages planners to demarcate areas for horticulture and/or for more ecological uses, such as green belts. The UPH program promotes the development of sustainable management of urban and peri-urban horticulture as a part of the national food security strategies, and advises city authorities on integrating horticulture into urban master development plans.

### 3 Cultural assumptions and criteria for the case-study area

The paper proposes an integrated design approach aimed at linking the requirement of protecting urban natural soils with the needs of implementing urban and environmental performances. According to the MEA vision of ecosystem services [3], the paper presents a case study addressed to the following questions:

- Can we consider the urban agricultural areas as an ecological infrastructure for the city?
- And, if affirmative, can we manage it in a more integrate way?

The study works in the framework of the case-study research by the aim of select project methodology that acts as best practice at local level. So the paper discusses the methodological approach through a demonstration project done by the University of Naples aimed at assessing the design opportunity of integrating soil protection and land use management with the instances coming from the social demand and from the need of economic viability. Further the research focuses on urban agriculture as key opportunity for providing new models for the maintenance of the urban natural environment. In such perspective, the study looks for the potential of agricultural use within the existent green natural areas of the city as strategic asset for implementing a more efficient urban ecological network.

The cultural assumption of the study is that “*the metabolism of the city is largely the result of the concentration of people and economic process. It is also related to urban form*” [10]. So, the research points out a set of criteria for selecting the case study area:

- agricultural potential, cropping the areas featured by soils consistent with the requirement of safe food production;
- adjacent land use, deepening the micro-scale uses all around the site in the perspective of integrating urban and ecological services;
- urban form, selecting area in which the morphological characteristic are consistent with the need of implementing ecological efficiency in the area.

Starting from this, the study takes into account the maps produced in 2006 by the University of Naples (Agrarian Department) for the City Plan, notably the Land Use, the Map of the Natural Elements (existing and potential) and the Map of the Urban Soils. All these maps have been overlaid for selecting the major green areas resulting from (Fig. 3). Further comparison have been done using aerial photos (for better assessing the land cover) and the historical maps of the city. Among these, a special care was given to the historic Duca di Noja Map (1775) that is well detailed in terms of land agriculture use.

Within the findings, five areas have been compared using the above mentioned criteria:

- *Area 1, Coroglio*: not fit for agriculture use because of the potential of metals in the soil due to the presence in the adjacent land use of a former industrial complex, working from 1910 to 1987.
- *Area 2, Cilea*: not fit for agriculture due to the potential impacts of water leaching coming from the viaduct.
- *Area 3, San Martino*: fit for agriculture use. The soils are remnants of the former agriculture area. The site is an important landmark in the cityscape and it is featured by a special identity. The adjacent land use is mostly residential and despite its location in the centre of the city, some agriculture uses still persist. The urban form is compact; the morphology slope down the hill and it is consistent with the need of soil maintenance in order to foster sliding risk potential.
- *Area 4, Capodimonte*: fit for agriculture. The area has built boundaries because of it occupies the site of the Royal Place of Capodimonte, made by Carlo di Borbone in 1734. Its land use is featured by the presence of

the Royal Palace (hosting the Museum of Paintings) and of the ancient woodland and of the Royal orchards and allotments. The site is under protection and it is managed by the National Authority for Monuments Conservation (Soprintendenza ai Beni Culturali).

- *Area 5, Colli Aminei*: fit for agriculture. The site is in the peri-urban area. The soils are mostly natural, remnants of the former woodland and farmland. The land use is featured by urban sprawl with the presence of residential area and a very poor location of other urban services. The urban form is still compact although threatened by the city growth.

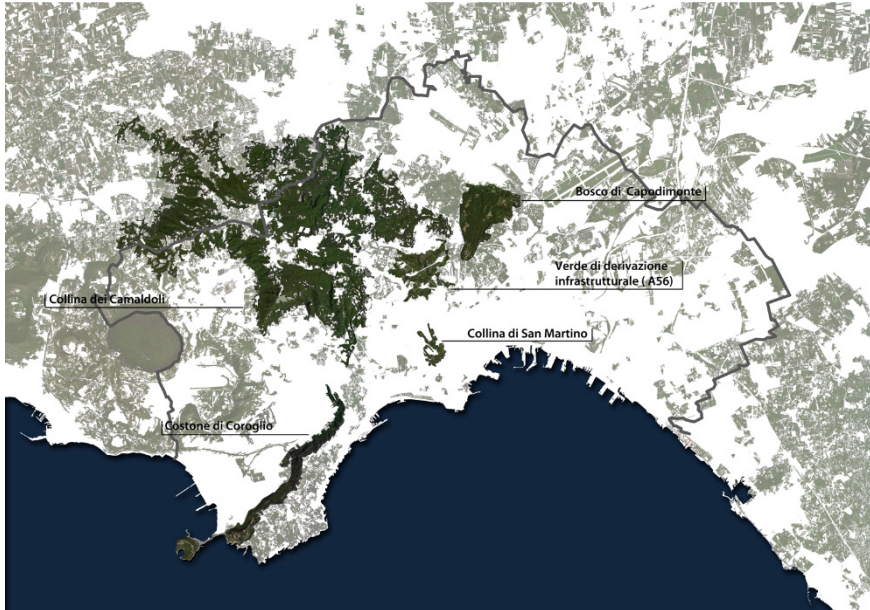


Figure 3: Map of green areas in Naples.

#### 4 Proposal for an integrated model

The research chose the Area no. 3, the San Martino site because of its location in the midst of the city centre and due to its importance as city's landmark.

This is an almost three hectare area on the hill of San Martino featured by specific morphology: soil benches slope down the hill, containing remnants of former allotments and gardens; the stair-street of via Pedamentina goes in between the slope, connecting the city centre (downtown) with the Northern boroughs; on the top of the hill, featuring the historic cityscape, lie the Chartreuse of San Martino and the St. Elmo Castle. The historic views of the city of Naples made by the paintings of Duperac-Lafrery in 1566 and by the Duca di Noja in 1775, describe the urban development on the slope, where the rural houses were harmoniously integrated with agriculture and with the natural landscape. The

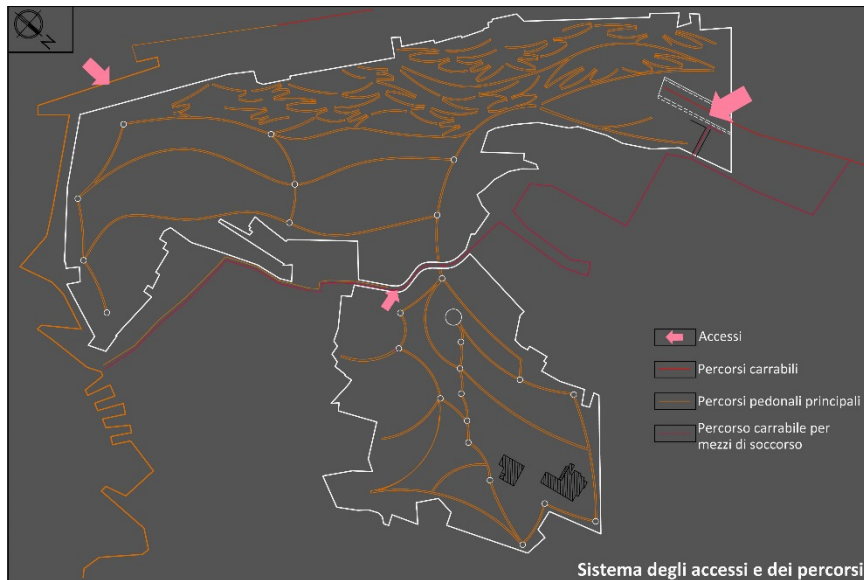


Figure 4: Access and pathways system in the green area.

street-stair ramps define the rhythm and logic distribution both of buildings and crops [17, 18].

Natural and built environment characterize even now by absolute spatial and functional integration in the landscape of the hill, still showing perfectly the logical relationship between artifice and nature. Starting from this special form, housing along the street-stair establishes intense social relationships among residents due to the objective difficulties of the people at getting essential urban services, such as waste collection, street cleaning, accessibility for disabled people, transport of bulky goods, night lighting, social security. One major difficulty is the impracticality of access for emergency vehicles in the event of fire or medical emergency, or for accomplishing the maintenance works of the scale and the slopes. Despite the difficult access, the street ramps are a tourist destination in all seasons of the year, due to the beautiful view and because of the presence of main cultural attractions such as the Charterhouse of San Martino and the Castle of St. Elmo.

The integrated model for managing the urban agricultural areas [19, 20], is focus especially on the physical, social and economic costs of the kind of unique social enclave as the residents of the Pedamentina stairways. The model also takes in count the tourist potential as added value of the project.

The proposal is based on a multi-disciplinary work aimed at interacting positively on different components of the project: the built environment, the natural environment, the social system and the economic values. A range of key indicators have been selected for orienting the site analysis and for defining a monitoring system of the project performances. The indicators cover the fields of the following topics: land use, land cover, population data, waste production and



collection, real estate data, construction technologies and maintenance needs. Further, more data have been collected concerning the value of agricultural land in terms of: food production potential, current ownership of the plots, value of the crops in terms of real estate quotation. In order to define a current economic value of the plots, the average of current economic value has been calculated comparing the evaluation made by the National Institute of Agriculture Economy (INEA) – chronologically more recent and reliable in terms of market valuations [21] – and the evaluation made by the Region Campania.



Figure 5: Map of land use.

In general terms, the demonstration project works on of the model of Public/Private Partnership (PPP). The proposal aims at supporting a “bottom up” process in which the private body plays a key role in merging economic viability with social demand, taking in account the life style and the needs of local communities. Moreover, the proposal focuses on some micro-business activities, related to the entrepreneurial capacity of the actors involved in and on the enhancement of the ecological and cultural capital of the area.

According to this, the model aims at creating effective condition for developing a shared experience of soil protection at local level. The expected result is a land use proposal consistent with the social needs, with the demand of urban and ecological services, with the economic sustainability of the program.

The project proposal is focused on a biologic, modern farm, able to generate income and environmental services for the district, but also be able to answer some of service needs of the residents, integrating the difficulties in managing the public administration and the ASIA. Some strategic objectives are sorted out:

1. The recovery of the agricultural areas, with a program guide that enhances the ecological and environmental performance of the fund;

2. Maintenance of the scale, with particular emphasis on waste management and security;
3. The adaptation of the scale to the requirements of accessibility.

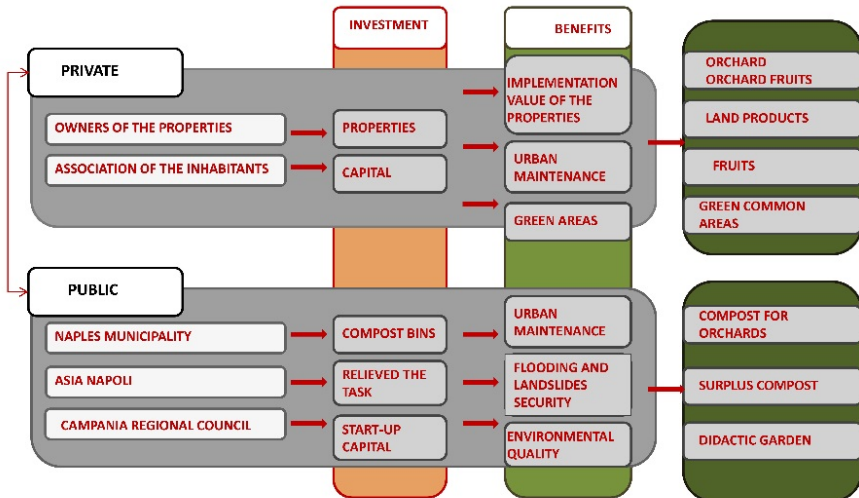


Figure 6: Relation between public and private actors.

The model aims at providing:

- Food production: direct sale of organic products, food store, food services, restaurant;
- Leisure facilities: recreation services for children and families, with the creation of, a teaching garden open to the public with guided tours and fee leisure spaces;
- Waste management: waste collection service “door to door”, production of organic compost, sale of services;
- Urban maintenance: maintenance of the slope in order to copy to sliding risk and fire risk, ordinary maintenance and cleaning of the street-stair;
- ITC implementation: Implementation of accessibility services for residents and tourists, implementing a smart phone application devices for information about local transport, waste delivery, availability of agricultural products and their delivery.

## 5 Conclusion

In the perspective of building sustainable city, the study propose a demonstration project aimed at assessing the comprehensive viability of the urban farming in the context of Naples, Italy. More in general the study tests an integrated model for urban design that takes together the instance of upgrading ecological performances in the city with the need of create new jobs and economic opportunity. The cultural

assumption is that green areas, and especially former agricultural areas, represent the ecological base for fostering the concept of landscape as urban infrastructure, so that actions, projects and policies aimed at its protection have to consider the topic of land use as critical stage of the decision process.

In more academic perspective, the study works in the framework of knowledge oriented research, focusing on testing the management model in terms of environmental, social and economic performances by the aim of defining a new approach to the governance of the city's ecological resources that could be a sort of best practice at local level. The major effort of the research team is now oriented at selecting a range of multidisciplinary indicators that could represent a sort of project priorities data both in terms of setting the knowledge base *ex ante* and of monitoring the project performances *ex post*.

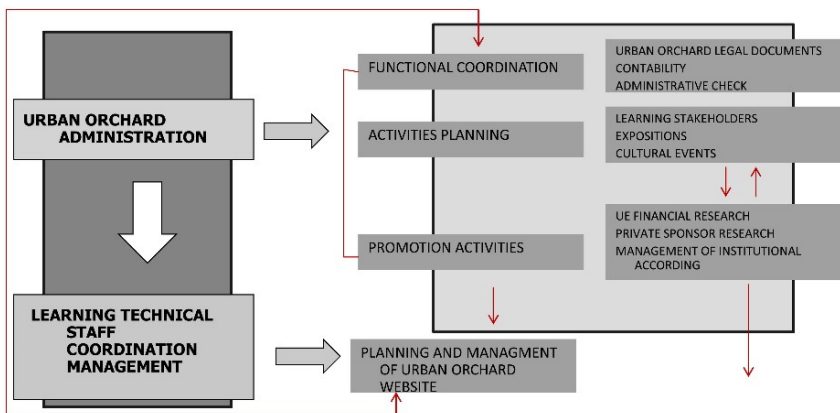


Figure 7: Integrating management of the activities in the urban farm in Naples.

The state of the art deals with a strong effort for presenting the project to local communities due to the creation of the via Pedamentina residents association (Comitato Pedamentina) and the opening of a new urban centre in the area (Quartiere Intelligente, Q.I.) that have improved social awareness about the cultural and environmental heritage of the Pedamentina street and about the agricultural potential.

Research advances are also oriented to present the project to the Public Authorities in order to impulse the discussion at local level about the protection and the management of the natural urban soils.

Finally, the study is now focused on the economic viability, deepening the topics related to the green economy and to the business opportunity linked to the management of the urban farms.

As part of the study, a number of thesis have been done on this topic in the framework of the Course of Environmental Design.

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