TRACK 3. RELEVANT EXPERIENCES AND PRACTICES

The track focuses on new relationships among rural areas, cities, nature and agriculture, the consequent transformations of need, cultural sensitivities and life styles.

Esther Sanyé-Mengual, Jordi Oliver-Solà, Juan Ignacio Montero, Joan Rieradevall, "Using a multidisciplinary approach for assessing the sustainability of urban rooftop farming", In: *Localizing urban food strategies. Farming cities and performing rurality.* 7th International Aesop Sustainable Food Planning Conference Proceedings, Torino, 7-9 October 2015, edited by Giuseppe Cinà and Egidio Dansero, Torino, Politecnico di Torino, 2015, pp 284-296. ISBN 978-88-8202-060-6

USING A MULTIDISCIPLINARY APPROACH FOR ASSESSING THE SUSTAINABILITY OF URBAN ROOFTOP FARMING

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Keywords: Urban agriculture, Life cycle assessment, Qualitative research, Geographic information systems, Integrated assessment

Abstract: Urban agriculture (UA) is blooming around cities of the developed world as a response to the increasing urban population, the growing environmental awareness of the industrial food system and the need of addressing social gaps. Within this expansion, urban rooftop farming (URF) is gaining importance as a way to further develop local food production. To assess the sustainability of implementing URF projects, a multidisciplinary methodological scheme was designed to approach such a complex system. The method combines four disciplines as follows: (a) qualitative research, to evaluate the qualitative potential by evaluating the perceptions of different stakeholders; (b) geographic information systems (GIS), to quantify the potential roofs for implementing URF; (c) life cycle assessment (LCA), to quantify the environmental impacts of URF forms; and (d) life cycle costing (LCC), to quantify the economic costs of URF forms. Results highlighted the potential of URF in both qualitative and quantitative terms and the potential benefits of different URF types. First, URF can contribute to the three dimensions of sustainability, although the complexity and novelty of URF shows specific barriers that might be overcome through further dissemination and demonstration activities. Second, available and feasible spaces can be found in retail and industrial parks to deploy commercial URF activities through rooftop greenhouses. Finally, rooftop greenhouses and open-air rooftop gardens were evaluated. LCA and LCC results outlined the relevance of design decision in terms of cultivation technique, crop and management.

1. Introduction

Urban agriculture (UA) is expanding over cities worldwide as a way to boost local food production (Orsini et al. 2013; Mok et al. 2013). In developed countries, urban agriculture projects addresses social, economic and environmental gaps thereby becoming multifunctional food systems. Beyond improving urban food security (Carney 2011), particularly in areas known as "food deserts" (Wrigley et al. 2004; McClintock 2011), UA initiatives are linked to community empowerment, social inclusion and community building processes (Howe and Wheeler 1999; Armstrong 2000; Lyson 2004; Lawson 2005; Teig et al. 2009; Carney 2011; Block et al. 2011; Guitart et al. 2012). Furthermore, the development of UA as local food systems positively contribute to urban sustainability by enhancing local and environmentally-friendly economies (Howe and Wheeler 1999; McClintock 2010; Arosemena 2012; Guitart et al. 2012; Smith et al. 2013; Sanyé-Mengual et al. 2013).

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Within such development, urban rooftop farming (URF) has grown in popularity as an alternative way to soil-based UA forms (Specht et al. 2014; Thomaier et al. 2015). URF is "*the development of farming activities on the top of buildings by taking advantage of the available spaces in roofs or terraces, which can be developed through open-air and protected technologies and used for multiple purposes*" (Sanyé-Mengual 2015). URF encompasses four main typologies of projects. Rooftop greenhouses are business-oriented projects that employ protected culture, such as Gotham Greens (New York, United States) (http://gothamgreens.com). Rooftop farms are commercial initiatives which use open-air practices, like the Eagle Street Rooftop Farm (New York, United States) (http://rooftopfarms.org). Socially-oriented URF initiatives can be both protected and open-air projects, such as the Manhattan School for Children (http://www.ps333.org/) or the community rooftop garden in Via Gandusio's social housing (Bologna, Italy) (Orsini et al. 2014). Currently, open-air rooftop initiatives which perform soil cultivation are the most common (Thomaier et al. 2015).

1.1 Urban rooftop farming research

The number of URF studies is reduced, limiting the scientific support to decision-making processes around URF at the policy and practice scales. To date, the barriers and opportunities behind URF have been observed from the experts' point of view (Cerón-Palma et al. 2012) and from the available literature (Specht et al. 2014). Both studies highlighted the potential contribution of URF to the three dimensions of sustainability: society, economy and environment. However, URF is a complex system where multiple stakeholders play a key role (e.g., as consumers, policymakers, technicians or practitioners) and deepening in the perceptions (i.e., knowledge, conceptualizations, perceived barriers and opportunities) of the different stakeholders could unravel a better understanding of URF implementation processes. Second, the identification of optimal spaces and the quantification of the potential area for implementing URF are basic for large-scale planning. Notwithstanding that some studies have approached the quantification of the URF potential (Berger 2013; Orsini et al. 2014), the development of quantitative tools to account the potential of URF could support planning decisions. Furthermore, the evaluation of different urban spaces and case studies could identify optimal areas for URF implementation. Finally, although several sustainability benefits are expected from urban rooftop farming (Cerón-Palma et al. 2012; Specht et al. 2014), studies have focused on the evaluation of the agronomic and biodiversity potential of URF (Whittinghill et al. 2013; Orsini et al. 2014; Freisinger et al. 2015). Furthermore, the lack of specific data forces the use of environmental values from conventional farming practices in UA studies (Kulak et al. 2013).
In this context, there is a need to cover such gaps in order to support the development process of urban agriculture and rooftop farming projects in developed countries. However, to approach such a complex process, multiple tools might be employed leading to a multidisciplinary evaluation scheme. This contribution describes a multidisciplinary methodological framework used to assess the sustainability of urban rooftop farming (URF) implementation and provides further knowledge on URF systems in the Mediterranean.

2. Proposing a multidisciplinary assessment scheme

Figure 1 illustrates the proposed multidisciplinary scheme which combines tools from four disciplines: social sciences, geography, environmental sciences and economy. The assessment focuses on deepening in "what is the potential" and "what are the impacts" of URF by assessing the qualitative and quantitative potential, and quantifying the environmental and economic impacts. This scheme allows performing the assessment from the city scale to the system-product scale.

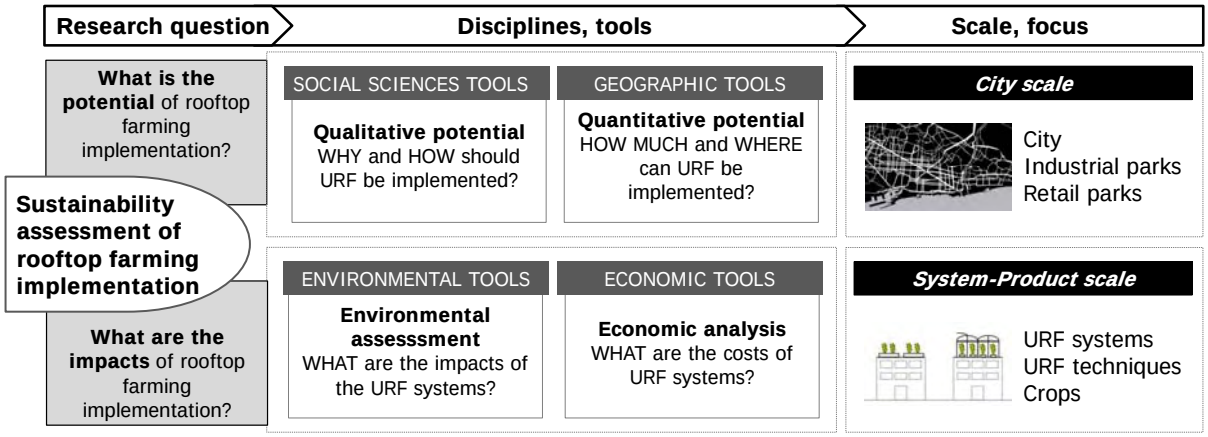

Figure 1. Multidisciplinary methodological scheme for assessing the sustainability of rooftop farming.

2.1 Social sciences

Social sciences research is used to interact with the different stakeholders involved in the development and implementation of URF. As a novel strategy, discovering the potential in qualitative terms is of great interest for planners and policymakers. The application of social sciences focuses on knowing "Why should URF be implemented?" and "How should URF be implemented?". To answer such questions, the background of URF, the interests of the different stakeholders, the opportunities and challenges associated to URF, and the potential URF models and users are key issues.

2.1.1 Semi-structured interviews

Semi-structured interviews are employed as qualitative tools that support the integration of multiple perspectives and the description of processes (Weiss 1995). Based on the transcripts and the coding of the interviews, grounded theory techniques (Kuckartz 2012) are used to unveil the concepts and discourses. After mapping the stakeholders related to the implementation of rooftop farming in Barcelona, 25 stakeholders were selected representing architects, urban planners, administration, gardeners, NGOs, food coops and URF promoters (i.e., restaurant manager that plans a rooftop greenhouse). Semi-structured interviews dealt with the concepts and definitions of urban agriculture, the perceptions around urban rooftop farming and the specific barriers and opportunities of such systems.

2.2 Geographic information systems (GIS)

Geographic information systems (GIS) are used to quantify the potential implementation of URF at different scales. As an urban strategy, the capacity to assess the implementation at the planning scale is essential to support urban planning decisions. The application of GIS aims to discover "Where can URF be implemented?" and "How much URF can be implemented?". In this sense, the identification of the optimal spaces for developing URF and the quantification of these potential areas are key in defining programs, urban strategies and planning actions. GIS are used to access spatial data (e.g., area, sunlight, availability) by consulting available maps, to create specific spatial data at the planning scale (e.g., retail parks) by digitalizing spatial elements and generating new data by creating databases (e.g., rooftop type, material).

2.2.1 An integrated GIS-LCA tool

For the purpose of quantifying and evaluating the potential implementation of URF, an integrated GIS-LCA tool was designed. The tool consists of three steps: requirements' definition, potential quantification and indicators evaluation.

- The requirements, based on experts' consultation, define the characteristics of an economically and technically feasible roof for implementing a rooftop greenhouse: allowed in the planning, available space, sunlight, minimum area of 500m^2, adaptation to the technical building code, flat and resistant.
- Once the requirements are established, data can be compiled in a database using GIS in order to quantify the area for a potential short-term implementation.
- Finally, the evaluation of the potential area can be done in self-sufficiency terms (i.e., potential supply of food demand) and environmental terms (i.e., potential environmental savings related to avoided food imports).

2.3 Environmental accounting: Life Cycle Assessment (LCA)

Life cycle assessment (LCA) is used to account for the environmental burdens of rooftop farming. As a sustainable strategy, the quantification and comparison of the environmental aspects of different URF types and practices can inform stakeholders in decision-making processes. Thus, LCA provides with quantitative data to know "What are the environmental impacts of different URF types?".

2.3.1 LCA specifications

LCA follows the ISO 14040-44 *(ISO 2006a; ISO 2006b)* standard which establish a four-stage scheme: Goal and scope definition, Life cycle inventory, Life cycle impact assessment and Interpretation. For the assessment of URF, the assessment considered two functional units: 1 kg for food products and 1m^2 for cultivation systems. The system boundaries varied from cradle-to-grave (greenhouse structure) to cradle-to-farm gate and cradle-to-consumer (food products). Experimental trials were used for compiling foreground inventory data (water consumption, design, etc.) and the ecoinvent *(Swiss Center for Life Cycle Inventories 2014)* and the LCA Food *(Nielsen et al. 2003)* databases were used for background data (electricity production, materials processing). The impact assessment included indicators from the CML 2001 *(Guinée et al. 2002)*, ReCiPe *(Goedkoop et al. 2009)*, Cumulative energy demand *(Hischier et al. 2010)* and Global warming *(IPCC 2007)* impact methods. The simapro software *(PRé Consultants 2013)* was used for the calculations.

2.4 Economic accounting: Life Cycle Costing (LCC)

Life cycle costing (LCC) is employed to evaluate the economic costs of rooftop farming. As a sustainable strategy which provides new business opportunities, the quantification and comparison of the economic aspects of different URF types and practices can inform stakeholders in decision-making processes. Thus, LCC supplies with quantitative data to know "What are the economic costs of different URF types?".

2.4.1 LCC specifications

LCC is partially standardized in the ISO 15686-5 *(ISO 2008)* for the construction sector. LCC follows the same four-stage scheme as LCA: Goal and scope definition, Life cycle inventory, Costs aggregation and Interpretation. A cost-benefit approach that includes both the costs and revenues of the systems was employed. The same functional units and systems boundaries as in the LCA were used. Data from projects and producers were compiled for the inventory. The indicators of Total cost (€) and Total profit (€) were used.

3. Assessing the implementation of URF in the Mediterranean

3.1 Case studies

Observing the potential implementation of URF from a qualitative and quantitative perspective was performed at different scales and using diverse case studies, as compiled in Table 1. In qualitative term, interviews were performed to 25 stakeholders that represented the different roles in the implementation of URF at the city scale (i.e., administration, architects, gardeners, NGOs, urban planners). The quantification of the potential of URF was done for different planning pieces, case studies representing industrial and retail parks were analysed.

Table 1. Description of case studies of the qualitative and quantitative potential studies

Study	Assessment scale	Location	Case studies
Qualitative potential (interviews)	City	Barcelona, Spain	URF in Barcelona (25 stakeholders)
Quantitative potential (GIS-LCA tool)	Planning piece: Industrial park	Barcelona, Spain	Zona Franca park
Quantitative potential (GIS-LCA tool)	Planning piece: Retail park	Barcelona, Spain	Montigalà retail park Sant Boi del Llobregat retail park

To account for the environmental and economic burdens of URF, specific case studies that represent diverse forms of URF were chosen. Table 2 compile the main characteristics of the case studies, including the cultivation technique employed and the crops cultivated. The three case studies (Figure 2) provided experimental data on the agronomic performance of the different URF forms (crop yield, resources consumption, crop management, crop design).

Table 2. Description of case studies of the environmental and economic assessments

Case study	URF form	Location	Cultivation system	Crops
RTG-Lab	Rooftop greenhouse (RTG)	Bellaterra, Spain	Soil-less production (perlite)	Tomato
Via Gandusio	Community rooftop garden (CRG)	Bologna, Italy	Soil production Floating hydroponic Nutrient film technique (NFT)	Tomato, Pepper Melon, Watermelon Lettuce, Eggplant
Gran Via	Private rooftop garden (PRG)	Barcelona, Spain	Soil-less production (perlite)	Tomato, Chard, Beet Lettuce, Cabbage

Figure 2. Case studies of the environmental and economic assessments.

3.2 Results

3.2.1 Qualitative potential

The stakeholders' analysis of the potential implementation of URF in Barcelona indicated that the development of URF can provide several environmental, social and economic opportunities towards designing sustainable cities, although a lack of support and acceptance from some stakeholders is currently a limiting factor.

This trend is mainly related to the complexity and the novelty of URF initiatives.

- Stakeholders currently conceptualize urban agriculture in different terms, even identifying urban agriculture as a false agriculture. The lack of a common definition of urban agriculture slows down the establishment of a framework where stakeholders can discuss and work towards the development of global urban agriculture policies and projects.
- Urban agriculture in Barcelona was developed for hobby purposes in the 80s, contrary to food security needs during war and economic crises in North America, United Kingdom or Cuba. Such origin led into the conception that urban agriculture is a social tool rather than a productive system with commercial opportunities. Consequently, soil-based urban agriculture is more interesting than rooftop farming since fewer resources are required.
- Barriers and challenges to the implementation of URF in Barcelona are mostly linked to acceptance issues, investment costs and legal barriers. However, the progressive implementation of URF through pilot projects and generation of new knowledge will increase the demonstration and dissemination towards a larger support of urban rooftop farming among stakeholders (Figure 3).

3.2.2 Quantitative potential

The GIS-tool was applied to different case studies of industrial and retail parks to evaluate the potential implementation of URF in quantitative terms, leading to implementation recommendations for urban planners, entrepreneurs and practitioners.

- Selecting suitable roofs for implementing rooftop greenhouses is a complex process that requires a multicriteria set: availability of space, sunlight, resistance and slope, and legal and planning requirements.
- For Barcelona, the short-term potential of retail parks was greater (53-74%) than industrial parks (8%). This trend is related to the infrastructure characteristics of retail buildings which

are more resistant and thus more suitable for URF. However, industrial areas had a large absolute potential (13ha), becoming interesting urban pieces for the planning and implementation of large-scale URF projects (Figure 4).

- Both industrial and retail parks resulted in optimal spaces for implementing commercial URF initiatives, since food-related business are commonly placed in such urban spaces: food distribution centres and supermarkets.
- In this study, the assessment of the quantitative potential was limited to rooftop greenhouses, since it is the more restrictive form of URF. Implementing open-air URF forms has fewer requirements and is more flexible (e.g., plots, raised beds and other growing systems can be adapted to the spaces available in roofs).

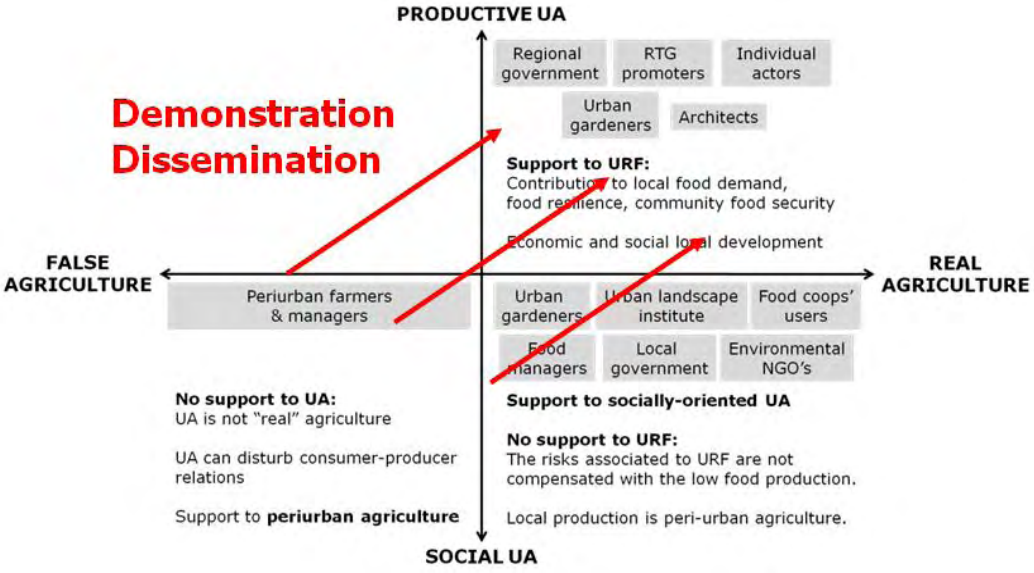

Figure 3. Stakeholders' position on conceptualizing UA and supporting URF in Barcelona, and expected trends through demonstration and dissemination activities.

Figure 4. Identification of suitable areas for implementing rooftop greenhouses in Barcelona (Spain).

3.2.3 Deepening in the sustainability profile of different forms of rooftop farming

The three case studies analysed (RTG-Lab, Via Gandusio, Gran Via) are pilot projects and, thus, the study provides the first environmental and economic results on urban rooftop farming, unravelling some trends and patterns of the environmental and economic burdens of rooftop greenhouses, community and private rooftop gardens.

Rooftop greenhouses:
The structure of the greenhouse of the RTG-Lab played the major role. To comply with the Technical Building Code (BOE 2006), the structure must be reinforced thereby ensuring resistance and security. However, the short-supply chain resulting from a local production gives advantage to the production in RTGs from both the environmental and economic perspectives, when compared to conventional supply-chains. The assessment of the RTG-Lab highlighted the following trends:

- The structure of the greenhouse was the most contributing element to the environmental burdens (41.0-79.5%) and to the economic costs (64%), as in conventional greenhouse systems. In some categories, fertirrigation played the major role. Compared to a multitunnel greenhouses (i.e., commonly used in conventional greenhouse production in the South of Spain), the structure of an RTG had an environmental impact between 17 and 75% larger.
- Considering the food product, tomatoes from an RTG in Barcelona had lower environmental burdens than conventional tomatoes not only at the production point (between 9 and 26% lower) but also at the consumer (between 33 and 42 % lower).
- Regarding the economic costs, local tomatoes would only be cheaper (21%), and thus competitive, when the entire supply-chain is considered. In this case, the conventional supply-chain includes the transportation, packaging and food waste costs.
- Future RTGs may optimize the structure requirements to minimize the environmental impacts and economic costs of this element.

Community and private rooftop gardens:
Rooftop gardens use open-air cultivation techniques. The assessment of the Via Gandusio and Gran Via case studies outlined the following trends:

- Crop inputs contributed the most to the environmental impacts (85%), where irrigation played the major role (60-75%). Even more, the needed equipment and the consumed resources for the irrigation were the most expensive elements.
- Fruit vegetables (in particular, eggplant and tomato) had the larger crop yield, leading to lower environmental burdens and economic costs.
- The integration of re-used elements, such as pallets, into the design of the gardens reduces the environmental burdens and costs of the required structure (e.g., pots, raised beds). In the community garden, the burdens of the structure were negligible to the final impacts as the users designed the garden with former pallets and PVC pipes. In the private garden, the structure was made of new elements and contributed to between 28 and 35% of the environmental impacts.
- The level of horticultural knowledge of the users in community and private gardens is determinant in the sustainability performance of this type of local products, since directly affects the efficiency of the production (e.g., crop yield, water consumption).
- Future designs may consider the integration of re-used elements, the optimization of water requirements and the training of users to enhance the sustainability of rooftop gardens.

3.2.4 Comparing rooftop farming forms and conventional production

Figure 5 shows the global warming potential of lettuce production and tomato production in the three URF forms assessed in this study, as well as the minimum and maximum values related to conventional production found in the literature.

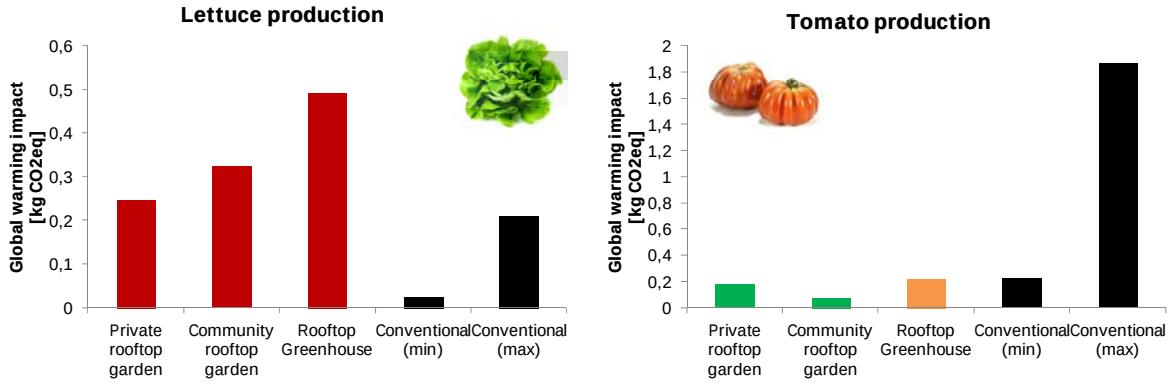

Figure 5. Comparison of the global warming impact of lettuce and tomato production in rooftop greenhouses, community rooftop garden, private rooftop garden and conventional production (minimum and maximum literature values).

The following patterns are observed:

- According to the results obtained from the case studies, products from open-air rooftop farming (both community and private) had a lower environmental impact and a lower cost than products from rooftop greenhouses, due to the burdens associated to the greenhouse structure. However, one may note that each type of rooftop farming aims to address different issues. Thus, although rooftop greenhouses showed larger environmental burdens, companies can benefit from a more-controlled environment and from the potential transformation to integrated RTGs. On the contrary, socially-oriented or self-managed initiatives may prefer rooftop systems more simple, placed in an open and fresh environment.
- Notwithstanding that lettuce production in rooftop farming forms had a larger environmental impact than in conventional production, the case studies analysed were polyculture gardens with a homogeneous design, resulting in a low plant density and high water irrigation for leafy vegetables since design parameters were established for fruit vegetables. Thus, an optimization of polyculture gardens by differentiating diverse design areas could improve the performance of leafy vegetables.
- Tomato production showed a lower environmental impact than values for conventional production. Among the different URF forms, tomato production in the RTG-Lab had the larger impact. However, the RTG-Lab can be integrated in the buildings where they are placed on by exchanging the flows of energy, water and CO_2, thereby improving the efficiency of the agriculture production and reducing the environmental burdens and costs of the activity.

3.2.5 Design recommendations: Prioritising growing systems and crops

Different growing systems and crops were analysed throughout the study, providing quantitative data to draw some design recommendations:

- Soil production with the use of compost as fertilizer is the most eco-efficient cultivation technique in rooftop farming. Similar eco-efficient values were obtained for the theoretical production in an integrated rooftop greenhouses (i.e., taking advantage of the residual flows from the building of energy, water and CO_2) (Figure 6). Notwithstanding that the values of crop yield were higher in the rooftop greenhouse case (25 $kg \cdot m^{-2}$), the higher costs of the greenhouse system (11.9€$\cdot m^{-2}$) reduced the eco-efficiency of this form of URF.
- Hydroponic techniques were the least eco-efficient ones due to the higher environmental impact of electricity (e.g., recirculation pump in the Nutrient Film Technique) (75% of burdens) and the large cost of irrigation equipment (e.g., aerator in the floating).

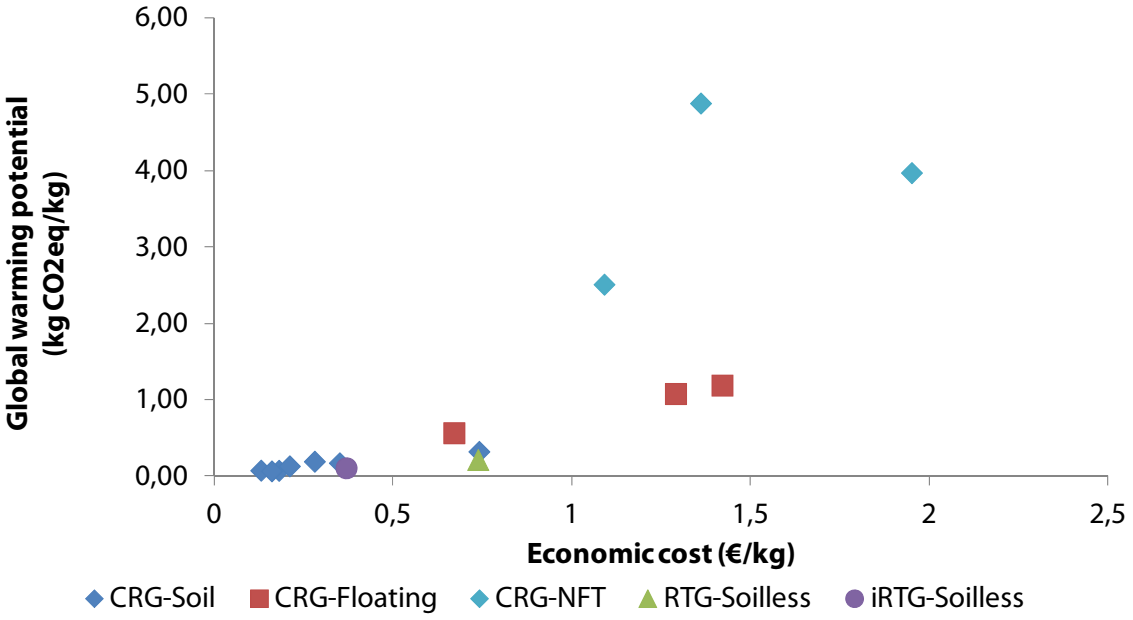

Figure 6. Eco-efficiency of crop production in rooftop greenhouses (RTG) and community rooftop farming (CRG).

- Regarding crop selection, fruit vegetables yielded better than leafy vegetables in all the URF forms assessed in this study. Notwithstanding that fruit vegetables have longer crop periods and consume a larger amount of resources, higher crop yields reduced the environmental impact per kg of product (Figure 7). Indeed, leafy vegetables could improve their efficiency by optimizing the design of polyculture gardens, as abovementioned.
- In terms of crop planning, self-sufficiency gardens are aimed to provide a diversified production in order to satisfy the food demand of the users during the different seasons of the year by combining fruit and leafy vegetables. On the contrary, commercial initiatives employing rooftop greenhouses would prefer monoculture crops to maximize the production efficiency.

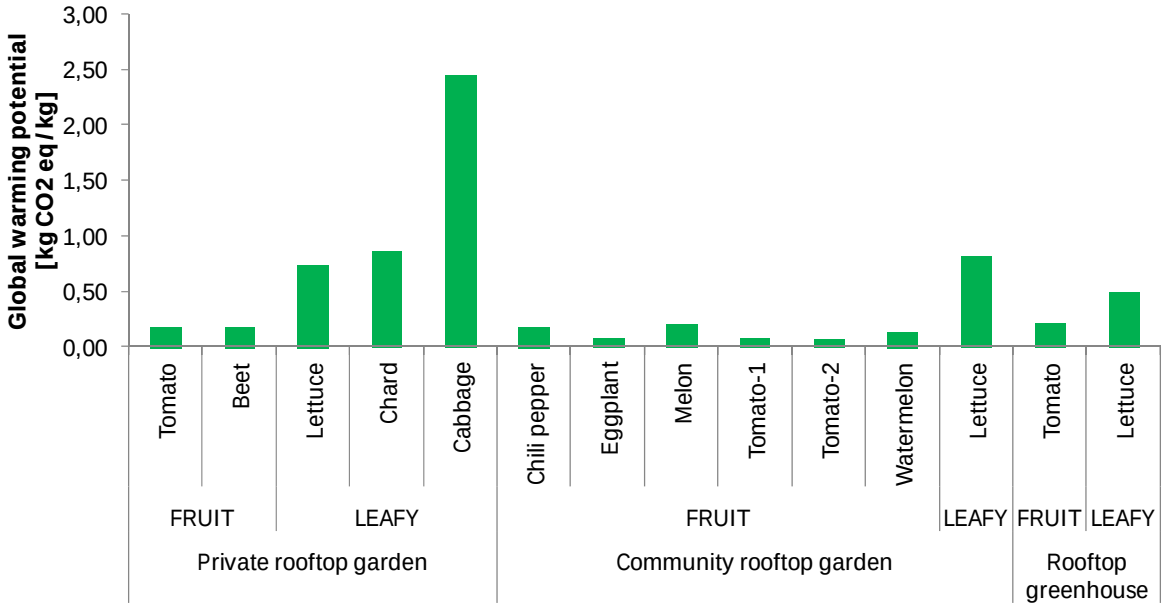

Figure 7. Comparison of the global warming impact of crop production in rooftop greenhouses (RTG), community rooftop farming (CRF) and private rooftop farming (PRF).

4. Conclusions

The multidisciplinary methodological scheme was essential to improve the current understanding of the implementation process and the potential benefits of urban rooftop farming in Barcelona. The combination of tools from different disciplines was fundamental to approach the complexity of implementing a new sustainable strategy in cities. A comprehensive picture of the potential and sustainability of URF was obtained from assessing the perceptions of the different stakeholders (social sciences), evaluating the potential in quantitative terms and from a planning perspective (geographic tools), and quantifying the environmental burdens (LCA) and the economic costs (LCC). This approach could be further applied to different regions, case studies and other forms of rooftop farming and urban agriculture in order to improve the current knowledge.

In terms of potential, urban rooftop farming in Barcelona shows a great potential in both qualitative and quantitative terms although specific barriers constrain this development at the small-scale. URF promoters may overcome social acceptance, economic and legal barriers to reach a large-scale implementation of these new forms of urban agriculture. For this development, industrial and retail parks showed a significant quantitative potential for the deployment of commercial initiatives through rooftop greenhouses.

According to the LCA and LCC results, URF can become an environmentally-friendly option for further developing local food systems in urban areas. Results depend on the type of URF, the cultivation technique and the crop under assessment, highlighting the importance of design decisions in the final impacts of rooftop farming products. Open-air systems, soil production and fruit vegetables were the most eco-efficient options.

In conclusion, rooftop farming in developed countries can positively contribute to urban sustainability and urban food security as their environmental impacts and costs highlights the feasibility of URF within the expansion of urban agriculture and local food systems. However, one

may note that urban food systems are a complementary pathway to the conventional agriculture industry thereby supplying the demand of citizens with a higher environmental awareness which positively value localism, seasonality and environmentalism.

5. Acknowledgements

The authors thank the Spanish Ministerio de Economía y Competitividad (MINECO) for the financial support to the research project "Agrourban sustainability through rooftop greenhouses. Ecoinnovation on residual flows of energy, water and CO_2 for food production" (CTM2013-47067-C2-1-R), and the Spanish Ministerio de Educación for awarding a research scholarship (AP2010-4044) to Esther Sanyé Mengual.

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Jeroen de Vries, Ruth Fleuren, "A spatial typology for designing a local food system", In: *Localizing urban food strategies. Farming cities and performing rurality.* 7th International Aesop Sustainable Food Planning Conference Proceedings, Torino, 7-9 October 2015, edited by Giuseppe Cinà and Egidio Dansero, Torino, Politecnico di Torino, 2015, pp 297-306. ISBN 978-88-8202-060-6

A SPATIAL TYPOLOGY FOR DESIGNING A LOCAL FOOD SYSTEM

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Keywords: keyword urban design, urban agriculture, spatial typology, local food, design process

Abstract: The local food system comprises productive elements ranging from balcony gardens, kitchen gardens, community gardens and fish ponds to multifunctional urban farms, food forests or dairy farms in the green infrastructure. For planning, designing and evaluating a sustainable, local food system a spatial typology of urban agriculture is required. This leads to the following research questions. What are the spatial types required to design a local food system for an existing urban area? And how can a designer evaluate the design as to productive capacity for local food?
Key publications and student research provide a broad spectrum of types of urban agriculture, based on goals, organisation, production systems, products and functions. From this we can deduce a set of spatial categories.
The spatial typology can be used to programme and design local food production elements in urban areas. The types are related to areas with individual houses and apartment blocks, (semi-) public urban open space, and green infrastructure.
To be able to compare the consumption of food with the potential production a local urban food calculator (LUFC) is developed. This can be used in two ways. Firstly to chart to what extent the potential production in an urban area meets the needs of its inhabitants. Secondly it can be used as an evaluation tool to measure to what extent the design of a local food system can provide in the needs of the consumers. Two existing residential areas in the city of Arnhem in the Netherlands are used as first test case.

1. Introduction

The local food system comprises productive elements ranging from balcony gardens, kitchen gardens, community gardens, and fish farms to multifunctional urban farms, food forests, intensive greenhouses or dairy farms in the green infrastructure. For planning, designing and evaluating a sustainable, local food system for urban areas a spatial typology of urban agriculture is required. This supports integrated development of urban agricultural systems and it provides the opportunity to increase the amount of food produced. This leads to two main research questions: What are the spatial types required to design a local food system for an existing urban area? And how can a designer evaluate the design as to productive capacity for local food? In order to answer this series of research questions are defined in Scheme 1.

2. Spatial typology of urban agriculture

Key publications on urban agriculture edited by Philips (2013), Viljoen & Bohn (2014) and Roggema & Keeffe (2014) provide a broad spectrum of types of urban agriculture, which are based on goals, organisation, production systems, products and functions. De Graaf (2011) organised urban

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agriculture on the basis of artificial or more self-regulating systems and whether it is related to built-up structures or open field cultivation. The sources illustrate these typologies with reference projects. In a series of student projects the typology of urban agriculture has been researched. Landscape architecture students of VHL (Hommel, Streng and Verheij, 2014; Kors and Floor, 2014) analysed urban agriculture and developed spatial categories, such as the kitchen garden, the advanced kitchen garden, the landscape management farm, the urban estate and the green infrastructure farm.

Scheme 1. Set of research questions for the evaluation of local food design

Production	Consumption
Which types of urban agriculture elements can be planned?	What is the average diet of Dutch consumers?
What kind of crops and animal produce can these provide?	Which type of food can be produced locally in the city?
What is the average yield of the crops and produce?	How many inhabitants are there in the planning area?
What surface of each types of urban agriculture can be programmed in the area?	
What is the total potential production of local food per year in the area?	What is the total amount of food that is yearly required for the area?
To what extent does the production meets the required consumption and can this be adapted by changing the programme for urban agriculture?	

Table 1. Spatial typology of urban agriculture with average surface and type of produce

Type of urban agriculture	Organisation	Approximate production area per unit	Main crops and animal produce
Productive house (indoor) private	Private	2 to 20 m^2 per house	mostly vegetables, herbs, and fruits
Productive roof (flat) private	Private	20 to 50 m^2 per house	mostly vegetables, herbs, and fruits
Productive roof (flat), aquaponics	Private	20 to 50 m^2 per house	vegetables and fish
Kitchen gardens	Private	50 to 300 m^2 per house	potatoes, vegetables, herbs, and fruits
Allotment gardens	Private	complex 5,000 to 20,000 m^2	potatoes, vegetables, herbs, and fruits
Community gardens, open field	Collective	400 to 10,000 m^2	potatoes, vegetables, herbs, and fruits
Community gardens, glass house	Collective	200 to 5,000 m^2	vegetables, herbs, and fruits
Edible green amenities	Public	400 to 10,000 m^2	fruits and nuts
Roof gardens aquaponics	Professional	500 to 1,500 m^2	vegetables and fish
Professional horticulture, open field	Professional	5,000 to 40,000 m^2	potatoes, vegetables, herbs, and fruits
Professional horticulture, glass house	Professional	5,000 to 10,000 m^2	vegetables, herbs, and fruits
Professional hydroponics	Professional	1,500 to 10,000 m^2	vegetables, herbs, fruits, and fish
Urban farm	Professional	300,000 to 800,000 m^2	combination of meat, potatoes, vegetables
Green infrastructure farm	Professional	300,000 to 1,200,000 m^2	combination of meat, wheat, vegetables

An inventory of the described types of urban agriculture was made and categorised on the bases of their spatial characteristics. A spatial typology has been developed, which can be used to programme and design local food production elements in urban areas. Making use of the properties of reference projects for each spatial type an indication of the surface area, production systems, crops and products was defined (Table 1). The private ones are to be located in private houses and gardens. The collective gardens can be located in (semi) public space or unbuilt private plots. The professionally managed types need larger surfaces in order to be profitable. Roof gardens can be located on larger buildings, the farms on private agricultural land or integrated into existing green ilegumesnfrastructure or the urban fringe areas.
The main crops for each type are based on what is found in the reference projects in the Netherlands. For the representation in designs proposals and maps for each type an icons is made.

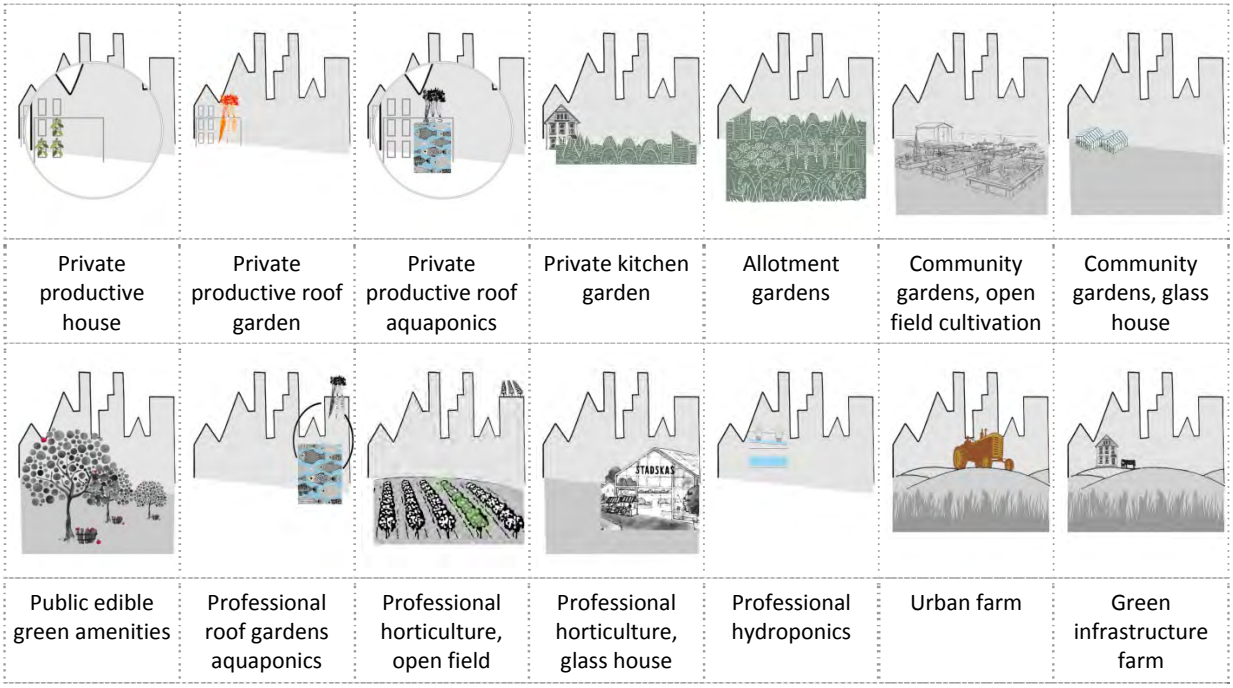

Figure 1. Representation of the spatial types by icons

3. Calculation of consumption of food

The amount of food that is required for the inhabitants of an area is based on the average diet in the Netherlands in 2010 (PBL, 2014).

For the calculation of the required amount of food the average diet is converted into kilos per year. The following elements are excluded from the calculation because these are difficult to produce locally in the Netherlands: alcoholic beverages, non-alcoholic beverages (including coffee and tea), sugar and fats. Meat is subdivided into beef (20%), pork (60%), and chicken (20%).

Figure 2. Average Dutch daily diet (source National Environmental Office – PBL 2014)

Table 2. Average consumption in kilos per year per person

Type of food	grams per person per day	kilos per person per year	Comments
Potatoes	88	32	
Grains (pasta and bread)	156	57	rice is not produced locally
Vegetables (excluding legumes)	145	53	
Pulse	20	7	
Fruits	40	15	mainly apples and pears
Herbs	10	4	
Beef	57	5	
Pork	19	21	
Poultry	19	7	mainly chicken
Fish	12	7	most of the fish in Dutch diets is caught at sea
Cheese	20	7	
Dairy (excluding cheese)	285	104	
Eggs	11	4	

The required amount of food is calculated by multiplying the average diet by the number of inhabitants in each area.

4. Calculation of production of local food

To calculate the potential food production the following steps are taken. Firstly the types of crops and produce are defined for each spatial type. Because the calculator works with gross surfaces, part of the surface is allocated for access and facilities. The results can be seen in Table 3.
Secondly the yields of crops and production are defined on the basis of organic farming. Data are retrieved from national statistics of production (www.cbs.nl) with addition of a series of specific research reports of the Louis Bolk Institute (www.louisbolk.nl). For the fish farms and hydroponics studies of the innovation network of agriculture and agribusiness (www.innovatienetwerk.org) are

used. For each type of urban agriculture the yields of suitable crops are selected, e.g. tomatoes, cucumber, courgette for professional horticulture in glass houses. Milk production is related to the average production per cow and the index of cattle per hectares. The amount of kilos per m^2 also includes the produce of fodder for cows (silage) and chickens (corn). For the production of pigs it is assumed that these are mainly fed on leftovers from other crops.

Table 3. Percentage of surface allocated to crops and products per type of urban agriculture

Crops -> / Types of urban agriculture	Potatoes	Vegetables (excl .legumes)	Legumes	Fruits	Herbs	Grains	Beef	Pork	Poultry	Fish	Cheese	Dairy (milk, yoghurt)	Eggs	Access & Facilities
Productive house (indoor) private		70%	10%		20%									0%
Productive roof (flat) private		50%	10%	10%	10%									30%
Productive roof (flat), aquaponics		25%	5%							30%				40%
Kitchen gardens	20%	35%	10%	20%	5%									10%
Allotment gardens	20%	35%	10%	20%	5%									10%
Community gardens, conventional	20%	40%	5%	15%	5%								5%	10%
Community gardens, glass house		55%	5%	30%										10%
Edible green amenities				30%										70%
Roofgardens aquaponics, professional		27%	3%							30%				40%
Professional horticulture, conventional	20%	40%	5%	20%	5%									10%
Professional horticulture, glass house		50%	5%	30%	5%									10%
Professional hydroponics		50%	5%		5%					30%				20%
Urban farm	15%			5%		20%	10%	5%	5%		5%	20%	10%	5%
Green infrastructure farm						10%	20%	15%	10%		5%	30%	5%	5%

In order to define the production space that is available in an urban area, the following data are collected: the number of houses, and the total surfaces of private gardens, flat roofs, and public green space. The surface of unbuilt land that is or can be used for horticulture, an urban farm,

etcetera is measured too. Consequently the available surface is allocated to one of the spatial types. Where the spatial types can be placed depends on the urban structure in the area, limitations like traffic, the size of plots and needs for other functions like recreation, water retention, alignment of roads, etcetera.

Table 4. Average yields or produce per year of organically grown products

Crop or product	kg/m^2 *)	comments
Potatoes	2.9	the same for all spatial types
Grain	0.7	the same for all spatial types
Legumes	1.5	the same for all spatial types
Vegetables	5	open field, the same for all spatial types
	30	glass house, the same for all spatial types
Herbs	1,5	the same for all spatial types
Fruits	4	mostly apples and pears: farms, orchards, edible green
	2	berries in roof gardens, kitchen gardens
	8	berries in glass houses, tunnels (professional horticulture)
Beef	0.07	pasture in urban farm or green infra farm
Pork	0.57	urban farm or green infra farm, outdoor
Poultry	0.11	urban farm combination indoor/outdoor incl corn fodder
Fish	6.67	organic aquaponics, with fodder production and facilities
Cheese	0.15	1/10 of milk production per hectare
Dairy	1.50	2 cows per hectare, 7500 litres per cow per year
Eggs	0,.4	urban farm combination indoor/outdoor including fodder (corn)

) the sources of the key figures can be found in the Excel file of the local urban food calculator, see Appendix 1 The produce per square meter is without taking into account the space for facilities, infrastructure, transport, and energy

A first test was made for two neighbourhoods in the city of Arnhem: Presikhaaf III, an example of modernism that mainly consists of high rise buildings and Elderhof, a residential area from the 1980's with terraces houses (Figure 3).

Presikhaaf III offers a huge amount of flat roofs and a good spatial structure to embed community gardens and some glass houses. Elderhof consists of a fine maze structure of private gardens and in the north a park area with allotment gardens. In the south there is space for glass houses and a fish farm.

Figure 3. Google map and map with public green space of Presikhaaf III and Elderhof

5. Discussion

The local urban food calculator (LUFC) uses a defined series of typologies of urban agriculture. The actual production may take place in units that are a mixture of these types. It is also possible that producers in a certain type grow more or less of a type of crop than defined in Table 3. For a specific area or a design the LUFC can be adapted to this.

In other countries the diet may be different and in the Netherlands scenarios exist for vegetarian or flexitarian diets. In a designated area the consumption may differ because of income and culture. For the calculation an average diet is used, but diets may vary depending on what can be locally produced and is offered.

In the calculation certain types of food were excluded, because these could not be produced locally in the Netherlands. It is possible to look for alternative types of food and drink, e.g. elderflower syrup replacing soft drinks, rhubarb wine as an alcoholic beverage. For products like coffee and tea there might also be alternatives, but it is doubtful to which extent consumers would be willing to adapt.

In the two test cases the planner decided how the available space was to be used for different types of urban agriculture, based on the interpretation of aerial views and the maps with the green structure. The percentage of the available space that is to be designed for the types of local food production (e.g. the percentage of the surface of private gardens for kitchen gardens, or the amount of houses that can be converted into productive houses) is to be based on reference projects. However, the actual production largely depends on the willingness of people to change ornamental gardens into productive gardens. Besides this there is always an amount of space needed for other

functions like terraces, recreation, parking, tool sheds, etcetera. Therefore it is recommended to use the local urban food calculator in a bottom-up planning process is recommended.

6. Conclusions and further research

The first tests in Arnhem for two neighbourhoods show that the local food system within the urban area can only provide a small amount of the total nutritional needs of the local population. The local production in these two areas may provide for half the amount of vegetables and fruits and to a lesser extent for the amount of potatoes and fish. Within these areas there is no space for dairy production and grains. Production can be raised by introducing more glass houses, polycultures and hydroponics in the area, but these types of urban agriculture are less attractive. The open field cultivation types also have a social and recreational function.

The next step in this research is to extend the analysis of available space for the different typologies to the whole city of Arnhem and to develop a set of scenarios for more and less intensive food production in relation to social and recreational use.

7. Postscript and acknowledgments

An Excel file with the urban local food with a short explanation on its functioning can be obtained from the author, by sending an e-mail to jeroen.devries@wur.nl.

The first author gratefully acknowledges the support of Ir. G. J. van der Burgt, Professor Dr. Ir. E.T. Lammerts van Bueren, and Professor Dr. Ir. P.C. Struik for leading him to the relevant key figures on yields and produce of organic farming.

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APPENDIX 1. Detailed table with yields per m2 of crops and products

Overview of yields and produce of organic crops and animal produce in kilo per m^2
This is the net surface so without the space for facilities, infrastructure, transport, and additional energy

Diet category	Crop or product	kg/m^2	Comments	Source
Potatoes	Potatoes	2.9		www.cbs.nl/NR/...5C74.../2009*biologischelandbouwmaatwerk2009.xls*
Potatoes		**2.9**	**the same for all spatial types**	
Grain	Wheat	0.7	winterwheat	www.louisbolk.org/downloads/1459.pdf
Grain	Corn	0.9	only the corns, not the leaves	www.cbs.nl/NR/...5C74.../2009*biologischelandbouwmaatwerk2009.xls*
Grain		**0.7**	**the same for all spatial types**	
Legumes	Legumes: Green peas for packing	0.7		https://www.wageningenur.nl/upload_mm/9/d/e/fdcfad65-920f-48c3-9a5e-335a882f6705_Flyer%20rapportage%20Bodemkwaliteit%20op%20zandgrond%202012.pdf
Legumes	Green Peas	1		personal communication Prof. Dr. Ir E. Lammers van Buren and Prof. Dr. Ir P.C. StruiK
Legumes	Green Beans	2		personal communication Prof. Dr. Ir E. Lammers van Buren and Prof. Dr. Ir P.C. StruiK
Legumes		**1.5**	**the same for all spatial types**	
Vegetables	Onions	5.4		www.louisbolk.org/downloads/1459.pdf
Vegetables	Onions	5.2		http://www.cbs.nl/nl-NL/menu/themas/landbouw/publicaties/artikelen/archief/2009/2009-2740-wm.htm
Vegetables	Endive	3.5	winter crop	http://www.louisbolk.org/downloads/2117.pdf
Vegetables	Lettuce - open field cultivation	5	4 crops, 12 /m2, 400 gr /p; 1st of May till end of Oct	personal communication Prof. Dr. Ir E. Lammers van Buren and Prof. Dr. Ir P.C. StruiK
Vegetables open field	**OUTDOOR**	**5**	**the same for all spatial types**	
Vegetables	Bell pepper	17	yearround	http://www.louisbolk.org/downloads/1899.pdf
Vegetables	Tomato	39	1/2 Jan to end of Oct; with one crop of lettuce	http://www.louisbolk.org/downloads/1899.pdf
Vegetables	Cucumber	26	yearround	http://edepot.wur.nl/323447
Vegetable glass house	**GLASS HOUSE**	**30**	**the same for all spatial types**	
Fruits	Apples	4		http://www.cbs.nl/nl-NL/menu/themas/landbouw/publicaties/artikelen/archief/2014/2014-4180-wm.html
Fruits	Pears	4		http://www.cbs.nl/nl-

Overview of yields and produce of organic crops and animal produce in kilo per m^2
This is the net surface so without the space for facilities, infrastructure, transport, and additional energy

Diet category	Crop or product	kg/m^2	Comments	Source
				NL/menu/themas/landbouw/publicaties/artikelen/archief/2014/2014-4180-wm.html
Fruits	Straw-berries	1.7	open field cultivation	http://www.cbs.nl/nl-NL/menu/themas/landbouw/publicaties/artikelen/archief/2009/2009-aardbeien-art.htm
Fruits	Straw-berries	8	cold frame or tunnel	http://www.cbs.nl/nl-NL/menu/themas/landbouw/publicaties/artikelen/archief/2009/2009-aardbeien-art.htm
Fruits	Black berries	3.6	open field cultivation	
Fruits	Blue berries	5.8	open field cultivation	
Fruits		**4**	**farms, orchards, edible green**	
Fruits		**2**	**roof gardens, kitchen gardens**	
Fruits		**8**	**glass houses, tunnels (professional horticulture)**	
Herbs		**1.5**	**open field cultivation**	www2.vlaanderen.be/landbouw/downloads/fijne_groententeelt.pdf, peterselie: 1,5 kg / m2
Beef	Beef	**0.07**	**pasture in urban farm or green infra farm**	30% milk cows (sausages etc.), 70% meat cows, 1,5 cow/hectare, 240 kg consumption meat per cow, 180 days
Pork	Pork	**0.57**	**urban farm or green infra farm, outdoor**	additional fodder by leftovers of crops and food, 27 pig / ha, 70 kg consumption meat per pig, 120 days
Poultry	Poultry	**0.11**	**urban farm combination indoor/outdoor incl corn fodder**	4 cycles per year, 4,1 m2 per chicken, 1,3 kg per chicken, m.bestman@louisbolk.nl
Fish	Fish	**6.67**	**organic aquaponics, with lemna minor, worms, tilapia**	innovatienetwerk, nutri-hof 10 ton plant ecological faming
Cheese	Cheese	**0.15**	**1/10 of milk production / ha**	personal communication Prof. Dr. Ir E. Lammers van Buren and Prof. Dr. Ir P.C. StruiK
Dairy	Dairy (milk, yoghurt, etc)	**1.50**	**2 cows per hectare, each 7500 litres (kg) per year**	personal communication Prof. Dr. Ir E. Lammers van Buren and Prof. Dr. Ir P.C. StruiK
Eggs	Eggs	**0.34**	**urban farm combination indoor/outdoor incl corn fodder**	leenstra a.o., m.bestman@louisbolk.nl

Kathrin Specht, Esther Sanyé-Mengual, "Urban rooftop farming in Berlin and Barcelona: which risks and uncertainties do key stakeholders perceive?", In: *Localizing urban food strategies. Farming cities and performing rurality.* 7th International Aesop Sustainable Food Planning Conference Proceedings, Torino, 7-9 October 2015, edited by Giuseppe Cinà and Egidio Dansero, Torino, Politecnico di Torino, 2015, pp 307-313. ISBN 978-88-8202-060-6

URBAN ROOFTOP FARMING IN BERLIN AND BARCELONA: WHAT RISKS AND UNCERTAINTIES DO KEY STAKEHOLDERS PERCEIVE?

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Keywords: Urban agriculture, Qualitative research, Technological innovations, Social perceptions

Abstract: Urban rooftop farming (URF) projects have been set up or planned by non-profit initiatives or business entrepreneurs in the cities of Berlin (Germany) and Barcelona (Spain) over the last few years. Beyond the already-established types of urban agriculture (UA) (such as allotments or school gardens), these "new forms" of UA are attracting increasing interest that can be observed in both cities. According to their proponents, they are supposed to provide potential benefits in the urban setting. At the same time, they are connected to a number of associated problems, uncertainties and risks, which constrain their social acceptability.
This paper aims to identify what risks key stakeholders perceive around URF in case studies of Berlin and Barcelona. To explore this objective, we analyzed 56 qualitative interviews conducted with key stakeholders (e.g., activists, lobby groups, planning experts, policy and administration officials, and sales representatives) in both cities.
The results provide an overview of the perceived risks associated with URF on different scales (from the single project level to the larger metropolitan region). We illustrate how certain groups are affected differently by those risks according to their respective roles in the system.
In conclusion, stakeholders associate a number of potential risks and problems with URF, which should be known, considered and addressed by those who want to develop, finance or implement URF in the cities of Europe and beyond.

1. Introduction

As in many other cities worldwide, urban agriculture (UA) has been progressively expanding in the cities of Berlin (Germany) and Barcelona (Spain) in the last few years. Beyond the already-established types of UA, such as family-home gardens, school gardens and garden plots, these "new forms" of urban agriculture are attracting increasing interest that can be observed in both cities. These new types of urban food producers focus on urban farming activities that take place around urban buildings. In recent years, rooftop gardens and rooftop greenhouses have been set up or planned by activists, non-profit associations, private initiatives or business entrepreneurs for social as well as commercial purposes.

1.1 Urban rooftop farming research

Notwithstanding the increasing interest in urban rooftop farming (URF), the existing literature in the field is limited to certain topics. Diverse studies have attempted to define the concepts behind URF, such as Vertical Farming (Despommier 2008; Despommier 2009; Despommier 2010) or Skyfarming (Germer et al. 2011), and highlighted the potential contribution of URF to food security and

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sustainable development. The opportunities and barriers associated with URF systems have been identified from a technical perspective (Cerón-Palma et al. 2012; Freisinger et al. 2015) and from the perspective of current literature and practices (Specht et al. 2014; Thomaier et al. 2015). Both approaches outlined the multiple contributions to sustainability (considering the effects on the environment, the economy and society).

In quantitative terms, rooftop farming has been assessed in terms of agronomic performance, potential area of implementation and eco-efficiency. Different studies have analyzed the varying production efficiency of rooftop gardens to identify optimal crops and techniques (Proksch 2011; Whittinghill et al. 2013; Pennisi 2014; Orsini et al. 2014). Attention has been also paid to the use of urban wastes as crop substrates (Grard et al. 2015). The quantification of the potential implementation of URF has been the focus of studies in New York, Bologna and Barcelona (Berger 2013; Orsini et al. 2014; Sanyé-Mengual et al. 2015a). Finally, among the three dimensions of sustainability, the environmental aspects and economic costs have been quantified for rooftop greenhouses (Sanyé-Mengual et al. 2015b) and community rooftop gardens (Sanyé-Mengual et al. 2015c) in a Mediterranean context.

Regarding the social aspects of URF, Sanyé-Mengual et al. (2015a) and Specht et al. (2015a,b) compiled the perceptions of stakeholders in relation to the potential implementation of URF forms in Barcelona and Berlin, respectively. Approaching stakeholders is essential in understanding the implementation of such a complex system, where multiple stakeholders play a key role (e.g., as consumers, policymakers, technicians or practitioners). The studies highlighted the several opportunities related to the environmental, economic and social advantages of developing local food systems through URF projects. However, stakeholders also perceived certain barriers to short-term implementation, mostly related to the novelty and complexity of URF. Among these barriers, some perceived risks were identified, such as risks attached to soilless growing techniques or health risks related to URF products. Notwithstanding these results, the studies did not delve into the multiple risks that stakeholders perceived.

In this context, the goal of this study is to identify the risks that stakeholders perceive concerning the implementation of URF in European cities. This contribution also focuses on classifying the risks, particularly in terms of spatial distribution and risk recipients. To do so, Barcelona and Berlin are used as case studies.

2. Research method

The results are based on the analysis of 56 qualitative interviews. Between 2011 and 2013, 25 guided interviews were conducted in Barcelona and 31 in Berlin as independent studies (Sanyé-Mengual et al. 2015a; Specht et al. 2015a). In both cities, key stakeholders (e.g., activists, lobby groups, planning experts, policy and administration officials, sales representatives, etc.) were approached and asked about perceived risks, problems and uncertainties related to rooftop farming, as one part of a broader interview on the topic. The interviews were transcribed, coded and analyzed applying the principles of qualitative content analysis (Kuckartz 2014; Weiss 1995).

3. Results: Perceived risks of URF implementation

The following results provide an overview of the identified risks associated with URF. First, we present the perceived risks along three different scales, from the single-project level to the city level to the larger metropolitan region. Second, we illustrate which particular risks might be relevant for different stakeholder groups, pursuant to their respective roles in the food system.

3.1 Perceived risks linked to URF on different scales

The interviewed stakeholders had different roles and came from different disciplines and backgrounds. Some stakeholders were concerned with a specific URF system on the single-project level (e.g., gardeners or technicians) or with the city as a whole (e.g., urban planners or architects), while some were more strongly associated with the urban fringe (e.g., peri-urban farmers or representatives of farmers’ associations). Risks were perceived on different spatial scales and can be related to them accordingly. Some of the risks perceived by stakeholders are connected to the single-project level and relate to production technology, system or potential products. Other concerns or uncertainties affect the city as a whole or encompass even a larger spatial area. Table 1 distributes the identified risks among the three spatial areas.

Table 1. Perceived risks of URF on different scales.

Micro level (URF project, production system or products)	**City level**	**Larger metropolitan and peri-urban area**
Logistics and management constrains for food products	Conflicts with images of “urbanity”	Conflicts with images of “agriculture”
Associated technology is perceived as too complex	Projects are exclusive and act as a driver for gentrification	Competition with peri-urban and rural farmers
Risk that projects are overtaken by large enterprises	Few or no aesthetic benefits are perceived	
Risk that the projects are set up too fast	Competition with other rooftop uses	
Risk of unsustainable management	Conflicts with potential urban animal production	
Soilless growing techniques are “unnatural”	Increase in noise and smell	
Quality of products expected to be low	Uncertainty about the overall environmental impact	
Health risks	Operators are not trained (professional) enough	
Soilless techniques cannot be organic		
Perceived little or no economic benefits		

On the micro level, those particular stakeholders who are closely related to URF systems identified specific risks associated with the management of URF projects (e.g., logistics, type of projects), the resulting products (e.g., quality) and the performance of the system (e.g., environmental impact,

costs). They perceived some of the applied rooftop farming technologies as too complex and expensive. Furthermore, stakeholders were concerned about potential health risks (due to contaminated air, soil or water). They further brought up general acceptance problems for the application of soilless growing techniques, which cannot be certified as "organic" and are perceived as an "unnatural" way of producing.

On the larger city level, stakeholders expressed concerns regarding the integration of the new system with the urban environment, including conflicts with prevailing images of "urbanity". Urban stakeholders were concerned about the impacts of integrating agricultural activities in the city (e.g., aesthetics, noise, smell), the impacts of the implementation process on society (e.g., gentrification) and competition with current sustainability strategies and alternative rooftop uses (e.g., photovoltaics). In particular, stakeholders are aware of the lack of agricultural training and expertise in the current job market in urban areas.

With regard to the larger metropolitan and peri-urban areas, stakeholders outlined global risks associated with the concept of URF and the economic competition with current activities. Some stakeholders even refused to define these types of projects as "agriculture" (Sanyé-Mengual et al. 2015a).

3.2 Who are the recipients of the identified risks?

In considering the identified risks, it turned out that they are not likewise relevant for those varied stakeholders who are associated with the introduction or implementation of URF. While some of the risks affect the general public or society as a whole, others are more relevant for specific groups, such as producers or potential consumers. As presented in table 2, we grouped the previously identified risks according to their relevance for the four societal groups of general citizens, promoters, users/producers and consumers.

Table 2. Identification of different groups as potential recipients of the acknowledged risks.

Citizens (General public)	**Promoters**	**Consumers**	**Producers**
Conflicts with images of "agriculture"	Risk that projects are overtaken by large enterprises	Soilless growing techniques are "unnatural"	Risk of unsustainable management
Conflicts with images of "urbanity"	Risk that the projects are set up too fast	Quality of products expected to be low	Logistics and management constraints for food products
Conflicts with potential urban animal production	Competition with other rooftop uses	Health risks	Associated technology is perceived as too complex
Increase in noise and smell	Competition with peri-urban and rural farmers	Soilless techniques cannot be organic	Operators are not trained (professional) enough
Projects are exclusive and act as a driver for gentrification	Uncertainty about the overall environmental impact		Perceived little or no economic benefits
Few or no aesthetic benefits are perceived			

The various identified risks can affect different recipients in a different manner.

Risks related to the general conceptualization of urban agriculture, the impacts of production (e.g., noise) and impacts of the URF project itself (e.g., aesthetics) affect the general public and all citizens can become recipients of them. These types of risks must be addressed and handled by the administration and the project managers. The establishment of a legal framework that avoids certain impacts (e.g., smell), the dissemination of information and communication campaigns can each contribute to minimize these risks.

Promoters of URF initiatives are affected by risks related to the implementation of the project, such as competition with other activities and the environmental and economic performance of the project. These types of risks can be minimized by establishing an alternative local food sector structure, building cooperative networks with rural farmers and providing data on the economic and environmental performance of URF projects.

Risks associated with the quality of and concerns related to the products provided by URF particularly affect the potential consumers of URF products. Strict quality control along with communication and campaigns on the quality of local food products as well as quantitative studies on potential health risks might minimize the negative perceptions related to URF products that otherwise lead to low social acceptance.

The producers of the URF system are directly affected by risks related to management. The complexity of management in URF systems depends on the level of knowledge of the respective user or producer. The promotion of specific education on urban agriculture and rooftop farming, such as in New York (e.g., training programs in the Eagle Street Rooftop farm) (http://rooftopfarms.org/education/), would improve the curricula of new urban farmers in European cities while reducing management risks.

4. Conclusions

We conclude that there are a number of potential risks and problems associated with URF that should be known, considered and addressed by those who want to develop, finance or implement URF in the cities of Europe and beyond. The perception of risks has a spatial component. Stakeholders identified risks on different scales from the project to the larger city context. Among them, the risks associated with the system are the most numerous and encompass concerns related to the integration of the system with the urban environment; the use, access and complexity of the system; and the aesthetical impact of URF. The number of risks closely related to the URF system is larger than the number that is perceived for the entire city or the peri-urban area.
Notwithstanding that risks are perceived by multiple stakeholders, each risk affects a specific group of recipients. The general public can be affected by negative impacts from the implementation of URF projects, which can be handled by normative schemes. The low acceptance of URF among potential consumers can only be minimized through communication campaigns.
The perceived risks cause several implementation barriers, such as problems with the social acceptance of URF products. To overcome such barriers, pilot projects and the dissemination of current knowledge and practices are fundamental in improving the current understanding of local food systems among the multiple stakeholders. Furthermore, URF may focus on sustainable technologies (e.g., local resources, energy efficiency), integrating social aspects (e.g., education) and

establishing new market structures (e.g., short supply-chains) to ensure a socially accepted development of this new form of urban agriculture.

5. Acknowledgements

We wish to express our greatest thanks to all the local stakeholders who collaborated with us during the research process.
Funding from the German Federal Ministry of Education and Research (BMBF) has supported parts of the work in the German case study (funding code FKZ 16I1619). The Leibniz Centre for Agricultural Landscape Research (ZALF) is institutionally funded by the Federal Ministry of Food and Agriculture (BMEL) and the Ministry for Science, Research and Culture of the State of Brandenburg (MWFK).
The authors further thank the Spanish Ministerio de Economía y Competitividad (MINECO) for the financial support to conduct the research project, "Agrourban sustainability through rooftop greenhouses. Ecoinnovation on residual flows of energy, water and CO2 for food production" (CTM2013-47067-C2-1-R), and the Spanish Ministerio de Educación for awarding a research scholarship (AP2010-4044) to Esther Sanyé Mengual.

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Erica Giorda, Gloria Lowe, "Restoring houses and restoring lives: experiments in livability in the Detroit East Side", In: *Localizing urban food strategies. Farming cities and performing rurality.* 7th International Aesop Sustainable Food Planning Conference Proceedings, Torino, 7-9 October 2015, edited by Giuseppe Cinà and Egidio Dansero, Torino, Politecnico di Torino, 2015, pp 314-323. ISBN 978-88-8202-060-6

RESTORING HOUSES AND RESTORING LIVES: AN EXPERIMENT IN LIVABILITY IN THE DETROIT EAST SIDE

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Keywords: Community, Sustainability, Resilience, New Work, Development, Inclusiveness

Abstract: A place – a neighborhood, a town, a block – thrives when people living there perceive it as theirs, and have or can create the material, social, and spiritual connections that provide traction to change the shape of things. But how can a place thrive when it has been polluted and neglected? How can people thrive when their lives have been shattered?
These questions arise with urgency on the Detroit East Side. Here industrial ruins lie side by side with the newly planted lots of the Hantz Woodlands, the famed Heidelberg Project is rebounding after suffering several arson attacks during winter 2014. Urban farms are still a growing trend. The Detroit Eastern Market is flourishing. Blight, record unemployment, and lack of services continue also as an everyday reality. Investors are coming in droves to Detroit attracted by the media blitz of cheap land and building an investor's paradise, yet with little knowledge or concern for the needs of the longstanding, not 'invisible' residents, who might face eviction should some large rehabilitation project be approved, or better yet, some investor who simply has a plan.
In this context, a small non-profit organization, We Want Green, too! (WWG2) launched the idea of retrofitting blighted houses with sustainable material and technologies, labor provided by differently-abled, unemployed, homeless veterans, on a shoestring budget. The dual mission of the organization is to rebuild blighted homes, souls, and communities while providing affordable housing that is environmentally friendly and energy efficient.
The project focuses on several social issues facing urban areas around Detroit, seeking to address how we design living spaces (homes, communities, cities, states etc.) that revitalize us as human beings? How do we restore the resilience and creativity that speaks to the human inner being? WWG2 and its partners aim to educate residents and introduce sustainable practices to build livable, viable, safe communities, not just "neighborhoods" for the 21st century.
In the long term, WWG2's vision is to create sustainable, livable communities where residents can grow their own food, produce the energy they need, develop local businesses, and create friendly, safe urban environments for all dwellers of all ages and skills.

1. Introduction

The challenge for sociology is not just to recognize the importance of both the physical and the social factors, and certainly not to argue over the relative importance of the two, but to recognize the extent to which what we take to be 'physical' and 'social' factors can be conjointly constituted. (Freudenburg, Frickel, and Gramling 1995)
"The truth of the matter is, a city is as natural as a forest or a desert or an ocean. Its structures will ebb and flow and cycle much as the trees and the sand and the waves will" (Palm inMillington 2013: 278).

On a chilly spring day, as chilly as Michigan can make them, two women coming from very different paths in life met at a hipster coffee shop in the historical Indian Village neighborhood in Detroit to

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talk about their ideas, and specifically about what can be done to support the growth of livable neighborhoods and communities in Detroit and beyond. This paper is an initial step in the direction of building a collaborative project. Following a paradigm that is traditional in both African American and Italian culture, we start our long-term collaboration by telling a story about Detroit. In this draft, the two voices are outlined in different print colors.

Storytelling has transformative and healing powers (Senehi 2009), specifically for marginalized groups to maintain cultural connections and make their voices more audible. Of course, many others are currently telling stories about Detroit, to highlight their viewpoint, to convince foundations to support their project, to attract investors, to make monies, sometimes at the expense of residents[3]. Such as the story told by Bruce Katz, director of the Brookings Metropolitan Policy Program to an audience at Tedx Hamburg, posted later for Linked in under the blog, Want to Change the World? Start with a City (Sept 23, 2015), his perception of Detroit as that city of change.

As a story with two narrators, two different voices will be heard throughout the paper. Following Mead's lead (Mead 1934), this paper aims to be a piece of research that does not just report facts about Detroit, but instigates actions. As such no distinction between the role of the academic (who in too many situations portrays herself as a detached observer) and that of the activist (who needs to be intensely involved with her job) can be made. (Frank 2005) The life and works of (Boggs and Kurashige 2012; Boggs 1978), also have significant influence on both authors: her lifelong commitment to grow knowledge and transformation from the ground up is an inspiration for both of us. The paper is thus set up as a montage of two different voices, following Salamon's (2013) idea of polyphonic ethnographies.

Detroit might have emerged from bankruptcy, and is being promoted around the United States as the new frontier for young entrepreneurs, but most of the problems that caused the city to collapse have not been addressed. Many aging residents are barely able to keep up with house expenses. Families who are delinquent on water or taxes, sometimes by small sums, get their water shut off and the kids sent to foster care. Access to affordable and healthy groceries is still very limited for those who don't own a car, and public transit is in dismay (Taylor and Kerry 2015). Blight here is more than just the abandoned factories and decrepit mansions powerfully shown by the work of Vergara (1999) in his investigation of the American ruins. In that book Vergara famously quipped that maybe it could be a good idea to let Detroit to go back to nature, to let it became a monument to the mistakes of the past. Touring the ruins of Detroit has become a pastime, and journalists and scholars flocked to the city in the past ten years to record its demise. Detroit city of ruins is just one of the many narratives that circulate and it is a perspective that dehumanize the people that call Detroit their home.

As one of us outlined in the past (Giorda 2011; Giorda 2012), conflicting narratives compete in making statements about what route should local government and agencies take to eventually restore Detroit to its past greatness. Another set of narratives, outlined by Millington (2013: 282) presents a "discursive scripting of Detroit as a blank slate for artists and creative gentrifiers who want to tap into the city's history of art and working-class culture." The story we tell with this paper aligns more with the work of researchers such as Monica White, who look at the groundwork of black activists as a powerful political message of re-empowering black communities from the ground up (White 2011a; White 2011b).

The first part of the paper sketches the challenging and exciting situation the city is facing after ten of the most turbulent years in its life and looks into the mainstream ideas about growing, shrinking, or

[3] Malik Yakini, 2013, personal communication.

leading Detroit on a novel route. The second part describes in depth the work one of us is doing to suggest yet another, and more livable, direction.

Detroit, like many of the cities in the Rust Belt of the Midwest, symbolizes the premier age of industrialization with the automobile, assembly-line production and the establishment of the blue collar middle class, and today is in a struggle for re-imagining itself as a 21st century model that survived industrial decline and urban decay. The main problems the city faces are unemployment, housing, and access to services.

Detroit is the largest city in Michigan, and is at the center of a metropolitan area that spans 10,130 km^2 and six counties. The governments of the six counties, 150 cities and townships that comprise the Detroit metropolitan area talk little and cooperate less. While the population of Metropolitan Detroit increased during the last two decades, the city of Detroit went from almost two million people in the 1950s to less than 714,000 in 2010. There is a significant difference in median household income between the suburbs and Detroit, and a persistent racial divide (Clemens 2006) While the population in the suburbs is primarily white, Detroit's population is 83% black[4]. The unemployment rate of Detroit is 19%, and about one-third of the population receives welfare support (Bing 2011; Gallagher 2010; Steinmetz 2009). These social, political and economic conditions impact the health and wellbeing of the residents of the city.

To suggest that these conditions occurred by accident would be shortsighted and revisionist at best. Historically, waves of urban renewal, beginning in the late 1940's (Pisani 2012), fostered plans for redevelopment funded by federal government initiatives that failed to account for the displacement of residents living in the affected areas. One of the most egregious examples of urban renewal through state violence took place in the Black Bottom neighborhood on Detroit's East Side. Urban renewal projects have " failed egregiously to serve the needs of most of the city's residents, some whom were forcibly evicted from their homes."(Goodspeed 2004: 6) For that project, which took 14 years to complete, city planners focused on an area of approximately 129 acres. The revitalization of Black Bottom received funds for the removal of approximately 7,000 African Americans from their community, as a part of the overall Detroit Plan of 1950. It was the first deliberate attempt to remove residents from their community for the construction of a highway that would in fact provide whites that had fled to the suburbs with a viable transportation route back into the city for economic reasons.

Despite the abundance of space, low-income housing has been traditionally neglected in Detroit, and the widespread practice of redlining further increased the problem for black residents. In many suburbs, local homeowners' associations specifically prohibited selling houses to Blacks.

The planners never considered the cultural, social or economic impact their actions would have on the residents of this area; it was a calculated political move by Mayor Albert Cobo to win the election (1946). Historians are correct in stating that the city policies on urban revitalization, intentionally or not, were a means of removal of African American from their economically viable community in Black Bottom. The residents were not passive onlookers, though. Voices of dissent led to political organizing. However, it was difficult, and they were no challenge to the coalition of government and political leadership that considered urban "blight" removal a priority that would be accomplished through the creation of public housing projects, freeway construction, and slums clearance.

[4] United States Census, 2010

We now recognize that large-scale urban renewal projects are disruptive of communities. We have sufficient research that acknowledges the problem of inadequate housing as a result of social inequities of wealth and income, access of which is not readily available to communities of color and immigrants. A solution to poor, deteriorated housing stock in Detroit could have been designed differently, but governments are not architects, and this program of renewal designed out of "free market" ideology was created and viewed through the lens of colonization with plans to control communities of color (See: Darden 1990). In the current climate of efforts to "right size" the city, there are no clear plans to help residents maintain the cultural, social and economic links to the neighborhoods in which they live, as if the past lessons have been forgotten.

Two examples –which have been widely covered by local newspapers and scholarly literature - are the Hantz Farms Detroit, and the Detroit Future City plan by Detroit Works. Hantz, a Detroit resident and rich entrepreneur, started and ambitious reinvestment program centered about urban farming in 2010 (Holt-Giménez, Wang, and Shattuck 2011; Walker 2015). Since then the scope of the project changed from a futuristic urban farm from a more doable, and already under implementation, urban tree plantation. Anderson (Anderson 2013: 1172) summarizes the issues with the project clearly: "A company called Hantz Farms Detroit, for instance, which is owned by one of the wealthiest men remaining in the city, purchased 1,500 lots in Detroit for less than $350 each—a "bake sale price" (217) that was criticized as a "land grab," but embraced by a mayor battling to manage an estimated 60,000 parcels of vacant or blighted property.(218) The company plans to clear the lots and turn the properties into commercial tree farms—more than 15,000 oaks and maples will be planted—thereby bringing the land back onto the productive tax rolls, improving safety in and around the properties, providing local jobs, and beautifying neighborhoods. It is a good plan, perhaps even a virtuous one, but nonetheless it is an indicator that if city land is being sold at nominal prices, the procedures to buy it should be transparent and available to small buyers, like local entrepreneurs and neighbors, as much as major landowners."
Akers (2013) also points out that the privatization efforts of the past administrations did not bring the expected results, increasing instead the role of external speculators, and opening spaces for business practices that do not support local communities nor give residents a voice to spell out their concerns and fears.

This is the starting point for this discourse. There is and there has been a gap in the discussion between those in power, government at local, state, and federal levels about urban renewal policies. This gap is creating the environment for the destruction of communities and leaves residents with no expected economic gain and no actual improvement of their living conditions. Institutional solutions to remove blight support the creation of a "blight task force," promote charter schools instead of viable public education, and aim at increasing rates for city services when possible. Currently, the Detroit Future City revitalization initiative seems identical to the failed Detroit Plan of 1950, complete with citizen removal and lacking minimal public housing availability. Today, throughout the area once known as Black Bottom, the I-375 highway connector is being considered for removal because a gentrified core downtown occupied mostly by white dwellers has no need for this piece of highway, the city never did.[5]
Yet, the planners and politicians have not learned necessary lessons that will allow the city to move forward and be inclusive of all its residents. Our leadership should understand that a fruitful, stable and attractive 21st century city is a balance of development and civic engagement with all its

[5] http://www.freep.com/article/20140223/OPINION05/302230041/Sugrue-Trickle-down-urbanism-won-t-work-Detroit

communities. People want to see a better future and are willing to do their part in achieving it. Let's examine the path of reconciliation from past mistakes to future problem solving.

The awareness of the differences in means and access, and the historical memory of neglect and discrimination are one of the first obstacles to overcome when underserved communities try to rebuild and renovate.

Internalized oppression is both a psychological and socio-cultural term used to define the experiences of many marginalized groups of people who feel inferior, living under oppressive circumstances, such as discrimination and structural racism. The marginalized groups adopt the negative, inferior images produced by the hegemonic ruling class, and use these images internally as "their own self-images." Accepting these images, a self-fulfilling prophecy effect occurs in which the marginalized group acts out the behavior as defined by the hegemonic powers. Freire (2000) speaks to this phenomenon as "identifying with the oppressor." Internalized oppression makes people fight with themselves and those in their own group rather than the dominant class. A current of self-hatred runs underneath.

Gramsci (Gramsci and Buttigieg 1992) describes a similar situation with his idea of cultural hegemony, which he defines as the system of values, perceptions, and beliefs of the prevailing ruling class (elites), which are absorbed by the lower classes and accepted as natural and uncontroversial. To perceive and to resist cultural hegemony, the working class would depend on their own organic intellectuals, grown within the communities, people not just of letters but also of engagement in community life, organizers of the people for the benefit of the people. Gramsci knew that in order to re-imagine a new society a new consciousness needed to be developed. For Gramsci this was a crucial element the political and social strategies needed to design a new and fair political structure.

Gramsci pointed out that cultural hegemony is the vehicle that drives internalized oppression and its manifestations: physical violence, psychological withdrawal, physical impact, and mimesis just to name a few behaviors that work unconsciously to destroy self-esteem. We see this behavior displayed in Black on Black crime. Self-hate the materialization of internalized oppression, unemployment, and homelessness can result in a wreck (Fonte 2001).

One way to recover is to find ways to recreate connections with the community that support spiritual as well as material growth. In contemporary Detroit the public recognition of skills and achievements comes mostly from the ability to be employed, which is difficult for people who suffers from post traumatic stress disorders and have low academic achievements. Health, the exercise and development of skills and capacities, self-esteem based on the recognition of one's achievements, a sense of social connectedness and exposure to the demands of cooperation are some of the intrinsic goods associated with a working life that is very difficult for many Detroiters to obtain.

There are some organizations in Detroit that are working to create holistic and supportive environments for new social and environmental projects.

Located on Detroit's East Side is the James and Grace Boggs Center for Nurturing Leadership, which shares in the belief that re-imagining society for the new human being will require a strategic plan to re-educate the masses, provide place-based education and design a local economy through New Work. One of the first students of the Boggs' Detroit Summer program, Julie Putnam, opened The James and Grace Boggs Educational Center in 2013, to nurture creative minds and critical thinkers at a young age. The primary school's core value is the development of the Beloved Community as envisioned through the philosophy of Dr. King that requires "a qualitative change in our souls as well

as quantitative changes in our lives". The school provides an environment that fosters learning through participation in service projects for the school and surrounding neighborhoods.
Another organization that has expanded its yearly conference to invite people to think about livability and how we can create the Beloved Community in Detroit is the local Great Lakes Bioneers Detroit (GLBD). Formed in 2005 as a regional chapter of the National Bioneers Conference, it embeds Social and Environmental justice as the main focus of dialogue at the annual conference. GLBD's mission is rooted in spirituality and sustainability for all life and Mother Earth, and the balance that we (humans) have to create for our survival and that of the Planet. In the past ten years the Detroit Bioneers have applied knowledge on sustainability and innovative approaches to pioneer changes between community and many non-profit community based organizations serving in Detroit.

Examining the work of these groups a question arises: why is sustainability so frequently presented as a luxury that poor people cannot afford, when they are the ones who need it most?

Real sustainability is the conscious spiritual relationship of all things to each other. It is the system of inter-connectedness that can be achieved after solving the broken-ness in the spirit of human beings. How do we become more human, how do we grow into being one with nature and with each other? This is no doubt one of the most pertinent questions to be asked in the 21st century and We Want Green, Too is an effort trying to answer this question.
Matthew Fox, radical priest and theologian, founder of the Institute of Culture and Creation Spirituality states: "The great work is the work of the universe, it is the unfolding of creation. Somehow, our work, our daily life, should contribute to that. We should feel that we are connected to the great work of the universe. Without that, we lose meaning in our work and the only meaning is a paycheck." (2004)
Our journey is to do development differently. African Americans came to Detroit for a better life and those dreams coupled with hard-core skills still exist, we are in need of devoted mentors to assist in the elevation of our talents not the destruction of our lives, and we can no longer wait on a system that seems to render us invisible, so we are seeking alternatives, reaching deep into our souls calling upon our spirit (resilience) and determination to create 'a way out of no way' receptive to joining forces with those offering a helping hand up, not out.
With nurturing, knowledge and encouragement from Grace Lee Boggs and Great Lakes Bioneers Detroit, listening to the stories from differently-abled, broken and homeless veterans, We Want Green, too! was born as a community based initiative whose members are invested in the re-imagining of Detroit, in creating a new story about the city, its residents, and the resilience they display in the face of adversity.
How can we thrive when our lives are so challenged and the place we call home is being taken away? Let's start by rebuilding those houses and communities, re-instilling the values forgotten, one soul, one house at a time. In late 2006 we set about the "good work" we envisioned.
A house in Jackson, Michigan, 112 kilometers west of Detroit, is where we started. As we worked, we noticed that the men –working with their hands – began to change, a sort of transformation was appearing. These were broken souls waiting for a chance to rectify their lives, and all that was necessary was good work, valuable work, work to be done with their hands (Crawford 2009). The house in Jackson was retrofitted using mostly recycled materials in an energy efficient manner. Working mostly on weekends the project was completed in a little more than 6 months, but a deeper form of work was just beginning. Few weeks after the retrofitting work was finished, the men came back, and stated that after hearing about "green this and green that, we want green, too!" They wanted another house to work on.

The year later, with a few veterans and returning citizens we started retrofitting a 1025 ft.^{2} bungalow on Detroit's East side, in a depressed and blighted community not far from the Grace and James Boggs Center. The plan was simple: we would include community members in as much of the work as possible to introduce ourselves and build trust. A few days into the project, the young son of one of the neighbors decided to throw a rock and broke one of the windows. What lesson could we teach this young man that would have lasting value after all, our goal was to give this young man a valuable lesson on work, so he worked to pay off the damages and we hired him to stay on and we paid him a small stipend. After several weeks with the team and plenty of conversation, his ways changed. By the time school started in September, he had purchased shoes for himself and many of his views were changed. This is only an example of the power of what community does.

Word spread fast about what we were doing and more young people came to visit the men working, conversations and sharing of stories became commonplace; trust was growing. The neighbors, hearing stories from their children, began upgrading their own properties.

The materials we used were the result of creativity and ingenuity. Architects and builders that volunteered time and expertise taught us which walls could be removed to achieve the open space look we desired. Once the walls were removed we salvaged the lumber for to make railings and re-framing of windows and doors. To brand our presence to the community, we installed a view to the world in the form of a 180-degree window purchased from a Habitat Reuse store for a tenth of the cost. It was the showcase for the house. We purchased environmentally friendly products online at a discount and talked about the importance of using low or no VOC paints. We built a relationship with the nearest Home Depot, whose manager would email us about products on sale or being discontinued such as the bamboo flooring we have. The 200-watt electrical system, providing enough electrical power for the appliances and computers, was installed by a neighbor and retired master electrician, at cost. A whole house high efficiency furnace with A/C was also installed at cost, through relationships in the community. Cabinetry was purchased at IKEA and the good quality and cost savings was shared with the community, which had no prior knowledge of the store.

As of September 2015, 95% of the retrofitting has been completed on the project house and most of the veterans have moved on to steady work. Our work has appeared on local radio ("On Being," 2012), we received visits by folks from all over the globe, and the full story of our inception can be viewed online. We have been gifted a second house to retrofit and will be using the two locations as our community office and worker's center.

The men who spoke into existence "We Want Green, too" are former veterans, and we are recruiting new veterans for the new program. They are mostly 28 through 45 years of age, with families, disillusioned by life and financially destitute. We Want Green, too makes a difference in their lives and in the communities that bear their scars.

We cannot accept the continued stigmatization of so many veterans who fought for the liberties of all people in the United States, it is not morally right. We don't want them banished from their communities and ineligible for employment, so we have created a program that will seek to eliminate these obstacles and let them return to their families. Our mission continues, one community, one soul at a time, this is our legacy and our pathway to restoring lives and restoring communities to a livable, sustainable design for a 21st century Detroit. The outcome we expect of our program is to remedy much of the spiritual, mental and personal oppression experienced by our veterans and some returning citizens in times of international and domestic wars, and to provide them with skills they can use to regain access to the options available for securing good work and returning to their communities the victors of war, both internally and externally.

2. Final remarks

In 2014, for the first time in decades, the population of Detroit increased. It was not a huge number, just about 6,000 people, but many hope it to be the start of a trend. Most new residents are not flocking to the blighted areas: most of them moved in around the Cass corridor, in the central neighborhoods where services, amenities and businesses look good. We find it important, as the city moves forward, to underline that the way recovery and growth are framed and presented might affect the opportunities poorer Detroiters have to participate in the process or being pushed away.

Not all blight removal projects are created equal, and the means used, the goal pursued, and the stories told about them can prevent current residents to partake in the effort, or –as it had already happened in the past- they can disempower and alienate the same people they purportedly set up to help. We believe that the nodal aspect is whether the emphasis is on economic development or it is on people. Walker (2015) argues that the way urban farming has been framed by the City of Detroit is more about increasing property values than it is about providing food access, and “that the Detroit Future City (DFC) planning framework shows that the City is enrolling urban agriculture in a sustainability fix meant to attract capital” (Walker 2015: 12). That has been the explicit bet behind the Hantz Farm project since its inception (Holt-Giménez, Wang, and Shattuck 2011). Many urban farmers, though, fight against that framing and keep working to create an alternative model (Taylor and Kerry 2015).

In this paper we described a similar situation looking at blight removal and urban renewal strategies. On the one hand, the idea behind Detroit Future City (DFC) is prominently about creating the right environment for economic growth. This being a neoliberal capitalist society, the project assumes that once the growth machine starts again, all residents will benefit (Detroit Works 2012). Unfortunately, so far the model has not been working well for the lower and middle classes (Akers 2013; Harvey 2005). It is telling that in the DFC’s brief (Detroit Works 2012), the first thing to be discussed is economic development, and community involvement is the last. Walker (2015) and Howell (2013) underline that the DFC’s framework is innovative and points toward some form of sustainable city planning. They also point out that the fact that it centers on economic growth undermines much the possible benefits.

Moore (2007) pointed out that sustainability has different meanings and different implementation in any urban context. Gilles (2006) suggested a change of focus, from the very abstract concept of sustainability to the more embedded and applied one of livability. In this paper we have proposed an example of how livability looks like in the East Side of Detroit.

The core idea is not new: do things as if people matter (Schumacher 1985). Instead of looking for moneyed investors and start-up funds WWG2 invests in people and looks at what resources are available on site. Instead of looking for new designs and recreate things anew, they rehab old structures with what material is available in the area. The means and the goals coincide: restoring a community by restoring its houses using locally available expertise and materials. It is the spirit of Bioneers (Ausubel 1997) and the spirit of permaculture (Mollison and Holmgren 1978): growth and renewal can be found when we harvest human and natural resources from the place where we live in, and give back to the community in the form of renewed buildings, newly found creative skills, and restored livelihoods.

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Rosalba D'Onofrio, Decio Rigatti, Massimo Sargolini, Elio Trusiani, "Vineyard Landscapes: a common denominator in Italian and Brazilian landscapes", In: *Localizing urban food strategies. Farming cities and performing rurality.* 7th International Aesop Sustainable Food Planning Conference Proceedings, Torino, 7-9 October 2015, edited by Giuseppe Cinà and Egidio Dansero, Torino, Politecnico di Torino, 2015, pp 324-335. ISBN 978-88-8202-060-6

VINEYARD LANDSCAPES: A COMMON DENOMINATOR IN ITALIAN AND BRAZILIAN LANDSCAPES

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Keywords: vineyard landscape, landscape planning and design, sustainable development, local communities, heritage.

Abstract: This paper addresses the theme of 'Landscape and Wine" through two experiences that are widely separated geographically (one in Italy, one in Brazil) but similar due to a common framework that makes the landscape a flywheel in promoting the harmonious development of the territories. In the case in Italy, the project to enhance the vineyard landscape in the Piceno area is implemented within a project to enhance and promote the rural hill landscape in Monteprandone. It proposes the reorganization of agrarian landscapes in the Piceno area by enhancing agricultural and food resources in general and the winemaking sector in particular, along with the promotion of integrated territorial development starting with the landscape, testing new methods and tools for territorial government and enhancement. For Brazil, the paper focuses on the experience of the so-called Italian colony of Rio Grande do Sul. This is a territory to which Italians have emigrated and where, in recent history, the local agricultural economy of winemaking has transformed the territory, creating a landscape that is unique in all of Brazil. It has triggered a process of inland-area development and tourism enhancement (Vale dos Vinhedos, Rua das Pedras, etc.), integrating the different, widespread historical/cultural values present, starting from small rural buildings. Today this territory is being preserved, consolidated, and managed in its transformations in order not to risk losing the characteristics that have determined its cultural and economic richness.

1. Introduction

In recent years, food traditions and typical production have increasingly become a favoured object of study through which the territory can be read and understood. Every society in every historical context tends to invest food with "extra-nutritional value and meaning, at the heart of which operate complex, contradictory social, cultural, and economic processes" (Seppilli 1994). In particular, the link between landscape, food, and territorial history assume special meaning in the case of quality winemaking. According to Antonioli Corigliano (1999), wine constitutes one of the most powerful territorial markers in that it acts as a carrier of rural identity. Gergaud and Livat (2007) maintain that consumers always need to connect the wine with something that guarantees its quality. Other scholars (Skuras and Vakrou 2002, Angulo et al. 2000, Barreiro-Hurle 2008) are convinced that the territory of origin is fundamental in choosing a wine. The choice of a wine would in fact result from cultural development and the perception of quality based on personal opinion and only in part on the chemical and physical characteristics of the product (Zeithaml, 1988, Lockshin 2006, Holleebeek 2007). The connection between wine and landscape was argued by Tomasi et al. (2010), who explain that appreciation for wine is highest where appreciation for the landscape is also high.

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This last argument holds particular meaning for the promotion of territorial economic development. Businesses should define focused marketing actions, creating in the collective imagination a harmonious continuum between wine and the landscape (Agnoli ed al., 2011).
All of this leads to the conclusion that to confirm a quality product on the global market, in the case of wine (but it might also be extended to other agricultural and food products), it is necessary to begin with the landscape that produces said product. From this consideration, the need to conserve, protect, and enhance the uniqueness and typicality of the landscape should arise. Along with territorial marketing actions, to promote these policies it is necessary for public and local administrations to develop plans and projects that deal in an integrated way with actions to protect the landscape, as well as actions for its promotion and development.
This contribution reflects on two experiences that are widely separated geographically (one in Italy, one in Brazil) but similar due to a common framework that makes the landscape—i.e., the visible connection between place, quality production, the recognisability of local communities, traditions, and culture—a new fly-wheel in promoting the harmonious development of the territories.

2. The experience in Italy: the vineyard landscape of the Piceno area

In his book "Vino al Vino", writer, screenwriter, and director Mario Soldati presented an incredible snapshot of Italy at the end of the 1960s. It is a country in which it was still possible to understand the change from a town to a city: the difference in smells, flavours, and humanity. This book was a desperate call to save an immense heritage that was about to be lost. It saw in the wine culture the wonderful diversity to be found in Italy. It was only at the end of the 1980s, after two decades of territorial and food homogenisation, that the profound relationship between landscape, quality wine and food production, identity, and place recognisability was rediscovered.
This rediscovery was the work of several non-profit associations and some legislative intuition. Slow Food Italy was created in 1986. A worldwide non-profit organisation, it is dedicated to promoting the value of food while respecting the people and territories that produce it. A year later in Siena, 39 Italian communities established an association to help relaunch the image and quality of Italian wine: the National Association of Wine Cities. This followed the wine-methanol scandal of 1987, taking a decided stance against the mass introduction of foreign vines.
In 1992, the Italian Government effectively responded to this emergency with Law 164/92, the Designation of Origin law (*Denominazione di Origine*) for the winemaking sector. This law clearly sanctioned the deep connection between wine and territory, marking a change in understanding the relationship between territory, landscape, and quality agricultural production. In 1993, the Wine Tourism Movement was born. It is a non-profit association that today includes around 1000 of the most prestigious Italian wineries selected on the basis of specific requirements, the first of which is the quality of wine tourism centres. In 1999, Law 268 gave rise to the Wine Routes, which constitute a tool through which the winemaking territories and related production can be publicized, marketed, and used as a tourism goal. With this aim, they become tools in promoting local development centred on networks created around the winemaking sector, but which also extend to other sectors and production, attracting public and private players (Pavolini and Alessandrelli 2006). In Italy, successful experiences dealing with the link between landscape, winemaking, and integrated economic development of the territory are not lacking. This paper deals with the experience of one territory that in recent years is working hard in this direction: the Piceno area.

2.1 Territorial characteristics, winemaking production, and criticalities in the development model

The Piceno area in the Marche Region deals with a significant part of three hydrogeographic basins that converge on the Adriatic: the Tronto, Menocchia, and Aso, limited in the west by the Monti Sibillini chain and in the east by the Adriatic Sea. In the Piceno area, different forms of settlements co-exist (historical hill settlements, more recent valley settlements), seminatural rural environments, and sometimes forest/pastoral zones. The weaving together of the different components determines the great variety of landscapes that are both urban and agricultural, industrial and natural, historical and contemporary.

Winemaking in the Piceno area has deep historical roots. Over the centuries, winemaking techniques have changed according to need and the progress of knowledge, but according to tradition, grape cultivation in this area has always been connected to local varieties or at least varieties from central Italy. An important reorganization phenomenon in the sector has distinguished winemaking in recent decades. Based on data from the ISTAT 6th General Census of Agriculture in 2010, it is clear how the number of businesses related to vine cultivation has undergone a dramatic drop, from 8,845 units in 1982 to 2,440 in 2010, and how from 2000–2010 the number of businesses involved in vine cultivation has decreased by almost 50%. It is also true, however, that production has greatly affected the quality of the product and the restructuring of businesses. Attention to quality production has been developing since the end of the 1970s.

Founded in 1979, Vinea is an association of producers that today encompasses 600 businesses representing about 50% of wine production in the area and 90% of the bottled product. The activities carried out by Vinea deal with a series of services guaranteed for members, both technical (favouring above all the qualitative development of small producers in the winemaking sector) and commercial/marketing of territorial typicality both nationally and internationally. The association is equipped with an analysis laboratory and bottling centre, and it manages the Offida section of the Marche Regional Enoteca. Among the projects realized by Vinea is the 'Vinea Qualità Picena' mark, which aims to enhance typical products from the territory and guarantee their traceability.

In addition, the Consorzio Vini Piceni (Piceno Wine Consortium), which is currently composed of 34 ordinary members, was formed in 2002. These are business people directly involved in one or more phases of DOC (Controlled Designation of Origin) and DOCG (Controlled and Guaranteed Designation of Origin) production protected by the Consortium. The Consortium deals with vine cultivation, winemaking, and bottling, but also informs and involves consumers. In fact, quality production works completely only in the presence of knowledgeable consumers.

Today winemaking in the Piceno area relies on one DOCG—Offida—characterized by three types: pecorino, passerina, and Offida Rosso, and three DOCs: Rosso Piceno (also Superiore), Falerio, and Terre di Offida (including passerina passito, Vin Santo, and sparkling wine).

These recent successes would, however, seem to be more connected to the business capabilities and mediation carried out by producer associations rather than to institutional factors (Pavolini and Alessandrelli, 2006). Public actors, in fact, have played a secondary role. Today a vision of territorial development for the Piceno area is lacking, which, by playing upon the uniqueness of the landscape, history/culture, food, and wine, would be able to connect private and public players in order to initiate a new model of development.

Researching this model was the goal of the research project "The need for innovation in regional food and agriculture". The project, financed by the Marche Region with the participation of the Universities of Macerata and Camerino, aimed to weigh in on CIPE (Italian Interministry Committee for Economic Planning) resolution no. 17/2003. This research, completed in 2006, started from a confirmed centrality in the agriculture and food sector and the winemaking sector in particular. It hypothesized the involvement of other material and non-material territorial resources in order to

enhance the entire Piceno territory as a fundamental factor in global competition. As of several years later, the research has progressed into the project "Enhancement and promotion of the landscape in the rural hill territory of Monteprandone" carried out by the School of Architecture and Design at the University of Camerino within a consultancy agreement to revise the new PRG (General Regulatory Plan) for the City of Monteprandone (AP).

2.2 The incentive for new development and the construction of a strategic framework for the Piceno area starting from wine

From research made on behalf of the Marche Region as reported in the introduction to 'Sviluppo Integrato e Risorse del Territorio' (*Integrated Development and Territorial Resources*), edited by Francesco Adornato and published by Franco Angeli in 2006, some reflections emerged that serve as a basis for a new model of integrated development for the rural Piceno territory.

- The need to initiate a process of innovation based on agricultural multi-functionality, the environmental compatibility of development, economic sustainability, and food safety.
- The need to promote a planning process that is conscious of territorial values and landscapes in order to guarantee a reduction in land use, a decrease in pollutants, and the protection of non-renewable resources and biodiversity.
- The need to promote the creation of tools to enhance the network of agricultural, tourist, environmental, landscape, cultural, and archaeological resources.
- The need to foresee the necessary infrastructure and services to promote these activities, but with constant attention for the surrounding landscape.

In each of these areas, one can see the main objective of agrarian landscape reorganization by enhancing the agricultural and food resources in general and the winemaking sector in particular. In this project, wine production is investigated from the point of view of both the final quality product and as a landscape builder. With the latter, it is considered a structural reference for large-scale land planning.

Therefore, the strategic framework proposed by the research provides guidelines for a series of actions to investigate through regional and local land planning. First of all, the project identifies the structural framework of resources and historical, natural, and landscape goods that can interact with the Piceno wine landscape system. It identifies the means to recover and protect specific components of traditional agrarian landscapes, with particular attention to vineyards, the relationships between vineyards and other agrarian production, and between vineyards and the rural building heritage. Particular attention is reserved for the most interesting points of view, maintaining inter-visibility, preserving hidden landscapes, and removing or mitigating visual detractors. Finally, the project dedicates particular attention to identifying point-of-sale centres, fairs, and markets, with infrastructure and services appropriate for supporting the commercialization of food and wine products.

In particular, the strategic lines defined in accordance with existing planning deal with (Sargolini 2006):

- managing the natural heritage;
- enhancing the rural territory;
- recovering and enhancing the cultural heritage (settlement, architectural, and infrastructural);
- enhancing tourism and social use;
- enhancing the landscape and local identities.

For each of these different lines, the study identifies a series of strategic actions.
The research therefore provides some planning references for the Piceno territorial project. In particular, it identifies a system of landscape use—'quick and slow paths'—that foresees different ways of using the Piceno territory (on foot or by car, bicycle, or horse); it also identifies frequent rest areas and the observation of landscapes near important views and essential services. Finally, the study provides indications and orientation for the system of large- and local-scale planning.

- On the regional scale: define areas, points, poles, and references to insert the goods and resources within a national and international network. This is essential in combating the risk of isolation in which the Piceno territory could find itself.
- On the municipal scale: define relationships between the different goods and resources, and especially favour the rooting and close connection between the agricultural/food sector and the natural/cultural heritage of the Piceno area.

2.3 Landscape enhancement and promotion of the rural hill area of Monteprandone

A few years ago, in 2013, a research group from the School of Architecture and Design at the University of Camerino dealt again with the theme of landscape enhancement and local production of the Piceno area. The group contributed with expert advice to enhance and promote the landscape of the rural hill territory of Monteprandone (AP) within the revision of the PRG.
On this occasion, a Hill Agricultural Park was proposed with the aim of protecting and promoting the identifying values of the municipal territory, especially those linked to quality agriculture and food production (wine and oil) by maintaining or reinserting agricultural activities in the landscape.
The Agricultural Park is a model of territorial planning aimed at integrating territorial governance and rural development plans, and it is proposed as a factor of integrated territorial requalification, focusing on a model of multi-functional and multi-productive agriculture. It acts on two levels: an institutional level of territorial government, and a voluntary level, aggregating local actors, putting local societies to work, and creating relationships through a network.
The territory affected by the Agricultural Park was identified by investigating the landscape and agronomy and mapping the agricultural businesses present. It covers an overall area of 1635 Ha.
The perimeter of the park intentionally encompasses the current settled areas as well as some of the areas of expansion in the new PRG. This endows the new tool with a strong innovative character that goes beyond enhancement of the territory and local production to establish new relationships between the country and the city.
The Agricultural Park pursues the following goals.

- Protecting biodiversity, prestigious natural elements, and the overall environmental balance of the territory, consolidating the ecological function of the agricultural territory in relation to the settlement system of the City of Monteprandone.
- Protecting the morphological structures and geomorphological peculiarities, with particular regard for the system of hilltops.
- Protecting and enhancing the landscape/cultural importance of the territory, the historical evidence of anthropization, buildings, and rural settlement systems.
- Promoting quality agricultural and winemaking activities connected to the sustainable, compatible use of natural resources.
- Promoting agricultural activities as an element to enhance and qualify the territory, even for tourism.
- Incentivizing cultural, educational, and recreational activities connected to environmental fruition and tourism promotion in the territory.

The main actions in creating the Park relate to:
- use and accessibility;
- requalifying the existing building heritage;
- enhancing the agrarian landscape;
- agricultural forestation and environmental requalification;
- promoting a free-trade group.

One of the actions deals with promoting sustainable mobility within the Park, with two types of paths:
- landscape paths, which connect the park by car with the hill territory, the centre of Centobuchi, and the Tronto River;
- agrotourism paths, which use different means of travel (horse, bicycle, walking), that allow the park territory to be discovered and which reach the different territorial agricultural companies.

3. The Brazilian experience: the wine landscape in the Italian colony of Rio Grande do Sul among enhancement processes and the risk of losing local identity

The present contribution is the partial result of critical/comparative international research[5] regarding the origin and destination of the first Italian immigrants in Brazil, with particular reference to territories in the State of Rio Grande do Sul. Research into the landscape/territorial aspects around the city of Bento Gonçalves in the Serra Gaucha and in some areas of the Province of Belluno in Italy forms the background to the main research topic. The project focused on the critical comparison of lesser rural buildings according to criteria of spatial syntax. The large number of Italian immigrants originating from the current area of Belluno constitutes the space/time anchor with the City of Bento Gonçalves.

3.1 Historical references

European emigration to Brazil began around 1820, but really expanded in the middle of the last century. In about 100 years, Brazil welcomed about 1,500,000 Italians, representing about a third of all immigrants and making them the second largest ethnic community in the country. Most immigration occurred between 1887 and 1902, when about 900,000 Italians entered Brazil headed for the inland areas of São Paulo to work in the coffee *fazendas* and the interior areas of the State of Rio Grande do Sul. The flux decreased afterwards both due to the decision by the Italian government to prohibit subsidized emigration and due to the crisis of coffee overproduction. The *fazendas* and the State of São Paulo remained in any case the primary goal of immigrants. Until 1915 there was a net predominance of small families and agricultural manpower. In this group, people from the Veneto Region represent the largest contingent, counting about 35% of the arrivals in Brazil between

[5] "Colonizzazione italiana nel Rio Grande do Sul: memoria e struttura dello spazio. Studio critico comparativo tra Bento Gonçalves/RS e le terre di orgine (Colonização Italiana no Rio Grande do Sul: Memória e Estruturação do Espaço. Estudo crítico-comparativo entre Bento Gonçalves/RS e as terras de origem)"; principal investigator E. Trusiani (Sapienza University of Rome/UNICAM), Livia Piccinini (UFRGS/Porto Alegre), Decio Rigatti (UniRitter/Porto Alegre). The research was financed by the Sapienza International Sector under a bilateral agreement with UFRGS in Porto Alegre.

1878 and 1902. As of 1950, of more than a million Italian emigrants, about three-fifths originated in the Triveneto region and two-thirds of this total settled in São Paulo.
From the mid 1800s, the Brazilian government began to promote the colonization of vast uninhabited areas in order to guarantee border safety and counteract the indigenous people in controlling the land. In 1848 the emperor had provided public lands and grants to those charged with bringing colonists to occupy and work those areas, thus creating a rural class. Governmental controls to assign the colonists to the states of Rio Grande do Sul, Santa Catarina, and Paranà began around 1850 when a law declared all lands without a legally recognized owner to be property of the State. Starting in 1867, Brazil had a policy of attracting farming manpower not only with intense publicity, but also by offering maritime transport and contracted recruitments. These consisted of an agreement in which the government conceded land to a businessman, who in turn worked to populate and cultivate those areas with European colonists, reassigning the lots and dividing the payments into instalments. The Triveneto region, in particular, became an inexhaustible supply of manpower in search of better conditions. The agrarian crisis, the ill-fated consequences of the pébrine that affected silkworm breeding, the arrival of European merchants of Chinese and Japanese silk and Indian rice at low prices had greatly impoverished the entire area. The need for Italians to find new outlets coincided with the need for Brazil to find a work force, especially for the coffee-cultivating regions and after 1850 when, pushed by London, the Brazilian government ended the slave trade, leading to the *Lei do Ventre Livre*[6] in 1871. The migratory flux increased between 1885 and 1897, incentivized by travel subsidies, and, beginning in 1894, immigrants were directed in particular towards São Paulo.
Around 1875, farmers from the Veneto Region began to reach the states of southern Brazil, attracted by the realistic perspective of becoming landowners, with the possibility of adapting easily to a mild climate similar to their homeland, thus allowing the cultivation of familiar products. Plots of land in the colonies varied between 25 and 60 Ha and were conceded only to families. Land assignments were dictated by colony management, but were often made by extraction; the lot had to be released in 5–10 years starting from the second year. The families had to deforest and prepare the terrain for cultivation, build their own housing, and see to opening roads and marking the property borders. The impact with this reality, with the luxuriant, thriving vegetation was initially shocking. Schools and medical assistance were lacking. The scarcity of good streets made communication, and especially the commercialization of products, difficult. Finally, the relationship with the Indians was problematic, generated conflicts, and in some cases led to punitive expeditions. The most characteristic settlement is the region of Rio Grande. The government had in fact marked out a very wide, totally uncultivated, mountainous area where the conditions of life were very hard. Despite this, the rate of abandonment was low.
A strong spirit of adaptation, a great work capacity, a profound religiousness, and a solid family structure allowed the Italians to survive. In these isolated areas, the homogeneous provenance of the immigrants allowed for the attachment to and maintenance of uses, customs, traditions, and original language. In establishing themselves, the farmers even transplanted their own agriculture. These were grapevines first and foremost, whose cultivation would give rise to a territory and landscape that is unique in Brazil, and that, while with some transformations and modifications that endanger its most indigenous and structural cultural characteristics, today represents an economic, cultural, and tourist resource for Rio Grande do Sul.

[6] The 'Free Womb Law' granted freedom to the children of slave mothers, but only upon reaching adulthood. Slavery was abolished in 1888.

3.2 The vineyard landscape of Bento Gonçalves: origin, evolution, and trends

The research identified some landscapes within the territory of Bento Gonçalves, a municipality established in 1890 by the fusion of the two Italian colonies: Dona Isabel and Conde D'Eu. In these areas, the industrial vineyard landscape and the rural family-vineyard landscape represent the areas that substantially mark the territory beyond the spatially dominant area of the Atlantic forest. These are two areas where grapevine cultivation strongly characterizes the territory. The traditional and original means of *latada* (pergola) are maintained and reproduced and are joined by the more recent *espaldeiras* (espalier) originating in a process to modernize production, operated by new generations in contact and cultural and educational exchange with Italy.

Vegetation in the Bento Gonçalves territory is characterized by heterogeneous, differentiated landscapes that range from a strong degree of territorial anthropization represented by the typical winemaking culture to structures with a very natural landscape character such as Mata Atlantica. Anthropic vegetation covers a greater surface area than natural vegetation, and is characterized mainly by large areas of *Vitis vinifera* cultivation that marks the hilly orography of the territory.

As mentioned previously, the vines were introduced at the end of the 1800s by emigrants from the Veneto Region. Today they constitute the main territorial landmark, with the historical/cultural value of the homeland. Within the vineyards, the tree species *Platanus occidentalis* (plane tree) is very common, along with shrub-like varieties of roses. Both are explicit representations of Italian country traditions from the beginning of the 1900s. Plane trees are used to support the planting layout of the vines and have a strong perceptual impact on the entire extent, characterizing and defining the structure and margins of each vineyard system. Roses are instead used at the end of each row of vines as a biological indicator and as a signal for treatment against eventual parasites and fungal diseases. This is because roses are more sensitive than the vines and are the first to detect parasitic attacks.

In the historical evolution of vine cultivation and the consequent creation of a unique landscape—and even in the economics—it is important to highlight some important moments[7]. Around ten years after the arrival of the Italians, the territory 'made available whatever was needed, and even better that there was … wine, grain, cheese, salami, animals in large quantities…. Wine everywhere, made purely of grapes, without sulphites, sugar, or other added ingredients…' (Lorenzoni). Grapevine cultivation allowed for continuity between original knowledge and local practice, which transformed the territory into a social space and ensured that the inhabitants could recognize each other within winemaking, bringing them into healthy contact with each other.

Current winemaking in the Vale dos Vinhedos, located along the Leopoldina railway, moved quickly from subsistence cultivation to primary cultivation, becoming the main economic resource of the entire area. In 1907 the agricultural syndicate was founded with the aim of reinforcing technology and agricultural production in order to improve local products, especially wine, and to commercialize them beyond the confines of Rio Grande do Sul. Contact with the homeland was constant, and representatives from the Italian government visiting at the beginning of the 1900s suggested sending specialized people known today as oenologists and agronomists. This gave rise to the Porto Alegre School of Engineering, which shortly after welcomed German, Italian, French, and American professors as well as experts in oenology and agriculture. *Latada* was the original cultivation system, which is similar in some respects to the pergola used in Trentino, i.e., horizontal cultivation that guarantees greater productivity and an excellent grape yield. This system immediately conferred an unmistakable image on the Bento Gonçalves territory and the entire region of the Italian colony, a

[7] Related to this, see the Master's thesis by Marilei Elisabete Piana Giordani, "Por tras das perreiras: embates da paisagem cultural vinicola e a urbanizaçao- Vale dos Vinhedos, Bento Gonçalves, RS, UFRGS, School of Architecture, PROPUR.

visual success of the original knowledge and local practice/adaptation seen above. This landscape made of vines, roses, and plane trees allows change to be seen throughout the year, with its chromatic variations that mark the seasons. This is in contrast to the Atlantic forest, which instead tends to remain chromatically constant.

The American grape, however, did not necessarily lead to quality wine, and the idea began to spread among experts that a different, almost industrialized production was necessary, one that foresaw the use of *vitis vinifera* with an *espaldeiras* system. At the beginning of the 1930s, wine was the main product exported by the colony and the winemaking sector economically and spatially determined the structure of the territory. It became the distinctive sign of the Italian colony and a local richness calling for new structures, activities, businesses, and professions. Winemaking cooperatives and the winemaking syndicate of Rio Grande do Sul (1927) were created, followed by the main Rio Grande cooperatives. 'The exportation of wine and spumante began in 1938 with 46 litres. Ten years later it had reached 246,000 litres' (Gobatto). The increase in production continued throughout the 50s, 60s, and 70s. In 1967 the first National Wine Festival (Fenavinho) was organized. Starting in the 1990s, the process of recognizing the economic/cultural value of the territory began, along with what can be defined as the cultural landscape of the Italian colony limited to this area of study. In fact, the process that would lead to recognition of territorial certification began. This is a process that begins with the APROVALE association, a group of six winemaking cooperatives out of the ten that existed in 1995, with the aim of promoting and sustainably developing the Vale dos Vinhedos through wine tourism as an economic cultural flywheel for the entire region of the Italian colony.

This gave rise to the request for a wine Certificaçao de Indicaçao de Procedencia (Certificate of Origin Indication) and the Vale dos Vinhedos Denominaçao de Origem (Designation of Origin). These recognize geographical origin and aim to promote and create added value around a single product, relying on the historical/cultural heritage of the homeland, a heritage that is unique and non-transferrable, expressed by the local landscape. The Indicaçao Geografica de Territorio Vinicola was created in 2002, followed by the Denominaçao de Origem in 2012. These are important recognitions, but they contain different indications and criteria for protection that undermine the cultural identity of the territory itself. The first allows only cultivation of *Vitis vinifera*, banning American and hybrid cultivation, and recognizes the *latada* structure as an element of the cultural identity of the area, but does not ban other solutions that look to qualitatively or quantitatively improve the wine.

Thus began a slow substitution of and/or new *espalderias* cultivation that is slowly changing the Vale dos Vinhedos landscape because it was adopted by the large APROVALE winemaking companies. In addition, the Denominaçao de Origem, in effect because it was the last recognition to be obtained, forbids the *latada* use and promotes the *espaldeiras* system for the reasons mentioned above. It is clear that this is a unique Brazilian landscape, an area of national and international tourism undergoing a phase of advanced transition between a consolidated process of quality recognition and an intense process of territorial enhancement to modify the structural elements of the landscape. It is a landscape where protecting the identifying characteristics of a historical/cultural heritage would seem, even if only apparently, not to mesh with the most advanced production systems and requests for quality. While it remains a principally winemaking landscape, these changes, starting from the planting systems and production, incite some reflections on the management of cultural landscapes. The economic enhancement of an extra-urban territory has triggered a process of expanding some winemaking cooperatives, not always in ways that agree with the historical/cultural characteristics of the territory. It is here that management of the territory and its values and characteristics comes into play, thus forming a link with planning tools capable of governing the territory.

4. Conclusion

When we eat or drink a quality product, we also want to understand where and how it was produced and what the symbolism associated with it is. We want to know if the product comes from afar, what culture generated it, what producer made it, and what the production techniques were. An act of reciprocal concurrence therefore develops between agricultural production and the landscape. As a first step, the agriculture produces the landscape; the landscape then becomes added value for the food or wine product associated with it. A short circuit is therefore created that connects the quality of the landscape to the quality of the food ever more closely. Reinforcement of this link can favour new forms of economic development in Europe that is also more sustainable because it is more attentive to the quality and identity of places and the expectations of local communities. To promote this connection, actions aimed at territorial marketing are not enough; it is necessary for public administrations to commit themselves to integrated actions and regulatory tools to protect and enhance the landscape.

This is true in both the Italian and Brazilian cases. In the Piceno area, the indications and orientations for the large- and local-scale planning systems set out in 'The need for innovation in regional agriculture and food production' and the provisions of the Agricultural Park in the PRG of Monteprandone represent an attempt to make the landscape assume a strategic role in developing policies, actions, and measures for intervention aimed at landscape enhancement, territorial requalification, and quality agricultural production. To do this, the wine landscape should be considered a fundamental heritage of the history, culture, and competitiveness of the territory. It cannot depend on spontaneous economic choices, but becomes the object of land planning analogous to what occurs for settled urban areas.

In the case of Brazil, the process of tourism enhancement on a cultural basis presents some problems that require special attention. The optimal, fertile organization of wine production also does not correspond to the other tourism-related aspects of the region. This can be seen, for example, in the lack of a wider and more strategic view of planning and in the weakness in some cases of public power compared to the pressure of the construction market. One example is the large transformation underway along the main colonial roads such as the Caminho das Pedra and the Vale dos Vinhedos, where the intense, continuous annual flux of tourists has given rise to buildings and activities external to the vineyard circuit, posing a problem related to building density rather than to the sale of products, which is always the expression of the territorial culture.

The most evident, urgent question from the landscape perspective is the *condominios fechados*, that is, urban settlements (second houses) located in the middle of rural areas. These destroy the structural signs of the original colonies historically composed of long narrow lots, which is a completely unusual rural/urban landscape in the context. Growing awareness on behalf of the rural population has had the effect not only of blocking the construction of some condominiums, but also of prohibiting their introduction within the entire area pertaining to the Caminho das Pedras, despite the fact that the local plan permits it. These conflicts demonstrate how the economic value of the vineyard landscape can be a double-edged sword for the entire area, if managed in a sectorial way and only through the approach of territorial marketing.

An opportunity and a need not to separate rural and urban areas, protected landscapes and transformed landscapes also emerge from the two experiences presented. On the contrary, there exists a need to promote an overall territorial project that sees in the enhancement and (overall) landscape requalification the key to interpret and design each action and intervention aimed at development. In both experiences, local communities and agricultural businesses play a primary role. Collaboration is also required to ensure care for the territory, conservation of the landscape, and the promotion of territorial culture.

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Sergi Garriga Bosch, Josep-Maria Garcia-Fuentes, "The idealization of a "Barcelona model" for markets renovation", In: *Localizing urban food strategies. Farming cities and performing rurality.* 7th International Aesop Sustainable Food Planning Conference Proceedings, Torino, 7-9 October 2015, edited by Giuseppe Cinà and Egidio Dansero, Torino, Politecnico di Torino, 2015, pp 336-342. ISBN 978-88-8202-060-6

THE IDEALIZATION OF A "BARCELONA MODEL" FOR MARKETS RENOVATION

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Keywords: market halls, Barcelona, renovation, urban studies, food supply chains

Abstract: The detailed study of markets provides valuable information about the changes and relations between urban trends and food practices in cities. In the case of Barcelona, the operations of preserving and renovating market halls during the last 30 years are a true record of the urban changes and they conceal a socioeconomic project often overshadowed by iconic architectures.
In this paper we analyze the early stages of the markets' renovation policies in Barcelona, which has been strongly characterized by the Special Plan for Food Retailing Facilities (known by the Catalan acronym PECAB), written in 1986. To this aim we will contextualize the origins and motivations of these renovations in the European urban framework of the 70s and the 80s. Instead of thinking of the Barcelona case as a unique and exceptional experience, we will rather understand the resulting policies as local answers to the urban theories of that time. We will then present the unusual conditions and constraints in Barcelona to finally pursue a better understanding of the social structures and the food supply chains fostered by these market renovations.

1. The context for a markets renovation policy

During the last recent years, we have seen how interest for markets has grown exponentially. Its role as urban assets has been explored and largely experimented by the municipalities resulting in a wide and varied panorama of experiences. However, we cannot understand these experiences as isolated phenomena, but as operations in which cross transferences between different cases play a fundamental role. For this reason, it is important to focus on the global context in which they emerge and are developed as well as on the characteristics that distinguish each case.

1.1 The raise of public awareness on the preservation of iron architecture and market hall structures: Les Halles in Paris

After II World War two related debates emerged: on the one hand, the modern reconstruction of cities and, on the other hand, the preservation of the architectural and monumental heritage of cities. At this doorstep, many market halls built during the 19th century were destroyed to leave space for new commercial forms. During the war, markets received small investment so they soon became obsolete and were seen as anachronistic food distribution systems in front of the progress of the cities (Schmiechen & Carls, 1999). In contrast, supermarkets and commercial malls proved their efficiency, competitiveness and adaptation to the urban patterns advocated by the Modern Movement: zoning, use of private transport and energy consumption (Koolhaas, Chung, Cha, & Inaba, 2001). Furthermore, agriculture was getting into what Harriet Friedmann would call the "second food regime" in which industrialization, internationalization, mechanization and dependency on oil and chemistry characterized agricultural production (Friedmann, 1987).
However, given these sudden changes it became clear that gradual awareness for lost heritage was arising. Alarms were triggered by the destruction of Les Halles in Paris, in 1971. This building,

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admired and copied by almost all countries in Europe during the 19th century, was being demolished and relocated to the outskirts to avoid operative problems in the city center and improve its distribution efficiency. This strategic decision enabled the arrival of goods from sources farther away. Consequently, this contributed to the homogenization of the food retail sector across regions, without regard to local diets and products.

In this same year, Hermione Hobhouse published Lost London, a compilation of the most singular architectures that London had lost during the previous decades. She also warned of the social need to protect historic buildings in order to prevent London from becoming a Manhattan-like city, "unattainable and unattractive to the middle classes" (Hobhouse, 1971). Also in Spain, the journal CAU published in 1975 a special issue that listed many buildings in danger. The fact that a large part of the selected building was related to food distribution is symptomatic of the changes that were taking place.

This approach was drawn in the actions carried out to preserve the Covent Garden Market and El Born Market in Barcelona —two wholesale markets that were relocated following the guidelines of Les Halles. In both cases, the primary concern was tightly related to the architectural and historical legacy of the buildings. So the neighborhood and conservationist associations gathered to protect them from disappearing and to protect their communities from loosing an inherent representation of their history. The governments ended up recognizing them as listed buildings, although initially they had planned to demolish them.

These movements saw market halls as identity signs of their neighborhoods and contributed to preserve the buildings as constituent parts of their historical memory. However, the activity was no longer supported. That was —and still is— the most common attitude towards the surviving market halls. Nowadays, they are being transformed to accommodate new activities like exhibition spaces, cultural centers, theaters or, in many cases, food hubs, largely dedicated to restaurants.

But there is another side of the coin. Market activity is now being vindicated as a strong urban asset and it is adopting new forms out of the market halls more appropriate to the contemporary reality. They have proved their impact in different communities; they can contribute to undergo economic initiatives —both, bottom up and top down—, as well as address urban changes.

1.2 Towards a comprehensive preservation: the Plan for the historical center of Bologna

However, in Barcelona, the El Born case is an extremely unique example. This is because market halls in the city of Barcelona were preserved regardless of their monumental and historic values. Less than half of them were examples of valuable iron architecture from the end of the 19th century while the others were built in concrete during Franco's dictatorship to supply the outlying neighborhoods. Nevertheless, the PECAB —Special Plan for Food Retailing Facilities (1986)— did not conceive them as isolated elements in the city but as an urban system with the potential at both the local and the municipal scale. Therefore, it was the potential of the whole rather than the individual value of each market hall what gave a comprehensive sense of preservation. This meant not only preserving the building but also the activity in it and its socioeconomic environment, as it was stated in the theoretical foundations of the reconstruction plan for the historic center of Bologna during the 60s and the 70s.

Although it is difficult to evaluate the feasibility of this plan —which soon started receiving critics—, it had a significant impact on the European urban debate (Angotti & Dale, 1976; Marston Fitch, 1990). The Bologna Plan understood the area to preserve as a settlement with buildings as much as people and organizations with the aim to keep a certain "urban atmosphere" (Cervellati, De Angelis, & Scannavini, 1977; Cervellati & Scannavini, 1973). This conservationist approach had strong political

and ideological implications. The plan not only expected an exhaustive restoration of the buildings according to the existing documentation, but also the preservation of the uses and activities to ensure the continuity of the social and economic values of the area, accepting the arising consequences.
Also in this regard, the Bologna Plan matches the origins of the PECAB in Barcelona, closer to a socioeconomic project than a monumental one. On the one hand, although markets were decaying in front of the supermarkets, the City Council of Barcelona decided to keep them as an urban public service. On the other hand, each market preserved the activity with the aim to establish a commercial polarity in each neighborhood that could help to overcome the deep crisis of the retail sector at that time (Ajuntament de Barcelona, 1986; Maymó, 1984). The protection of this small commercial activity in front of the spread of the supermarkets had and implicit desire: preventing the local and traditional trade from disappearing as an operation of protecting a constituent "urban atmosphere" of the compact Mediterranean city. At that point, the City Council began a policy of refurbishing the market halls to make them more competitive in a more liberalized environment, upgrading their logistical core.

1.3 To preserve or to renovate? The IBA in Berlin

In the 70s, criticism to the Modern Movement consolidated throughout Europe, and consideration for the existing city was substituting the abstract practice of developing supposedly universal models. This turn to focus on the existing became evident with the writings from Colin Rowe to Leon Krier, with a general interest in the urban assessments of the 19th century, like Camillo Sitte.
Many of these theories converged in the project for Barcelona elaborated by Oriol Bohigas —head of the City's Planning Office, 1984-1991—, which led to a prolific activity during the 80s. These projects focused on solving specific problems in the existing city with significant attention to architecture and urban morphology (Ajuntament de Barcelona & Àrea d'Urbanisme, 1983). Bohigas advocated for the "reconstruction" of the city to overcome the urban "development" needs. For him, interventions in the existing should accommodate the future developments of the city, and the projects had to be "contemporary, that is to say, respectful but creative" (Bohigas, 1985). These ideas on reconstruction were largely tested during the 70s and the 80s within the framework of the IBA in Berlin.
The underlying intent of the Berlin International Building Exhibition —Internationale Bauausstellung—, under the leadership of Josef Paul Kleihues and Hardt Waltherr Hämer, highlights the analysis of the city's history and the search for a contemporary equivalent. Under the name of "critical reconstruction" or "careful urban renewal", the IBA suggested the adaptation of the former structures to the current needs. In this regard, the PECAB is an example of preservation, but above all it is also a regeneration project that has taken the markets legacy as a starting point. It interprets the historical role of markets in the structuring of the traditional city and updates their attributes to inscribe them in a totally different city governed by new economic laws, new producing standards and new consuming trends.
In Barcelona, this approach led to the renovation, refurbishment and modernization of the market halls and the market activity. And over time, this practice has progressively defined some recognizable characteristics of the renewed Barcelona markets: first of all, the introduction of an entrepreneurial thinking (Cabruja, 1990). Sellers are no longer licensees of a service to become tenants of a physical space. This fosters the capitalization of the stalls that grow in dimension and decrease in number. At the same time, the seller becomes also an investor and adopts a proactive attitude towards the revitalization and the success of the market. Secondly, the use of supermarkets inside the market hall to generate a symbiotic relationship with the stalls. This needs to be carefully

designed so that the supermarket gets a place inside the market hall but in turns the market ensures a reliable flow of people and controls the competition in the area outside the building. The interpretation of the new consumption habits and social changes —female participation in the labor force and changes in family structures and time schedules— is a key element for this modernization. All these factors combined can offer a wide commercial mix, a one-stop-shopping experience. And finally, the opening of the market halls façade to the public space for the advent of new relations and activities as a way of revealing and emphasizing the permeable nature of the market.

In parallel, architecture has also played an important role in the popularization of market halls, though not a central one in their success or failure. However, the undeniable efforts and construction costs of some of the interventions, mainly those in the central areas of the city —like Santa Caterina (2005), la Barceloneta (2007) or recently El Ninot (2015) or Sant Antoni (2016)—, highlights the interest to include markets into the set of institutions which serve as urban references in the city. Food culture —like the Mediterranean Diet or the Slow Food— is adopting a representative role supported by renovated market halls architecture since they are a new asset in their promotion (Garriga Bosch, 2015).

Nevertheless, in spite of this traditional imagery promoted by the markets themselves, data reveals another reality. The 72% of the produce sold in the market halls comes from Mercabarna (41,7%) —the biggest wholesale cluster in the metropolitan area—, distributors (22,0%) and other wholesalers (14,8%), while the amount of produce directly bought to producers or of own production represents the 15,4% (Ajuntament de Barcelona & Institut Municipal de Mercats de Barcelona, 2009). Also, while in 1996 the mean distance of fruits and vegetables reaching Mercabarna was 400km, in 2013 the figure was about 1750km (Garcia Fuentes, Guardia Bassols, & Oyón Bañales, 2014; Mercabarna, 2013).

Therefore, it is obvious that although in some countries markets represent an alternative to the standard supply chains, in Barcelona, the renovations of the markets have not restored the logic of the past, but have adapted the markets to the prevailing dynamics of the European contemporary commerce. The idealized version of the Barcelona model emerges between the traditional imagery of markets and the globalized economic context.

2. Markets' mission change: from need to choice

During Franco's dictatorship, markets in Barcelona proved to be the most effective way to supply the city and keep prices in check. But with the substantial liberalization of trade, new commercial forms became more efficient and gradually competed for the relative monopoly on food sales that markets had had until the end of the 80s (Guardia Bassols & Fava, 2015). Consumption patterns changed and availability of the commercial forms was multiplied. Consequently, markets lost their main function as a food supply service to become one among the many consumers' choices. This change of purpose motivated a reorientation of the products supplied. On the one hand, it required adaptation and produce specialization —ready or semi-ready cooked food, gourmetization—. On the other hand, it generated a shift towards the ecologic and local sector and, in general, domains where large supply chains are less likely to access.

While adaptation has been the answer in Barcelona to preserve markets, the ecological and local sector also reflects a small but generalized movement in many other places. In theses cases, markets are vindicated once more as an efficient way to supply the consumers' demands concerned about a healthier, local and less homogenized diet. Although they represent a very small share, the exponential growth of farmer's markets in United States or their resilience in France or Germany are indicative of this trend.

And this is not happening only because of a consumers demand. Producers are seeing their economic margins structurally decrease as productions costs increase due to the need for continuous technological investment, new sanitary regulations and competitive low prices (Renting, 2003; van der Ploeg et al., 2000). Attempts by producers to recapture value in the supply chain, even though they are weak, have references to the Agricultural Park of South Milan, created in 1990. This project, although it established its theoretical bases in the 30s, it consolidated as an answer to the uncontrolled impact of the metropolitan growth of Milan (Calori, 2009; Matarán Ruiz, 2013; Sabaté Bel, 2013). In Barcelona, however, the concern about peri-urban agriculture led to the creation of the Agricultural Park of the Baix Llobregat in 1998 (Montasell i Dorda, 2006). And today, some producers from the metropolitan area of Barcelona claim for a place to sell their produce avoiding the wholesalers and distributors structures. These claims are resulting into a new generation of open-air, weekly markets that live together with municipal permanent markets. The former recover the eventual nature of the market. The latter accommodate and shape an urban and a commercial fabric on its surroundings.

3. Conclusions: defining a model?

The contextualization of the European framework in which the PECAB was developed is needed to avoid localisms and helps us to better understand the nature of the plan for Barcelona market halls. However, it is also essential to highlight the constraints and conditions that make the Barcelona case a singular and therefore a rather unusual experience, very unlikely to be replicated anywhere else.

On the one side, it is important to consider the strong presence of the market halls in Barcelona during the second half of the 20th century. While in many other cities markets were becoming huge obsolete urban facilities and falling into disuse, in Barcelona they were consolidated and even increased their presence in the urban structure. That left the city with and exceptional legacy of 40 operative food markets distributed homogenously across the neighborhoods (Guardia, Oyón, & Fava, 2010). Moreover, in 1985, these markets accounted for 45% of total food sales and 75% of fresh produce (Ajuntament de Barcelona, 1986). Therefore, policies focused on preserving and boosting the prominence of these markets as a mechanism to reorganize and consolidate the retail sector throughout the city. Today, this prominence is stabilizing around the 40% in fresh produce. But the urban —and even social— benefits and contributions of these renovations are much more comprehensive than the economic and statistical results and still justify the promotion of markets in front of other commercial forms (Institut Municipal de Mercats de Barcelona, 2014).

On the other side, it should be noted that markets in Barcelona are still managed by public authorities. With the advent of private suppliers, many cities gave up on public ownership of markets. Instead of this, Barcelona updated them as a tool to mobilize strategic private investments: a selective public intervention intended to improve the economic and functional efficiency of the city and address the crisis of the retail sector in the 80s. Nowadays, thanks to this strategy, these investments in market halls are enabling spaces to accommodate urban and social processes of regeneration.

To take up the challenge of an entrepreneurial management of these markets, in 1991, the Markets' Institute of Barcelona (IMMB) was established. The IMMB is an autonomous body with budgetary and administrative capacity, under the auspices of the City Council, to manage and direct markets. Since then, the Institute has sustained a continuous investment policy of markets evaluation, renovation and promotion; it has established a formal relation with the associations of sellers; as well as it has gathered enough experience to systematize, particularize and undergo the renovation

of the whole system of market halls in the city. This panorama is in stark contrast to the simplistic assessment in which management and socioeconomic projects are placed in a second level.

So, if there is to be a Barcelona model for markets susceptible to be applied in other contexts, it has nothing to do with iconic architecture. In countries like United States or France, markets have a clear function to bring producers and consumers closer together, while in Barcelona, as we have seen, the trend has been quite the opposite. Also, in other contexts, like in the United Kingdom, many markets still play an important part in the less well-off inhabitants economies, something that is certainly not happening in Barcelona either. In these cases, markets followed different guidelines and are of an entirely different format, focus and organization. Consequently, adopting a model such as Barcelona's one, or a misconception of it, would probably turn into a disorder to the established social structures.

In any case, it is evident that markets are the result of a complex socioeconomic structure, both in the city and the agricultural environment. And renovations always reshape them according to the existing contemporary social and economic changes. So, markets become and observatory of the societies that conceive them, and therefore the study of markets transformations highlight their dynamic nature. Markets and the social structure of the city are deeply intertwined. Because, indeed, the act of buying potatoes helps us to understand the social fabric and the territorial structure that cultivate, transport, store, sell, cook and eat them. However, the question that still remains unanswered is: could this happen the other way round? Could a change in our markets foster changes in the economic, commercial and urban policies on different scales?

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Patricia Bon, "Participatory planning for community gardens: practices that foster community engagement", In: Localizing *urban food strategies. Farming cities and performing rurality.* 7th International Aesop Sustainable Food Planning Conference Proceedings, Torino, 7-9 October 2015, edited by Giuseppe Cinà and Egidio Dansero, Torino, Politecnico di Torino, 2015, pp 343-354. ISBN 978-88-8202-060-6

PARTICIPATORY PLANNING FOR COMMUNITY GARDENS: PRACTICES THAT FOSTER COMMUNITY ENGAGEMENT

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Keywords: Participatory Planning, Community Engagement, Empowerment, Community Garden, Community Development

Abstract: Community gardens are a powerful tool for improving the urban environment, and the benefits associated with them have been well recognized in both popular publications and in academia. Unfortunately, we often see community gardens fail. Literature suggests that the considerable rate of failure may be brought upon by lack of community engagement. In light of this premise, this paper aims to identify practices used in a planning process that enhance community engagement. In order to do this, this paper analyzes the case of a unique community-driven, participatory planning process developed for a community garden in Chicago, La Huerta Roots & Rays.

1. Introduction

Community gardens are a powerful tool for improving the urban environment (Ferris 2001; Lawson 2005; Shinew 2004; Yotti 2006; Twiss et al. 2003). They help revitalize communities by improving health (Alaimo, 2008; Lackey, 1998; Robinson-O'Brien, 2009), increase food access (Lackey 1998; Bleasedale et al. 2011), maintain green space, increase biodiversity and conserve wildlife habitat (Beran et al. 2012), promote social justice (Lackey 1998), reduce crime rates (Herod 2013), increase property values (Been 2006), and build social capital (Lawson 2005; Shinew 2005). Overall, community gardens are a great tool to help overcome some of our most pressing contemporary urban issues.

Unfortunately, many community gardens fail in their first few years. According to Beran et al. (2012), Kearney (2009) and Thomas (2008), lack of community engagement is one of the main reasons that community gardens fail.

With this in mind, this paper aims to identify practices that enhance engagement during the planning process, in an attempt to contribute to their longevity and success. In particular, we are interested in practices used during community planning processes that increase feelings of ownership and commitment, and foster a tangible connection between people and place.

We will do this by analyzing the community-driven, participatory planning process for *La Huerta Roots & Rays*, a community garden prized by the American Planning Association (APA-IL) for their successful community outreach initiative during the planning process and continued community involvement following implementation. We examine the collaborative nature of the planning techniques they used and detail the process from conception to implementation, extracting useful experiences and practices that may be applicable to planning in general.

The following section discusses the relevance of community gardens for urban planners and includes a literature review that establishes the importance of community engagement for the long-term sustainability of community gardens. A description of the methodology used comes next, and finally the case study itself, followed by an analysis of the findings and the conclusion.

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2. Literature Review

The notion that community gardens bring great benefits to urban areas is widely accepted (Ferris 2001; Lackey 1998; Lawson 2005; Shinew 2004; Yotti 2006; Malakoff 1995; Hancock 2001; Carney et al. 2012, Twiss et al. 2003). They benefit urban environments in multiple ways and are often praised for their positive effects on communities and on urban revitalization. Unfortunately, a large proportion of these projects fail in their early years. In order to understand why they fail and how we can increase the rate of success, it is crucial to understand the dynamics behind a successful garden.

Even though the physical and logistical aspects of community gardens may seem to be a priority, -such as securing land, funding and other material resources -, a community garden is in fact, above all, more about the community that grows around it than about gardening itself (Glover et al. 2004). There are two main reasons for this. First, the motivation to establish a community garden often comes from a community's willingness to address a common problem, "notably urban decline and the criminal activity often associated with it" (Glover 2004, 143). Second, because a community garden is a relatively complex project that requires constant management and tending; it "cannot succeed with the enthusiasm of just one or two people" (Thomas 2008, 10). It needs strong community engagement, which will bring the resources the garden needs to success. In fact, having people committed to the garden project is the first step for a successful implementation (ibid).

In the same way that the presence of community involvement is fundamental for the success of a garden, the lack of community involvement usually leads to a garden's demise. As a study on community gardening in New Hampshire states, the failure of a community garden is usually caused by a failure of human relationships (Beran et al. 2012). As the authors state, "rarely was failure based on mechanical problems, lack of money, or issues concerning soil, property, or irrigation" (Beran et al. 2012, 11).

As established above, community involvement is a crucial factor for the long-term sustainability of community gardens. But how can we enhance community participation and engagement? A participatory planning process may be a powerful tool to foster community engagement. As Thomas argues, one way to avoid community garden failure is to foster a sense of ownership from the beginning of the project (Thomas 2008), and having community members plan the project together may be the ideal way to do this.

With this in mind, this paper aims to identify a set of practices that enhance engagement during the planning process. In particular, we are interested in practices used during community planning processes that increase feelings of ownership and commitment, and foster a tangible connection between people and place.

We will do this by analyzing the community-driven, participatory planning process for *La Huerta Roots & Rays*, a community garden in Chicago. We examine the collaborative nature of the planning techniques they used and detail the process from conception to implementation, highlighting a set of useful experiences that may be applicable to planning in general. The next section will explain the methodology used in this research.

3. Methodology

The data for this case study was collected primarily through participant observation. I had been an active member of *La Huerta Roots & Rays* since March of 2012 and acted as project manager for the remediation and redevelopment of the garden since the conception of the project through to May 2014 when the basic reconstruction was completed. This intensive participation gave me an insider's perspective of the dynamics between the garden organization and the wider community.

I recognize, however, some of the perils of participant observation – Yin (1994) states that, beyond the usual weaknesses of direct observation, participant observation may introduce "bias due to investigator's manipulation of events" (p. 80). I understand that I have written this report playing a dual role of researcher and agent of change, and I have tried to remain objective and impartial by being reflexive about where I stand. In order to maintain objectivity, I have tried to support my arguments with evidence from what was seen on the ground.

4. The Case

4.1 Background of the Garden

La Huerta Roots & Rays is a community garden in Chicago that was founded in 2008. The garden was run by a small group of white, middle class, young American students, even though the site is located in Pilsen, an overwhelmingly Latino neighborhood. By 2013, the garden had been all but abandoned, with few members still involved.

At this time, new leadership emerged with a desire to revitalize the space and broaden the membership base. They recognized that wider participation in the garden would be a good strategy for community building through placemaking. Their intention was to expand and diversify the membership base by engaging long-term residents and involving residents of different age groups and cultural backgrounds.

Around the same time, a critical issue came to light. After completing extensive environmental tests, gardeners discovered that the soil at the site was contaminated. Even though they followed gardening best practices, levels of contaminants were so high that these precautions were not enough and the area still posed a risk to the children in the neighborhood.

An opportunity emerged to remediate the site with support from NeighborSpace (a non-profit land trust dedicated to providing long-term protection for community gardens in Chicago). The process would involve removing 3 feet of soil from roughly 30% of the garden area (approximately 400 tons of soil) and replacing it with clean soil. This meant that the garden would have to pull up all of its existing structures, essentially destroying what had been built over the past 5 years. It also meant that after the remediation the garden would have to be rebuilt from scratch. It was a huge task, both to remediate and to reconstruct the garden. The cost of the remediation alone was estimated at U$35,000.

The garden leadership organized a meeting with the garden group in October 2013 to talk about the proposition to remediate the site. Their intention was to understand the members' feelings regarding the remediation and necessary reconstruction of the space. After much discussion, garden members concluded that even though the remediation would come as a great inconvenience to everyone, it was their moral duty to move forward with it. Pilsen had very few green spaces, and because of the high levels of pollution all around, after remediation the garden would be one of the only clean and safe areas available for public use. The decision was made.

The opportunity to remediate the site and transform it into a clean, safe location served as a catalyst for garden leaders to jump into action. And so, with this in mind, the team started to develop a community planning process to engage the residents and transform the space.

4.2 The Planning Process

The planning process included six sessions, including an initial session, followed by four development sessions, and finally, an integration session, when they brought everything together and created the site plan.

4.2.1 Initial Planning Session

The planning team decided that the first community meeting would be dedicated to understanding the goals and objectives of the community, and they would loosely base the following sessions on their findings from that day. The session was structured around three activities: envisioning the future; feedback from the community; and determining the goals and objectives for the plan.
About 35 people attended the meeting. The first activity was a visioning exercise that encouraged participants to close their eyes and "imagine the garden if...". The results were used as the foundation for the vision statement.
The planning team identified what the community's priorities for the garden were in their second exercise. The whole group participated in a brief discussion and together they chose 12 categories to vote on. Participants then received dot stickers and were asked to vote on the categories. After voting and debating, they determined 4 priorities for the garden.
The final exercise asked participants to write down their ideas for what they would like to see in the space. A total of 168 suggestions were made, and ranged from physical structures like raised beds to activities like classes and workshops.
The results from these three exercises combined shaped the proposed goals and objectives for the redevelopment of the garden (La Huerta Roots & Rays 2013 "*Goals and Objectives Matrix"*, p. 42) and were used to structure the following planning sessions.

4.2.2 Development Sessions and Meeting Structure

The following four sessions were focused on developing the topics identified by the community in the initial planning session. Each week had one particular emphasis and each session was structured around a particular theme or goal, with activities, exercises and discussions that allowed participants to deepen their understanding around a particular matter or build consensus regarding specific issues.
They tried to be creative and make the meetings as engaging as possible and so used different media, different presenters and different settings. The activities also included a lot of moving around and props and they avoided sitting around a table for too long and letting conversations drag on. They also tried to break up the size of discussion groups; sometimes they would have large group discussions and keep stack of people who wanted to speak, sometimes they would break into small groups then reconvene and have one representative from each group present their findings.
They quickly learned that their planning process was a living being, and that they had to adapt the structure of the meetings to suit the needs of the particular sessions. Sometimes this involved creating new processes from scratch. For example, one of the critical decisions they had to make was to determine how much of the growing area of the garden would be dedicated to individual, collective, or donation beds. The group was very divided about this and everyone felt very passionately about it. It was clear to them that if they tried to make a decision about this by talking it over with the whole group and trying to reach consensus, they would use up one entire 3-hour session, if not more.

They decided that they needed a process that was brief and democratic. After brainstorming, the planning team came up with a process of voting with beans, whereby each garden member would receive 10 beans, and they would use them to distribute the percentages they felt each of the three growing areas should receive. On the day of, they had a brief group discussion on the topic and then they swiftly moved on to the vote. They managed to make a decision in less than 40 minutes. Participants felt the decision was reached fairly and overall garden members were pleased with the outcome.

The planning team tried to pull in participants to present to the group as much as possible, whenever they found they could bring in a level of expertise that was missing from the conversation. Having personal knowledge about many of the participants beforehand, as they were already involved with the garden, and getting to know new participants on a personal level once they became involved, was a great advantage that allowed them to pull people deeper into the process.

For example, two participants delivered a great presentation on how the plan could incorporate elements from Mexican art and culture into the garden; another member presented on permaculture and different growing techniques. There was another participant who was a fantastic artist and could help with the designs and illustrations, but was also very shy, so they invited her to work with a few of the gardeners in small groups in situations she would feel more comfortable in.

They also invoked individuals or small teams to lead activities that they were experts in. For example one of the participants was an architect, so she led the conversations and activities regarding the development of the site plan; the session on planning with and for children was run by three other participants, a planning student, a child psychologist and a teacher's aide, who had the skills and the experience needed to structure planning activities for children.

4.2.3 Individual Projects

At the first planning session they were able to catch a glimpse of the multitude of activities that the community would like to see in the garden. Their neighbors wanted to use the space to read a book, to grill, to grow food, to play chess, to teach their children about their heritage, to compost, to train espaliers, to sunbathe, to socialize, to raise chickens ... and the list went on and on. The only way they would manage to cover everything on the wish list was to break the work down into specific projects for small teams and individuals to tackle.

After gathering feedback from the community about each individual element – 61 in total - (La Huerta Roots & Rays 2013, "*Individual and Group Projects"*, p. 34), participants took the lead on different projects and developed them over the course of the planning sessions. Examples of the projects included: chess table, chicken coop, compost bin, cooking area and grill, fairy garden, bike dome, shed, hops tunnel, herb spiral, and frankentree (La Huerta Roots & Rays 2013, see index of Individual and Group Projects, p. 43).

The end result was a modest collection of original and professional quality project proposals for the items they were including in the plan. Several of the authors applied for grants through the garden and are currently implementing those same projects (for example, the chess table, the children's growing area and the grill were all ideas that were developed during the planning process and then executed by the creators during the following summer).

4.2.4 Integration Session

This final session aimed to integrate all the individual projects into a coherent plan. By the beginning of this session, they had already defined which projects and elements would be included in the redeveloped garden. Their goal then was to figure out how they would bring it all together.
During this session they worked with four different spatial modeling techniques. The most engaging was a paper model of the site plan with accompanying miniature figurines of all the elements and projects that were to be included in the plan (61 in total). They split into groups and took turns arranging the figurines. A stop motion video of the process can be seen here: https://www.youtube.com/watch?v=QGYRO16-vLk ("The Evolution of Our Site Plan").

4.3 The Logistics

4.3.1 Outreach

The planning team considered the outreach plan to be critical because of specific neighborhood issues. There were cultural and language barriers to cross, as well as prejudice and an unspoken hostility towards the garden group that they needed to overcome (since its conception the garden had been a place known for its "whiteness"). They thought their whole approach to the redevelopment process had to be well thought out and sensitive to these issues, and they were particularly concerned about how they were presenting the endeavor to the wider community.
The outreach plan then became a crucial tool for communication as they were trying to convey not only the incredible opportunity that they had in their hands *as a community* (and not as the garden group), but also that everyone was welcome to participate in the process. Hence, the reach of the communication plan was very important.
Once they knew their audience, they started to develop the written and print material. Every piece of written material prepared was bilingual in English and Spanish and included contact information for questions in both languages. When the print material was ready, the team went door-to-door with fliers to invite people to the first meeting. They also met with community leaders to carefully explain their intention, try to gain their support and ask for their help in spreading the word.

4.3.2 Time and Location

Just as the cultural and language barriers were significant concerns in their outreach plan, they were also key in the choice of location. They had secured two possibilities: St Pius Church and Blue1647, a co-working space that was relatively new to the neighborhood. Both organizations supported the project and offered to let them use the space for free.
Blue1647 offered the best option in terms of infrastructure. They had an enormous amount of space, including a main hall with desks and chairs, meeting rooms with projectors and white boards, computer labs and wireless internet. St Pius Church on the other hand had only one small meeting room to offer and no other amenities, but it right across the street from the garden and was very well known and respected in the community.
The planning team knew they would have a better turnout if the meetings were held at St Pius, yet they needed the infrastructure that Blue 1647 could offer. They decided to have the first meeting at St Pius, as it would be an introduction of sorts, and then, once they had connected with the participants, hold the charrettes at Blue1647.

4.3.3 Food

As the meetings were scheduled to happen around dinnertime, the planning team made an effort to always have food available. The team reached out to local stores, bars and restaurants asking for food donations and received a positive reply. They had a good line-up of food donations scheduled for all six meetings.
They found that food was also important to keep participants active. The meetings were supposed to last 3 hours but inevitably they ran long or people stayed behind afterwards to work on individual or group projects. There were also snack breaks between activities, and these extra opportunities for informal exchange provided occasions for people to develop new ideas to present when they regrouped after the breaks. They were important for the creative process and enriched the conversations.

4.3.4 Childcare

One thing that the planning team had not anticipated was the number of children that attended the first meeting at St Pius. They had not arranged childcare, they did not have toys and games available and they had not considered ways to include the children in the planning process. They found that the presence of the children impeded the parents from participating because their attention was constantly divided. The children were also bored with all of the "grown-up talk", meaning that there were constant interruptions and the meeting did not flow as well as it could have.
Offering childcare for the younger children therefore became crucial to welcome and engage families, and necessary to maintain a high level productivity in the meetings; and including the older children in the planning process would enrich everyone's experience.
The team adapted the meeting structure to make the necessary accommodations. They wanted to make sure the children were as engaged as the parents and participated whenever possible. The team divided them into age groups and organized special activates for the older ones, and provided toys, games and crayons for the younger kids, along with adult supervision.

4.3.5 Bilingual Communication

La Huerta Roots & Rays, being the multicultural space that it is, motivated the team to organize a fully bilingual planning process. Two languages, Spanish and English, were used from day one and participants were encouraged to speak in the language they felt most comfortable in. All meetings were opened with the following announcement (delivered in English and Spanish): *"This is a bilingual meeting, please speak in the language you feel most comfortable in."* All of the meetings included simultaneous interpretative translation, and multiple English-Spanish/Spanish-English dictionaries were available for participants to consult.

4.4 Final steps, Implementation and Recognition

Once the planning process was over and the group had created the planning document and the project proposals for the individual projects, they started working on fundraising, grant writing and project implementation.
Funding for remediation of the site had already been secured by NeighborSpace through OSIF funds (Open Space Impact Fee), a total of U$35,000. However the redevelopment of the garden, including all of the construction and landscaping, still needed to be financed. They were able to secure the

remainder, (approximately USD$45,000) in in-kind donations, store credit and cash from a variety of sources and grants, including U$10,000 from Whole Foods, U$15,000 from the Walton Foundation, U$3,000 from the Christian Relief Service and U$5,000 from Home Depot, among others. Professionals who lived in the area provided services (for example two contractors who lived by the garden built the fence and the paths[2]); local stores provided equipment and materials (for example Sunbelt Rentals loaned a bobcat for a whole month and Ozinga provided concrete at a massive discount). Finally, many people from the neighborhood showed up to help on the workdays as they rebuilt the site together.
By May 2014, the garden had been remediated and about 70% of the plan had been implemented. The redevelopment was overall a great success, and a detailed video of it can be seen at https://www.youtube.com/watch?v=Bo7qrU7Yfc8 ("La Huerta Roots & Rays - Time lapse of remediation/redevelopment 2014").

5. Findings

In this section, we present the main findings of this study, which detail the practices through which the planning process fostered community engagement. For analytical purposes, we have divided this section into two parts: involvement with the planning process; and engagement with the goals and products of the planning process.

5.1 Involvement with the planning process

For a participatory planning process to be successful, people need to be truly involved. First, they need to be able to attend the meetings; they also need to feel that they are welcome; and they sometimes need to be empowered (for example, through effective facilitation). In this case study, we were able to identify several instances when these measures were taken.

5.1.1 Careful Outreach Plan

The planning team carefully planned and executed an outreach strategy that involved numerous stakeholders in the community. There were some particular challenges in this outreach plan that are worth mentioning: there were culture and language barriers, and there was hostility towards the original garden group's "whiteness". The outreach plan took these issues into account and acted to counteract them by seeking out the community leaders and gaining their support, and by preparing bilingual print material that was culturally relevant.
The outreach plan was a fundamental first step to bring a diverse group of people on board with the planning process. It brought various advantages to the process. First, it brought legitimacy to its participatory nature - many non-members of the garden felt that they could participate in the planning process. Second, this brought legitimacy to what the team was doing vis-à-vis the neighborhood - community members would be more prone to support decisions made during the planning process even if they did not participate since they had been encouraged to join the effort. Third, this helped the planning team tap into community resources (such as food donations) from

[2] The gentleman who built the paths lived across the street from the garden. He had never been involved with the garden and did not attend any of the planning sessions, but said he was working on the paths because "Now I have a reason to come here, for the grill and the picnic area. The garden is going to become an extension of my backyard".

businesses and organizations in the neighborhood that knew that the process and the garden redesign were in progress.

5.1.2 Language

As most of the residents of Pilsen were Spanish speakers, the planning team's decision to conduct a bilingual planning process was significant. Some participants did not communicate well in English, and they would not have been able to understand, let alone voice their ideas, if the process had not embraced them. Additionally, the fact that the interpretive translators were garden members ensured a closer, more personal environment that made people feel comfortable with the process.

5.1.3 Logistics

Many decisions regarding the meeting's logistics were important to increase the participatory nature of the process. The first aspect refers to time and location; the planning sessions had a good turnout because these were carefully planned around the dynamics of the neighborhood. For example, the team was sensitive to the fact that even though they had a great location with the necessary infrastructure for the planning sessions, the church was a familiar location and hence more welcoming for the community. As such, they decided to hold the first meeting at the church, and then, after bringing people on board, they continued the sessions in the second location.
Second, offering food was a good measure to increase participation and to help people connect in an informal manner. Having good, hot food available gave people energy to keep going, even when the meetings ran late. Besides, it allowed for families to participate, as they would not need to cook that evening for the family. It also worked well to have snack breaks between activities; the breaks were informal and gave people an opportunity to interact and get to know each other, forming bonds between participants.
Another relevant measure taken was offering childcare. Offering childcare for the younger children was crucial to welcome and engage families, and necessary to maintain a high level of productivity in the meetings. The fact that they also adapted the meeting structures to include planning activities specifically targeted for children is yet another example of how they were concerned with creating an inclusive and engaging process.

5.1.4 Making the process interesting, relevant and fun

The planning team made a conscious effort to make the process interesting and fun for participants. Activities included a lot of moving around and props, and they avoided making people sit around a table for too long and letting conversations drag on. This constant shifting of gears was important to keep such a diverse group of people engaged. They also adopted creative ways of doing things, customized for their particular context. For instance, voting was performed in a variety of ways, using dot stickers, beans, runoff method and more.
The final session was dedicated to the charrette of the site plan, which was perhaps the most engaging activity. This was a great exercise for two reasons. First, the dynamic nature of the exercise demanded constant negotiation between participants, and in the end they had reached a consensus about the layout. This really brought participants together. Second, it allowed everyone to visualize what they had been working towards for the past several weeks, giving participants a great sense of accomplishment, pride and satisfaction. This was crucial, as it motivated them to move forward the

next steps in the process (fundraising and implementation of the plan) and to remain engaged with the garden.

5.2 Engagement with the goals and products of the planning process

As this study proposes, the first step to guarantee future community engagement with a project is to involve people in the planning process. The second step is to conduct the planning process in such a way that its practices will induce people to develop a sense of ownership with that which is being planned.
La Huerta Roots & Rays' planning process was successful because it promoted many practices that gave people ownership of the project; and ultimately making people feel emotionally attached to the garden and connected to other garden members motivated them to stay involved.

5.2.1 Democratic decision-making

Every decision made was either by consensus or by vote. Even the most crucial decisions of the project were made democratically. For instance, even though the decision to remediate the (contaminated) land seemed obvious, the garden leadership still called a meeting with garden members to understand their positions and feelings about it. It also ensured that the decision was made by the group as a whole, giving everyone ownership of this important decision and increasing the likelihood that they would remain engaged throughout the entire planning process.
Another example of this was the first session, in which everyone could propose the goals and objectives for the garden. All goals and wishes of the community were included in a "goals and objectives matrix", which served as a guide throughout the whole planning process. All of the ideas that were suggested in that first meeting were included in the plan.

5.2.2 Individual projects

Perhaps the activity that most fostered engagement was the individual projects. As explained before, participants proposed ideas of elements to include in the garden (a grill, a picnic table, an apple tree, etc.) and were tasked with developing a one-page professional-grade summary of it. The act of proposing an idea was already an act of cognitive engagement: most people proposed projects that had personal significance. For example, one garden member was part of the Pilsen Chess Club and so he proposed a chess table, another one was a teacher and she suggested bird feeders that she would make with her students, and so on.
The individual projects connected people with the garden at the individual level, making the sense of ownership a concrete, rather than abstract, idea. There was indeed a part of the garden that existed due to them, and it was now, above all, their job (and the community's) to implement and sustain it.

5.2.3 Skill sharing and empowerment

Another manner of fostering engagement and a feeling of empowerment was by assigning participants with special roles and functions throughout the process. Every session included presentations and activities led by different participants, often designed for participants to showcase special skills and expertise. For example, one of the garden members was an architect, and she helped with the site plan. Another was a child psychologist and she worked with the younger

participants. Another member was a master gardener, and she prepared a presentation on gardening techniques. This made participants feel valued and appreciated, as they all had something special to contribute to the process.

6. Conclusion

Community gardens are unlike any other public spaces in that the responsibility for their maintenance lies upon the community that surrounds it. Very few cities provide resources and services to upkeep publicly owned spaces like urban gardens, and when they do they are minimal. This means that *one of the most important aspects of planning a garden is engaging with its potential users to make sure the space is kept alive and well maintained*.

In order for people to care for the space, they need to feel connected to it. A basic premise of planning a community garden therefore is *developing a community that will grow around the space*. The people involved need to be engaged in a way that they naturally take ownership of it.

The goal of this paper was to identify practices in the planning process that enhance community engagement and increase feelings of ownership and commitment. The case of *La Huerta Roots & Rays* demonstrated that a powerful bond may be established between a community and a physical space through a process that uses a participatory and collaborative approach. Our findings highlighted the specific practices used during their planning process that mobilized participants and fostered a sense of community and ownership towards the space.

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Aurora Cavallo, D. Pellegrino, Benedetta Di Donato, Davide Marino, "Values, roles and actors as drivers to build a local food strategy: the case of Agricultural Park of *Casal del marmo*", In: *Localizing urban food strategies. Farming cities and performing rurality.* 7th International Aesop Sustainable Food Planning Conference Proceedings, Torino, 7-9 October 2015, edited by Giuseppe Cinà and Egidio Dansero, Torino, Politecnico di Torino, 2015, pp 355-364. ISBN 978-88-8202-060-6

VALUES, ROLES AND ACTORS AS DRIVERS TO BUILD A LOCAL FOOD STRATEGY: THE CASE OF AGRICULTURAL PARK OF "CASAL DEL MARMO"

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Keywords: Food planning, urban agriculture, Rome, ecosystem services.

Abstract: The paper configures the Parco Agricolo of Casal del Marmo, as well as all other food practices in Rome, as a device of resilience for the city, made up of places where flows, relationships and processes become increasingly more sustainable, and where both physical and intangible spaces act as an infrastructure in their exchange with the city. Our issue is about understanding the role of a Parco Agricolo in building a food strategy, increasing knowledge and establishing a baseline for evaluating the potential role of local food shed, even in terms of its impact on agro-ecosystems and landscape.

1. Introduction

The relationship between agriculture, food and cities - seen not as a simple fact but as a complex system of social, economical and political behaviours - can tell the story of many Mediterranean cities and certainly that of Rome. The lack of productive urban land, the food insecurity, the uncontrolled urban growth, the lack of stable local food markets, the land use conflicts in the urban areas and a general lack of knowledge about the food production, fuel the debate about city and food in time of changes.

Casal del Marmo area is located in Rome, on both public and private land. In the area take place two different farms, one is a social cooperative, deeply involved in care farming, and the other one is a large landed estate example. The park's area hosts several informal allotment gardens and it seems extremely interesting in terms of both natural and agricultural aspects. The process of park design is involving both the Municipality of Rome and different local stakeholders. It has several objectives: it aims to reconstruct the historical heritage of the area, to develop innovative ways to strengthen the sustainability of new model of business and market, and to identify governance model of public involvement. We focus on understanding the role of a Parco Agricolo in building a food strategy, increasing knowledge and establishing a baseline for evaluating the potential role of local food shed, even in terms of its impact on agro-ecosystems and landscape. Starting from the relationship between town and country in Mediterranean contexts (Cavallo et al., 2014), we focusing on some main questions: Which planning and governance path is developing? How the local community perceived the flow of externalities produced by the park? And finally which role can be played by farming and food activities conducted in the Park, in the neighbourhood transformation process?

The paper is organized as follow: paragraph 2 summarizes the main Rome practice, in paragraph 3 we focus on the park area, in 4 on analysis of ecosystem services in Casal del Marmo to understand how the local community perceived the flows of products, good and services of the Parco. In sections 5 we deepen the role played by the involved actors and the commitment of Rome City Council and we discuss the potential role of the park in building a local food Strategy and some final remarks.

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2. The role of Casal del Marmo Park within Rome food practices

Since 2013 Rome Municipality is engaged in different initiatives strictly linked with agriculture and food. Analysing all actions we have select a set of thematic axes to understand their meaning and role in the Roman model.

Frist we have choose the programme 100 Resilient Cities financed by the Rockefeller Foundation (100RC) as the most relevant in terms of education. The program aims to bring cities around the world to a more resilient model, within the program 100RC Rome Municipality is seeking new ways to preserve its rich cultural heritage and protect itself from a variety of environmental and socioeconomic shocks and stresses. Rome is struggling to reverse decades of poorly regulated development and address its informal housing neighbourhoods, inadequate infrastructure provision, and sprawl.

Regarding the public food service, Rome represents a model at international level in school canteen (Morgan and Sonnino, 2008). One of the most important project deserving to be presented is known as the Quality Revolution, concerned with school canteen service in Rome. In the last decade the concept of quality has been widely used to describe the dynamics that have been shaping the system of food and agriculture. Moreover, nowadays organic food represents the 69% of all food served in schools, except meat, fish and cold cuts. Rome's approach enhanced the market in terms of sustainability and quality and companies are now aware that they face a public administration, which requires strict compliance in order to continuously improve their own performance. Nowadays, the Rome City Council has promoted a new initiative involving an agricultural cooperative and a primary school, named "Uruguay", where twice a month the school meals come from a farm based near the school. We can consider this practice as at the same time an education and a farming support action, but due to the fact that only one school has adopted this model we can not consider notable its impact on urban resilience.

The role played by the local food network in Rome is remarkable, particularly in case of farmers' market, SPG' and those linked to box schemes experiences have seen significant success (Cavallo et al., 2015). The increasing importance of Alternative and Local Food Networks is showed in the data: the 60% of Rome municipalities farms sell directly (Istat, 2012) it was registered an increase of + 57% Farmers' market at municipality level and of + 64% in Rome Metropolitan Area (2010/13) (Marino et al., 2013). The Rome Local Food Network behind agriculture in the city, within a number of integrated social agrarian cooperative, who represented an alternative food production system and landmark for many initiatives carried out by the civil society, associations, cooperatives, volunteer and school sectors, community supported agriculture (CSA) initiatives. Now Rome has a Regulation on farmers market and the XIV Municipality has activated "DOM", a brand that distinguishes the products of SFSC from about 30 local farms. "DOM" is an interesting case due to its role in terms of business, different from all other action that are able to act mostly in terms of education.

Rome's city limits include large expanses of still viable agricultural lands and natural reserves, and its forward looking planners are focused on transforming these assets in order to maintain and protect its environment and build long-term resilience to shocks and stresses. The Rome City Council is enhancing actions to promote integrated management of agricultural lands, defining tools aimed to promote biodiversity and landscape protection. During the last year the Rome Municipality allocate 50 hectares of vacant public lands to two different groups of young farmers with the idea of promote urban and periurban agriculture. Borghetto San Carlo, 22 hectares in the north side of the city, is located in the Protected area of Parco di Vejo, a green infrastructure that connect a marginal urban area with the Rome countryside. The second, named Tor de Cenci, is in the opposite side of Rome, between an high density neighbourhood and the Protected area of Castel Porziano. It's to early to analyse effects of both experiences in terms of impacts, but we can estimate a very high role of this

kind of practice in education. The Rome council presents an announcement for four different areas, but due the fact that one of those was not vacant – it is occupied by a group of activist from the 60s– and one needs an high investment to be activate, only the 50% are involved in a process of reuse.
Rome has four historical public farms, for an amount of 2400 hectares inside the city, in an deficit budget, in this framework Borghetto and Tor de Cenci represent a new and interesting way to manage public lands, the framework of the Rome City Council Commitment on food and agriculture is summarized in figure 1.
Moving from farming to planning actions, again the XIV Municipality has started the project for Casal del Marmo Park. It's a combination of a working farm and a municipal park that is located at the urban edge. The Agro Park can serve as transition and buffer between urban and agricultural uses. It'd be a multiple space defined by small farms, public areas and natural habitat.
Casal del Marmo is located on both public and private lands, vary in acreage, and it host single and multiple tenants, and have a variety of both agricultural and park components.
The system described above configures a set of different forms of foodscape as a device of resilience, made up of places where flows, relationships and processes become increasingly more sustainable, and where both physical and intangible spaces act as an infrastructure in their exchange with the city.

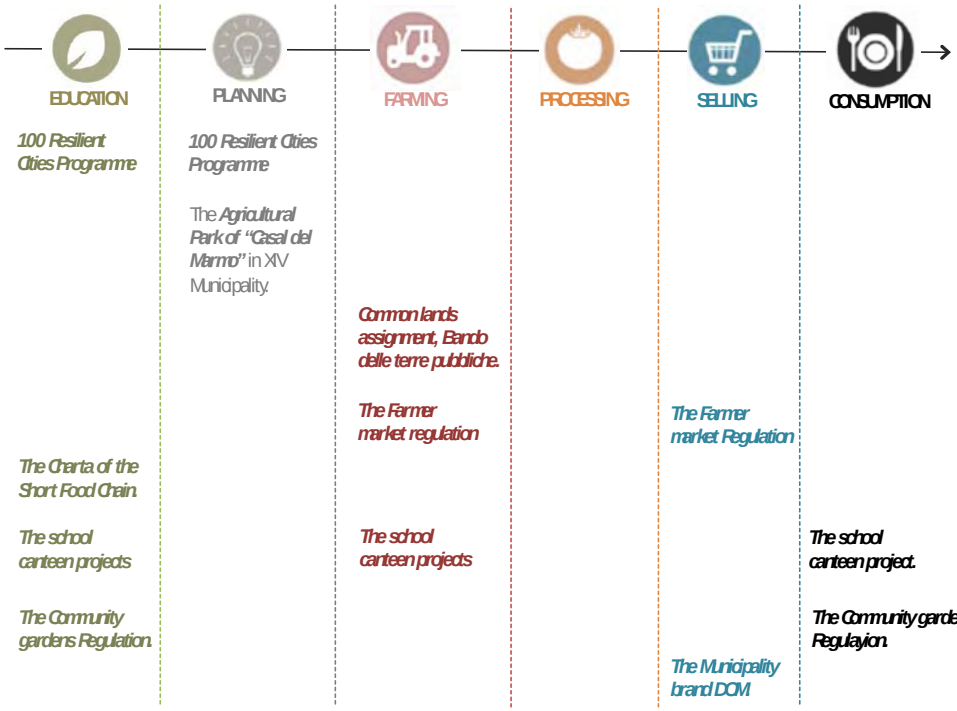

Figure 1. The Rome City Council Commitment on food and agriculture.

However most actions are based on informal practices, establish by The Rome Municipality, their scale is still local and can't design a network. The Roman model is strongly bottom up, with an ineffective policy making and planning actions. The Rome council is not able to act also at the metropolitan level and it's an obstacle in building a strengthening urban rural relationship in terms of administrative engagement. The last issues is about built a link between market and Institutions: it's seems that all energies are in education actions and only a few part of Roman Council projects are able to look at the agriculture activity as economic tools to develop new urban models.

3. The Parco Agricolo of Casal del Marmo

The Parco Agricolo of Casal del Marmo is located in the North-West of Rome within the GRA, the major highway that surrounds the city. The Parco Agricolo includes about 500 hectares of cropland (Agro Romano) between the urban areas of Palmarola neighborhood in the north and Primavalle and Torrevecchia neighborhoods in the south-east. In the Parco Agricolo there are numerous items of historical and archaeological interest and some major public infrastructure like Santa Maria della Pietà, San Filippo Neri Hospital, the high school "Pasteur" and the juvenile prison "Casal del Marmo".
The Parco Agricolo of Casal del Marmo is a "naturalistic remains" of the Agro Romano that, before the urbanization and expansion of the city, had an ecosystemic continuity with other green areas, now protected, in the North West of Rome (Insugherata Natural Reserve, Urban Regional Park "Pineto", Natural Reserve of Monte Mario and Natural Reserve of the "Tenuta dell'Acquafredda").
The area of the Parco Agricolo is included in the XIV Municipality of Rome, it is an extended floodplan with a minor hydrographic network made up of three valleys: Polledrara ditch (1.5 km), Marmo Nuovo ditch (4.3 km) and Fagiano ditch which flows into Capannelle ditch (3.6 km). While Polledrara ditch has not suffered any particular environmental impacts, Marmo Nuovo and Capannelle ditches present bad environmental conditions due to not untreated sewage that is the main cause of pollution in the area, together with illegal landfills dumping.
The Parco Agricolo is a complex agro-ecosystem where natural and human factors are highly integrated. The allocation of land ownership is a first factor: the 30% of the area is owned by the Rome Metro Area (120 hectares), half is entrusted to the Cobragor cooperative, a multifunctional farm that, in addition to traditional farming activities, including arable land, permanent crops (olive groves, orchards), greenhouse and open field vegetables, has been carrying on different activities related to olives processing, agritourism and educative courses for schools.
The remaining public part of the Parco Agricolo includes some areas squatted by "ortisti" (vegetable gardeners) and divided in about 200 small cultivated plots fenced with recycled materials.
The private land of the Parco Agricolo is about twice in terms of extension of the public part and it is currently used for cultivation. It consists of three large estates (Massara, Mancini and Vittorini, respectively of 100, 110 and 60 ha) and other small areas smaller than one hectare. The part of the Parco Agricolo beside via di Casal del Marmo is important for grazing thanks to presence of meadows and pastures.
Agricultural activities in the area both as an economic (Cobragor cooperative) and a social activity and leisure (urban gardens) have undoubtedly been the main defense of this part of the city from soil sealing and have increased people's awareness of the material and immaterial value. In 2012 the "Committee for the Parco Agricolo di Casal del Marmo" has started to promote the project of the Parco Agricolo of Casal del Marmo as required by the Piano Regolatore Generale of Rome (PRG), the roman urban plan. The project has many objectives crucial for the future of the area from environmental and socio-economic point of view.
The Parco Agricolo di Casal del Marmo has a good potential accessibility related to the presence of the urban railway Rome-Cesano and several entrances for cars, bikes and pedestrians. Despite this advantage, the use of the area is still very difficult as most of the land is private and inaccessible.
Currently land use cover shows the presence of natural grasslands mostly without trees and shrubs (32.5%), arable land (23.4%) and grassland without trees and shrubs (17.3%), as showed in table 1.

Table 1. Land use of the Casal del Marmo Agricultural Park

Corine Land Cover code	Land Use Class definition	Area (ha)	%
2111	Arable land prevailingly without dispersed (line and point) vegetation	107,86	23,4
2221	Orchards	6,87	1,5
2231	Olive groves	4,08	0,9
2311	Grassland (pastures and meadows) prevailingly without trees and shrubs	79,8	17,3
2422	Complex cultivation patterns with scattered houses	36,76	8
3211	Natural grassland prevailingly without trees and shrubs	150,16	32,5
3111	Broad-leaved forests with continuous canopy, not on mire	16,36	3,5
31121	Broad-leaved forests with continuous canopy on mire	42,77	9,3
322	Moors and heathland	12,27	2,7
323	Sclerophyllous vegetation	4,94	1,1
	Total	461,873	100

Source: Cafiero et al., 2004.

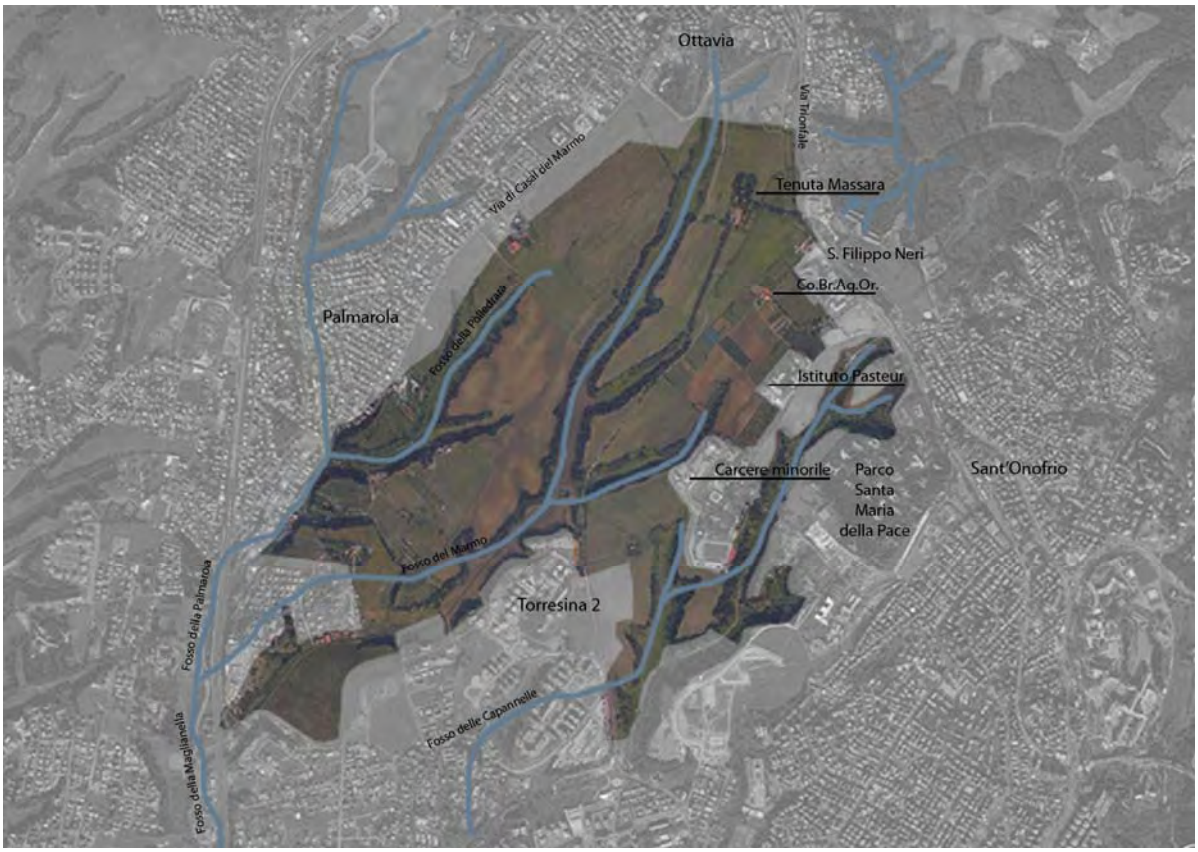

Figure 2. The Agricultural Park of Casal del Marmo.

4. Mapping and assessing the ecosystem service of the Park

One of the main attraction of the Parco Agricolo of Casal del Marmo is its multifunctionality. The benefits provided by the Parco can be defined as "ecosystem services" and have direct and indirect impacts on the urban population well-being (EEA, 2014). The multifunctionality of the Parco Agricolo thus refers to its ability to provide a wide range of ecosystem services to humans, such as provisioning, regulating and cultural services.

To assess the multifunctionality we tried to identify the main ES provided by the area of the Parco Agricolo and to map them through an analysis conducted during the workshop held from the 18th to the 20th of June 2015 and organized by the european project TURAS (Transitioning towards Urban Resilience and Sustainability)[3], an European research on sustainable and resilient cities, financed by the Seventh Framework Programme. The workshop involved about 60 stakeholders including national and international experts: professors, researchers, engineers, architects, agronomists, urban planners, economists and so on, as well as local stakeholders (Parco Agricolo , institutions, etc.). Each expert was asked to indicate the importance (from 1 - very low to 5 - very high) of each ES currently provided by the Parco Agricolo of Casal del Marmo and to indicate "NS" (Don't Know) in case of uncertainty.

After identifying the 3 main ES for the area, in order to figure out which portions and/or elements of the Parco Agricolo could provide these services respondents were asked to draw the number of the corresponding ES within a circle on a map of the area where they believed the service was provided.

As the map shows, the result is quite interesting because it consists in a first spatialization of the main ES by linking elements of the Parco Agricolo to the benefits for the urban population. It is worth noting that the ES 1 "Crops" is concentrated mainly in the area of the CoBragor cooperative, although it is also provided by other areas of the Parco Agricolo including those of private ownership beside Casal del Marmo street or along the Capannelle ditch where the urban gardens are cultivated.

The ES 13 "Pollination and seed dispersal" and 14 "Habitat for biodiversity" are provided mainly by the hydrographic network and appear to be primarily related to the riparian vegetation. Finally, the cultural ES 15 " Recreation and leisure", 16 "Cultural/spirtitual and educational values" and 17 "Landscape aesthetic" are related to both anthropic and natural elements that are widespread throughout the area. In some cases the respondents were not able to identify a specific point for the provision of ES, but they attributed all or some of the main ES to the entire area; this seems more evident for cultural ES that can be hardly associated with a single land use or item, as they result from the overall use of the area. Compared to the knowledge of the ES it is clear that in this area the main interest is the development of agricultural and recreation activities as well as the conservation of landscape amenity within the urban area; indeed, all the respondents have been able to score these ES (none has flag "NS"). Instead the regulating ecosystem services are not always well known as they require specific technical skills to be recognized and understood such as the ES 8 "Erosion control" and ES 12 "Waste treatment".

The perception and evaluation of ecosystem services is a first step for raising awareness of the urban population of the importance of green urban areas. Our assessment has shown that the Parco Agricolo provides many ecosystem services, but at the same time relationships between different stakeholders and land ownership greatly influence the provision of these benefits for the whole urban population. In the case of the Parco Agricolo of Casal del Marmo agricultural production seems to be the key for maintaining or increasing urban resilience. In other words the multifunctionality of Casal del Marmo is mainly due to the food production because without this activity the other ecosystemic functions would not be provided at the same level by the Parco Agricolo. So, defining

[3] www.turas-cities.eu

and implementing a food strategy means also influencing urban land use and local development. In this sense, a major issue is in understanding how to handle different interests (landowners and other stakeholders) and which tools are available for that.

Table 2. List and description of ecosystem services included in the questionnaire

Code	Ecosystem service	Definition
1	Crops	*Cultivation of edible plants and harvest of these plants on agricultural fields and gardens which are used for human nutrition*
2	Biomass for energy (wood)	*Wood used for energy conversion and/or heat production*
3	Wild food	*Wild food, medicinal herbs, etc.*
4	Fresh water	*Used freshwater (e.g. for drinking, domestic use, industrial use, irrigation)*
5	Global climate regulation	*Long-term storage of greenhouse gases in the Park ecosystems*
6	Urban climate regulation	*Changes in local climate components like wind, precipitation, temperature, radiation, etc. due to the Park ecosystem properties.*
7	Water flow regulation	*Maintaining of water cycle features (e.g. water storage and buffer, natural drainage, drought prevention)*
8	Erosion control	*Soil retention and the capacity to prevent and mitigate soil and wind erosion and landslides*
9	Noise reduction	*Absorption of sound waves by vegetation and water*
10	Air purification	*Capturing/filtering of dust, chemicals and gases.*
11	Moderation of environmental extremes	*Physical barrier and absorption on kinetic energy (e.g. storm, floods, heat waves)*
12	Waste treatment	*Effluent filtering and nutrient fixation by ecosystems*
13	Pollination and seed dispersal	*Habitat provision for birds, insects and pollinators*
14	Habitat for biodiversity	*Habitat provision for animal species*
15	Recreation and leisure	*Outdoor activities, including forms of sports, leisure and outdoor pursuit*
16	Cultural/spirtitual and educational values	*Cultural, spiritual or educational values that people attach to the Park*
17	Landscape aesthetic	*Visual quality of the landscape/ecosystems which influences human well-being*

Source: Gómez-Baggethun and Barton, 2013; Kandziora et al., 2013.

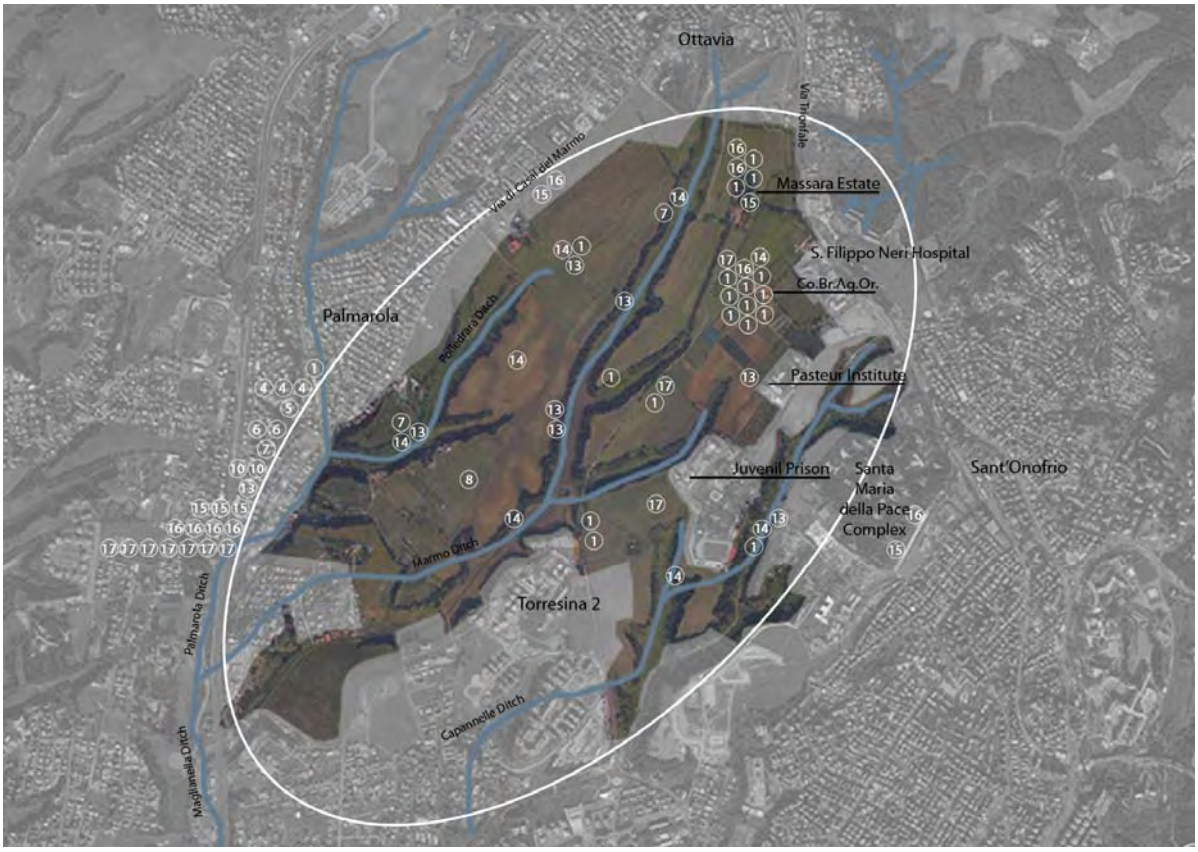

Figure 3. Participatory map of the main Ecosystem services Parco Agricolo di Casal del Marmo.

5. Bridging the gap: actors, procedures and tools

The participatory planning process of Casal del Marmo was started in 2014 within the TURAS project. The process involves a range of actors: the institutional part includes the regional public business innovation agency (BIC Lazio), the XIV local municipality of Rome and the Department of Environment of the Rome City Council. Two associations are involved as civic actors: "Associazione Comitato per il Parco di Casal del Marmo" who has started, since 2012, an informal process to encourage citizens participation and involvement in the planning and transformation processes of the Park area. The gardeners who manage the family allotment gardens in the Western fringe of the site founded an association involved in the process. The landowners represent the business actors: the social agricultural cooperative of CoBrAgOr, who has cultivated a portion of the publicly owned land since the 80s, that is involved in local alternative food network initiatives. The large landed estate of Massara and Vittorini families, those one of Unicredit Bank and the area of the Church. The role played by land property in the Casal del Marmo park is a key issue: there were likewise many actors with conflicting values. Part of the local business community and civil society has also interest in the development of the Parco. The entire area has been earmarked as "collective interest area" in land use planning as "agricultural park" within the last Rome Plan of 2008, the planning process as well as the political decisions that translated into a considerable financial loss for landowners expecting to develop the land. The issues comprises in the Casal del Marmo project at such a large scale within the political and economic context of the city of Rome, with implications for social and natural systems at different scales is particularly relevant.

The Plan of Rome has identifies "agricultural parks" as rural areas to be protected and enhanced due to a unitary systems of their natural, landscape, historical, archaeological values. The tool identify in terms of planning is a "program unit intervention" to be implemented through public interventions, farms planning and "agreements with owner or lessee of farms, also gathered according to the different forms of representation for testing specific projects environmental rehabilitation and agricultural conversion".
The vision developed within the Turas' framework is that the Parco should become the heart of a locally grounded, community-based food system that combines the ecological production of food with leisure, tourism and educational activities for the neighbours and institutions in its local system but also for the entire city.
The model identified by BIC Lazio in the project is linked to an application already conducted in Lazio, which would have a more articulated form in the Park, also including land management. The model is mainly oriented to the food chain: primary agricultural production, manufacturing, processing, packaging and marketing of agricultural products. The goal is to support a highly innovative entrepreneurial activities associated with systems agrifood, forestry, agricultural production and food quality, especially organic.
The key element of the implementation strategy is the establishment of a Public-Private Partnership that should act as the engine of the transition process and bring together the key stakeholders (including the private and public landowners). Within Turas project the research group has identify the case of Community Interest Company (CIC), which is a type of company introduced by the United Kingdom government in 2005, designed for social enterprises that want to use their profits and assets for the public good.

6. Some final remarks

We introduced the concept of agriculture and food as an infrastructure (Cavallo et al., 2014), who refers to agricultural activities and food practices as a fixed social capital: physical as well as immaterial components of interrelated systems providing food and services essential to enable, sustain, or enhance living conditions, considered as a determinant of economic, social as well as environmental growth. The idea of infrastructure aims to focus on the role played by flows (of food, resources, knowledge, work, innovation, waste) between people, areas (urban, agricultural, rural) or neighbourhoods and landscapes beyond divide.
The project configures the Parco Agricolo of Casal del Marmo, within roman food practices framework, as a device of resilience for the city, made up of places where flows, relationships and processes become increasingly more sustainable, and where both physical and intangible spaces act as an infrastructure in their exchange with the city.
The community perception of the park, as result in the ES assessment, still confirms its role in the neighbour. The multifunctionality of the Park refers to its ability to provide a wide range of ecosystem services to humans, such as provisioning, regulating and cultural services.
The Parco Agricolo provides many ecosystem services, furthermore the relationships between different stakeholders and land ownership greatly will influence the provision of these benefits for the whole local community as well as the governance process of the area itself. Moreover, it is seems interesting apply the ES assessment to all different roman practice defined by a strong space approach – Borghetto Flaminio and Tor de Cenci farms within the common public land as well as in the context of Rome City Council' Farms – to understand impacts in terms of knowledge and perceptions and better direct the City Council strategy.

The Parco Agricolo of Casal del Marmo represents a context where farming is answering urban demands in re-building innovative relationships between city and agriculture, citizens and farmers, between private and public (or collective) space. In this sense, the on-going process should play a role in terms of endogenous innovation catalysing farmers' attitudes of responsibility to the community. It is also related to the idea of the civic economy, where the economic value is directly connected to the organisation of relational goods. Local actors – new farmers or social workers, Community Supported Agriculture and box scheme initiatives – can be able to act as a network in a wider perspective of change, following the principles of social innovation and transition theory, where people involved in organising political arenas and planning/policy networks develop and re-organize solutions and negotiate change among sectors and places.

However, local institutions - Municipality, Rome City Council, Metropolitan government, protect areas – play a crucial role. As we discuss in the paper, the on-going process is strongly bottom up – even considering the role played by TURAS project - it is clearly also both cause and effect of feeble planning and policy action, that is, the role of institutions and decision-making in governing the processes, where planning and policy chases rather than directs the change. Moreover the local institutions should rebalance the relationship between actors in a case such Casal del Marmo where large landowners force the process toward the private and income interests rather than those of local community. Finally, adequate governance, procedures and tools have to be considered in order to built an inclusive, effective and multilevel government action, in this fields further research efforts are required.

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ROOFTOP ORCHARDS AS URBAN REGENERATION DEVICES. ORTIALTI CASE STUDY

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Keywords : rooftop farming, urban regeneration, participation, social innovation

Abstract: This paper explains how grown rooftop gardens can work as urban regeneration devices, by combining environmental and social benefits. In particular, it describes OrtiAlti project, a research project and a start-up, set up to boost up and to coordinate collaborative processes, involving profit sector, public institutions, third sector and citizens, aimed at building community rooftop gardens and connecting them in a supportive urban network. OrtiAlti is a metaphor, a way to demystify the old categories of spatial planning, a real new ontology that redefines the conflicting relationship between the public and private sectors in the use of resources such as the soil; that recognizes as multi-dimensional certain categories of urban spaces and activities; that includes new economic and social actors that operate as subjects able to produce values of collective interest to the community.

1. New challenges, new solutions

According to data compiled by the United Nations, in the incoming 10 years more than half of the world population will live in urban areas (UN HABITAT, 2010). Cities are in fact the places where environmental issues occur more evidently, due to gas emissions, energy consumption, waste production, heat islands and rainfall events; where the reduction of open spaces, the high demand for increasingly scarce resources such as water, energy and fresh food supply contribute to increase social conflicts and segregation. Nevertheless, cities are also the ideal spatial conditions for research and innovation and for active participation: by opening the field to new models of sociability, urban policies have been implemented, supported and informed by "bottom-up" urban communities' initiatives, often filling up the limits of a "top-down" politics. As a creative response to these dynamics, in 2013 in Turin was established OrtiAlti**,** a social innovation project, that aims to interlace environmental sustainability, with ethical food production and participation.

The idea at the core of OrtiAlti is to activate a collaborative methodology between the local communities, social enterprises (Zandonai, Venturi, 2014), private owners and profit organizations, by recovering abandoned flat roofs and converting them into productive community gardens. OrtiAlti combines in its approach two main urban problems, common to the most of contemporary European cities. The first concerns climate change impacts and the need for ensuring adaptation strategies for urban development and management; the second is related to the progressive increase of urban relicts: old factories, abandoned public facilities even private real estates, contended between a saturated market and the inability of public policies in promoting and investing on effective requalification processes (Saporito, 2015). The main goal of the project is then to facilitate and boost bottom-up practices of urban re-use and regeneration through urban farming, that can be certainly considered one of the main adaptation strategy for climate change (Dubbeling, 2014; World Bank, 2010), especially when integrated in architecture through green roofing solutions (Acherman & Al., 2014).

Food, in fact, appears as the ideal medium through which to design sustainable places and to contribute to the growth of the public city of tomorrow. In fact, next to the impact on the urban environment, due to the opportunity of greening the city and re-using abandoned lands or buildings,

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stands the opportunity of empowering urban inhabitants by allowing them to have direct access to food production and food procurement, which is increasingly seen as a matter of social justice (Mees & Stone, 2012), and to reclaim urban spaces for collective uses, like community gardens.
Urban farming is hence opening the way to a renewed urban landscape, levering on a growing and widespread culture of green and sustainable urban life styles. In a period of recession in which 7 families out 10 are forced to cut spending on food, urban gardens are becoming increasingly popular. In Italy there are about nine million city farmers (+ 9% compared to 2012)[2] who take care of a vegetable garden in the suburbs, for a total of 1.8 million hectares. The demand for these spaces is growing and not always administrations are able to satisfy it. In fact, for some cities, land availability constitutes a big challenge for urban food production: although there might be large resources of brownfields that could be made accessible and suitable for agricultural purposes, this would imply high decontamination costs, often not affordable for public administrations (Specht & Al., 2014). Moreover, in densely built-up areas, low-space technologies, from green roofing tech to vertical farming3, would offer tremendous opportunities for space-confined cultivation (Quesnel & Al., 2011).
In the light of ever more reduced public investments and of further impoverishment of weaker sections of urban societies, alternative approaches to urban development and food access, like the one proposed by OrtiAlti, appear necessary and more effective. The activation of local resources, the exploitation of the different identities, creating living spaces that facilitate collective social ties, foster new alliances, creating new job opportunities, make clear the link that necessarily exists between the processes of social innovation, urban regeneration and urban farming.
OrtiAlti has recently been awarded with the first prize of the national contest "WE-progetti delle donne", announced by WE-Women for Expo and Italian Pavillion for Expo Milano 2015.

2. The OrtiAlti case study

In the city of Turin, almost the 10%[4] of the territorial area is made of unused flat roofs – from garages, to residential buildings, supermarkets and industrial sheds-. To convert these parts of the city in roof gardens planted with vegetables, managed by citizens and connected in a supportive network represents a powerful tool for urban transformation and renewal, and cities environmental and social regeneration. As a first experimentation of that, in 2010 was realized the first community rooftop garden in Turin, known as "Oursecretgarden"[5](Fig. 1). This first installation was built over the roof of an architectural office (STUDIO999), located in the courtyard of a residential block in one of the most dense and populated neighborhoods of the city, San Salvario. Since then, the orchard has been cultivated and managed by the architects that work "under the garden" and by the inhabitants of the block, who have participated to the recovery process since the beginning. It was technically a simple project, but an innovative concept. This first experience received a lot of media attention, because it was able to intercept, in a more or less explicit and conscious way, many sensitive issues which are increasingly falling into common understandings and public policy-making practices: environmental sustainability and energy conservation, urban agriculture and the short chain, new forms of proximity and sharing practices, as well as sharing economy. The success of Oursecretgarden triggered an

[2] This data is drawn from CIA, the Italian Confederation of Farmers, from 2013.
[3] With the expression "Vertical Farming" is defined as the concept of cultivating plants or animal life within skyscrapers or on vertically inclined surfaces. For a deeper study, see Despommier, D. (2010), *The vertical farm: Feeding the world in the 21st Century*, Thomas Dunne Books, New York
[4] Source C.S.I. Piemonte (Informative System Consortium)
[5] Oursecretgarden has been awarded in 2010 with the Legambiente Prize "Innovazione Amica dell'Ambiente", and in 2011 was included among the Best Private Plots from an Austrian prize for gardening and design.

immediate reflection about the potential impact at the urban scale of similar actions. The flat roofs appear as unused resources available to urban inhabitants, and the roof garden as a device capable of integrating immediate environmental benefits, with important social effects, linking urban re-use, to collective green places, and promoting horticultural production as a practice of food security, solidarity, education and care. OrtiAlti was born in 2013, while working on the candidacy at the European competition LIFE+, thanks to a collaboration between the designers of Oursecretgarden, the Departments of Urban Planning, Environmental Engineering and Energy of the Polytechnic School of Turin and the company Harpo Trieste, producer and supplier of green roof technologies. A first application of the project was proposed for the City of Nichelino (Turin) and consisted in creating a network of rooftop community gardens on public buildings like schools and libraries, through the direct participation of local inhabitants and users.

Figure 1. Ousecretgarden, San Salvario, Turin. Ph. Lena Cagnotto

From this first confrontation of the project, OrtiAlti evolved into a social enterprise project, able to work on urban regeneration through virtuous collaborative processes between different subjects: profit and nonprofit, local and institutional actors, individuals and communities. The social innovation model proposed by the project consists in aggregating different functions and new opportunities for local actors, thanks to the installation of a farmed roof. In particular, the collaborative methodology developed consists of complementary steps: co-design the intervention with direct users, empowering them in taking care of the garden; involve local social enterprises employing disadvantaged people, or working in the health care service, as operative partners, both for roofing installation and gardens management; engage nonprofit associations working on food security to share the surplus produce; organize cultural and entertainment activities open to everybody on the recovered roofs. OrtiAlti thus induces social value and contributes to design and activate new

community spaces, overcoming the public-private dichotomy. Each ortoalto is a unique project, contingent in time and space. In fact, it grows from the coordination of a plurality of subjects with potentially different interests and values, whose action can be mediated only because it takes place around that specific project. The subjects coordinated by OrtiAlti are: Harpo, the company that produces its own technology for green roofs; The Cooperative and Social Enterprise Agridea, that thanks to OrtiAlti has certified its gardeners for the installation of green roofs, thus expanding its market and offering new opportunities of employment and training for its beneficiaries; the building owners, which benefits from the valorization of the property, because of the improvement of buinding energy performance and its aesthetical quality; the householders and users of the space reclaimed, who can benefit from fresh zero food miles every day.
The approach to urban re-use and farming proposed by OrtiAlti is easily scalable. It can be applied on different typologies of buildings, with different direct users, but still combing private and public rationalities: rooftop gardens can be placed on individual homes, institutional and office buildings, and roofs of restaurants and serve either home consumption, use of fresh produce in restaurants or institutional kitchens or commercial production.
Related to that, the OrtiAlti team is today working on two main prototypal interventions. The first involves a restaurant and a hostel in Turin, both run by a social enterprise that employs disadvantaged young and organizes cooking classes for its beneficiaries. Thanks to its new ortoalto, this cooperative will be able to refurbish the building where its activities are located –an old factory from early 30’s, owed by the Municipality - ; to produce fresh vegetables for the restaurant; to extend their set of services, by adding gardening classes for its beneficiaries; to provide the neighborhood with a new and high quality community space, open for schools and several public activities. The other implementation is with Carrefour Italia: the project consists in a new ortoalto for educational activities in Carrefour new mall in the city of Nichelino – next to Turin -, as part of its corporate social responsibility. Carrefour has allocated 600 sqm for this new function and is working on a management plan, that will include the direct involvement of local inhabitants, associations and schools, in order to make this space publicly accessible.

3. An urban regeneration device: combining multiple impacts

OrtiAlti combines two innovations: a technological one and a social one. According to literature on green roofs and urban farming, a farmed green roof can at the same time value the real estate, and work as a new ecosystem (Oberndorfer, Lundholm, Bass, Coffman, 2007) and a climate change mitigation solution. The technology for green roofs, in fact, consists of the superposition on the flat surface of a series of insulating elements/layers: a root-resistant waterproofing PVC membrane; a water storage and mechanical protection felt; a drainage, aeration and water storage element; a filter sheet and the cultivation soil[6]. The latter is particularly important, since it needs to be composed in order to have enough nutrients for the cultivation, to be effective within no more than 20-25 cm of thickness, and to be lightweight. From an environmental point of view, green roofs improve air quality, by filtrating particulates and creating re-oxygenation zones. If put in a network, green roofs can create a real ecosystem, able to reactivate biodiversity in urban environments, to prevent “heat-island” effects and to ensure better management for rainfalls, reducing episodes of urban flooding. A green roof, in fact, imbibes and “stores” water and blocks instant flow. Furthermore, it allows the reintroduction and the re-use of sewage into the building-apparatus. In regards of energy

[6] The technology used by OrtiAlti is the one produced by HARPO Group, an Italian company from Trieste. For more informations, see www.harpogroup.it

consumption, green roofs improve buildings performances, by intensifying thermal insulation and improving indoor micro-climate of rooms in the floors below and thus contributing to reduce heating and cooling systems costs as well as C02 emissions. In addition, this solution absorbs sound waves and controls their diffusion, allowing to achieve better room acoustic insulation.

Table 1. Environmental benefits of a green roof in urban areas

	Improvements
Roof external temperature	- 20° C
Heat Island effect	- 2 °C
Air quality	> Oxygen
Building energy demand in winter	- 10/30 %
Building energy demand in summer	-75,00%
Noise pollution	- 5dB
Rain water contained in the drainage system	35,00%

[A]100 mq of leaves can filter up to 10/30 mg of pollute (Susca, Graffin, Dell'Osso, 2011)
Sources: (Tehodosius, 2003; Dunnett and Kingsbury 2004; Oberndorfer & al., 2011)

Since it is cultivated, a farmed green roof can satisfy fresh vegetables requirements of several families - for example, 100 sqm of tomatoes can produce 2 tonnes per year-, combining private benefits with collective ones. It can contribute to ensure food security and promote KM0 food supply chain (Bohn & Viljoen, 2011; Wilson, 2009). Moreover, it enables to recycle the biggest part of organic domestic waste of an entire residential building that, transformed in compost, can be used as natural fertilizers for the soil. The experience of *Ousecretgarden* has shown that even if 40 sqm of a grown garden are not sufficient to guarantee the yearly needs of the 6 families living in the overlooking condo, it can certainly integrate part of the vegetables required and offer them a new urban living experience. However, if one of the reason behind urban farming is the desire to reconnect production with consumption, roofs dimensions matter in case of soil-based farming. In response to similar limits, some of the most futuristic systems for roof farming propose to intensify production through multilevel urban structures or greenhouse systems, with very sophisticated growing methods, like hydroponic or aquaponics[7], so that to exploit as much as possible the available roof surface (Thomaier & Al., 20015) and still obtain relevant environmental effects (Delor, 2011).
From the social impact point of view, the innovation boosted by OrtiAlti approach is systemic: building owners -private or public-, which pay for the rooftop garden, can benefit from the risen value of their real estate property, the reduction of their expenditures, and the return of image –especially in case of investors like companies or G.D.O-, while they contribute to environmental sustainability and social cohesion; P.A. can leverage on these interventions integrating their public policies on green areas and food security, especially thanks to the potential involvement of local O.N.G. engaged in fighting urban poverty; local communities can satisfy part of their requirements for fresh vegetable, but, most of all, they can benefit of a new pleasant collective green area. A grown garden cultivated and looked after by citizens favours sociability between them, exchanges between generations -

[7] Hydroponics is a subset of hydroculture and is a method of **growing** plants using mineral nutrient solutions, in water, without soil. Aquaponics is even more sophisticated, since it integrates plant and fish production, in re-circulated closed system (water tank).

especially between elders and kids - and different cultures, and the pursuance of healthy and economical physical activity.

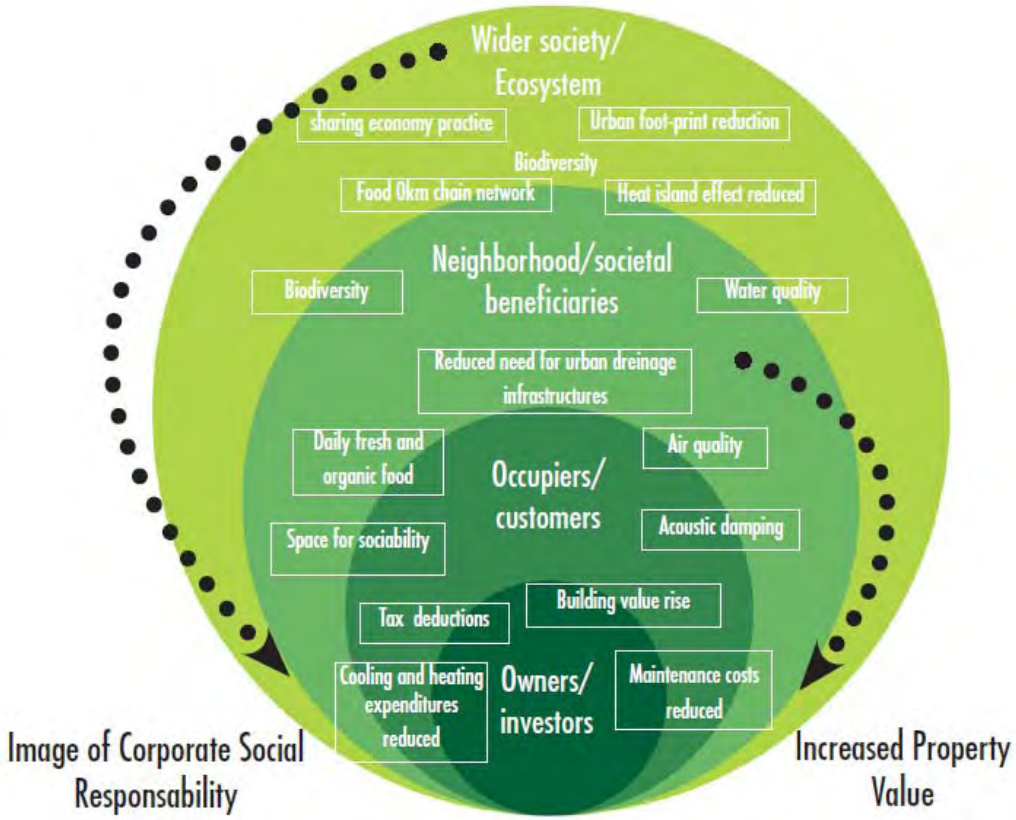

Figure 2. Multi-scalar positive impacts of OrtiAlti approach.

4. Towards a new ontology for urban planning

At the core of the OrtiAlti approach there was the idea that urban farming and urban regeneration could have been associated if framed within the concept of “urban resilience”, meaning the ability to adapt at changes without changing the systemic structure. In particular, this concept has recently migrated into the urban debate as umbrella for the planning and design strategies needed to support cities to develop the necessary capacity to meet the challenges of the future. Urban resilience is the degree to which cities are able to tolerate alteration before reorganizing around a new set of structures and processes. Hence, a resilient city is a settlement able to activate strategies to innovate its own internal equilibrium, according to the evolutions of contextual conditions; it is a city that adapts to climate change and that opts for the re-use and reconversion of its own urban fabric, rather than investing on no longer sustainable edification. Moreover, a city is resilient when it’s able to plan and implement permanent strategies for social homoeostasis, through mechanisms of smart collective governance.

According to this new paradigm for urban development, the ortoalto concept unveils the tangible opportunity to consider urban equipment – buildings, infrastructures, squares, green areas, ecc.. - as

dynamic resources, able to aggregate different communities of users, different public policies, different functions, hence different stakeholders. To reintroduce sustainable food infrastructures in the urban space becomes thus a “boundary strategy” to coordinate a wide range of functions, able to meet not-only production-oriented spaces, but many societal and ecological aims. According to Lovell (2010) the real challenge is hence to design multi-dimensional urban landscapes.
The ortoalto can work as a metaphor, a concept that demystify the old categories of spatial planning. A real new ontology that redefines the conflicting relationship between the public and private sectors in the use of resources such as the soil; that recognizes as multi-dimensional certain categories of urban spaces and activities; that includes new economic and social actors that operate as subjects able to produce values of collective interest to the community. The OrtiAlti case study, in fact, demonstrates the integrationist role of urban space, as at the same time prompter and recipient of different public policies: on the ortoalto meet welfare and educational policies, but also environmental and economic public initiatives. It also underlines the widespread commitment of private subjects – professionals, neighborhood organizations, social enterprises, inhabitants, ecc. – in taking care of the urban spaces and in designing new urban services through collaborative relationships.

We are facing an important paradigmatic change in urban planning, which implies some important reflections about meanings and methods:

- First, the overthrow of the traditional consideration of externalities produced by the phenomena of urban transformation and territorial policies. In Italy we are used to consider real estate initiatives and urban development projects as economical activity that involves generally positive externalities for the promoters, and as such subject to some form of direct payment of money in favor of the administration, by way of refreshment - in addition to the so-called burden of Urbanization -. This relationship between private parties - developers - and public - the municipalities - is regulated by laws from about half a century. Transformation initiatives of the city described in this note constitute a real reversal of the traditional public / private relationship: here is the public that is to take advantage of urban transformation made by private subjects. We are facing eventualities that require to update traditional assumptions on the redistributive aim of public action in urban planning.
- Second, the policy-maker is necessarily called to reconsider its decision-making process according to a renewed pragmatic rationality. This means to start and to learn from what already exists; from the “intelligence of democracy” (Lindblom, 1959) and from the social capital, the organizational capacity and the bottom-up initiatives spread all over the urban territory.

In particular, to build orchards on roofs matches with the tangible attempt to reconsider buildings in a renewed form and according to integrated uses, in the light of land consumption reduction and participatory practices. However, for being implemented correctly it still calls for innovations in urban policies and land use planning tools, particularly concerning the zoning codes. Major obstacles for constructing rooftop orchards and rooftop greenhouses are related to local building regulations and land-use laws: first, the change of the intended use of the surface – from not accessible, to accessible, for instance – implies procedures and precaution measures, which make the intervention too costly and time consuming. Rooftop greenhouse are even considered additional usable space, exceeding the floor-to-area ration in most cities. Interestingly enough, especially in Northern European countries like Austria, Germany and, across the Ocean, in Canada or United States, local regulatory bodies have started to adjust their urban planning tools in order to facilitate rooftop farming initiatives. This is the case for Monaco, Paris or Basilea, for instance, that have adopted specific policy tools to facilitate the

green roofs installations, as means for pursuing urban biodiversity, ecologic conservation and urban requalification. At the same time, the city of Vancouver or Toronto have developed specific urban food policies, according to which available flat roofs, especially those publicly owned, are included in their urban agriculture plans, as complementary spaces for food production. Other cities like New York and Boston have just started the revision of their zoning codes in order to introduce in their land-use urban agriculture, by including also rooftops as suitable spaces for farming.

5. Conclusions

This paper has been the occasion to reflect upon the OrtiAlti case study, as the exemplification of social innovation initiatives for urban re-use and urban farming. Differently from land based urban agriculture, the ortoalto has multiple functions and produces a wide range of non-food and non-market goods (Specht & Al., 2014), that contribute to create a new urban setting, sustainable and inclusive. It provides innovative architectural solutions for buildings reuse and urban regeneration, reducing food mile and improving resource and energy efficiency. In terms of social impacts, it contributes to improve community food security, to provide educational facilities, connecting consumers to food production, to empower urban inhabitants in taking care of the gardens. This has important effects also in economic terms, since it creates local circuits of produce exchange, and productive collaborations that can act as factors of local development.
Being rooftop farming a relatively unexplored field in urban planning discipline, especially in Italy, a lot of further research is still required.

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Joe Nasr, June Komisar, "Rooftops as productive spaces: planning and design lessons from Toronto", In: *Localizing urban food strategies. Farming cities and performing rurality.* 7th International Aesop Sustainable Food Planning Conference Proceedings, Torino, 7-9 October 2015, edited by Giuseppe Cinà and Egidio Dansero, Torino, Politecnico di Torino, 2015, pp 374-380. ISBN 978-88-8202-060-6

ROOFTOPS AS PRODUCTIVE SPACES: PLANNING AND DESIGN LESSONS FROM TORONTO

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Keywords: rooftop cultivation, Toronto, urban agriculture, sustainable building systems

Abstract: While the use of rooftops has long been common in some countries for various purposes, in many others, the roof has been one of the most underused spaces in cities. In recent years there has been increasing interest in rooftops as a valuable neglected resource, particularly for use to produce food. Much excitement as well as questioning has arisen about the potential for creating new productive roofs, for transforming unused rooftops, and for adapting existing green roofs into productive spaces. As it moves from hypothetical proposals to an increasingly common practice, rooftop gardening and farming is starting to mature as a practice. Given the fast spread of widely varied experiences with rooftops used for food growing over the past decade, lessons are becoming available on the opportunities, challenges and solutions to food growing on rooftops. This talk will offer some reflections based on these experiences, particularly as they pertain to planning and design considerations. The lessons will be drawn from the authors' participation in the Carrot City initiative that continues to identify exemplary cases of designing for urban agriculture, as well as their knowledge of productive roofs in Toronto, particularly the campus-based Rye's HomeGrown project. Examples considered here will be discussed in light of infrastructural and technical obstacles that faced the designers and cultivators of the projects, the regulatory issues (from bylaws to building codes) that helped or hindered implementation, and the ongoing challenges faced by the cultivators. Finally, broader implications for the built environment, and for the roles of different professionals involved in shaping it, will be discussed.

1. Introduction

While the use of rooftops has long been common in some countries for various purposes, in many others, the roof has been one of the most underused spaces in cities. As interest in the rooftop as a valuable neglected resource has increased, its use as a space that can be used for food production has been received particular attention in recent years. Much excitement (as well as questioning) has arisen about the potential for creating new productive roofs, for transforming unused rooftops into actively cultivated ones, and for adapting existing green roofs into productive spaces. Despite many challenges to this type of production, the benefits are numerous. In some cases, such as production in schools, the proximity of rooftop growing spaces to learning spaces is seen as a distinct advantage. In other cases, there is scarce affordable land for growing, and there is no other alternative to rooftops as a space for growing food.

Extensive green roofs (usually a thin layer of growing medium sown with sedum, wildflowers, grasses or equivalent) have become increasingly used or even required in many cities in Europe, and more recently in North America and some other regions. As cities begin to see the benefits of green roofs – including, for example, the reduction of both storm water runoff and the city's heat-island effect – the question needs to be asked: if green roofs are going to be installed anyway, why not install productive (intensive) green roofs instead of merely green roofs? Is a productive green roof

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necessarily more difficult or expensive to install or maintain than an extensive, non-productive roof? And are the benefits from the extra effort worth it?

Answering such questions depends on understanding the variety of forms of rooftop food production systems, the many types of roofs, and the different types of contexts for these roofs – particularly the type of building and its construction, the way the building is used, and a number of related questions such as access, exposure, stakeholders, etc. Looking at the great variety in rooftop growing conditions can provide insight into the problems and solutions, the feasibility and suitability, of different types of rooftop production choices.

Given the fast spread of widely varied experiences with rooftops used for food growing over the past decade, lessons are becoming available on the opportunities, challenges and solutions to food growing on rooftops. Some large cities, such as Montreal, New York, Paris, Seoul and Tokyo, have by now developed a range of experiences in rooftop growing in varied settings. This short paper will offer some reflections based on experiences from Toronto, particularly as they pertain to planning and design considerations. The number of Toronto-based cases since around 2000 provides a good basis for analyzing the variety of settings and to raise a range of issues around the use of roofs for food production. The lessons will be drawn from the authors' participation as coordinators of the Carrot City initiative that continues to identify exemplary cases of designing for urban agriculture, as well as their knowledge of productive roofs in Toronto.

Examples considered here will be discussed in light of infrastructural and technical obstacles that faced the designers and cultivators of the projects, the regulatory issues (from bylaws to building codes) that helped or hindered implementation, and the ongoing challenges faced by the cultivators. Finally, broader implications for the built environment, and for the roles of different professionals involved in shaping it, will be discussed.

2. Learning from Toronto: A partial typology of rooftop production settings

While the proliferation of productive rooftop projects in Toronto is relatively recent, ideas for such projects have been proposed for some years before that. Some greenhouses with productive elements had existed in Toronto in the past, including some historic ones many decades ago to supply the city with some vegetables, but these had largely disappeared by 2000. Some precedents did remain, such as the pioneering greenhouse that was attached against the upper level of the industrial building where FoodShare, the largest food advocacy organization in Toronto had been based until a decade ago. This small greenhouse was managed by FoodShare's first Urban Agriculture Coordinator and served as incubator to early urban farming enterprises. This building was demolished and FoodShare considered added a greenhouse in its current location at a school building, but did not proceed with such plans (it has a ground-level cultivation and composting area).

In the second half of the 2000s, while few new productive roofs were installed, a number of conceptual proposals were put forward. Several student thesis projects, such as some by Ryerson University architecture students that helped form the basis of the Carrot City initiative, included proposed cultivated roofs or greenhouses. Another thesis project, Vertical Farm Arcology by Gordon Graff, a student at the University of Waterloo, was devoted to conceiving a farm that covers a series of new housing blocks. A competition called Cities Alive, organized by Green Roofs for Healthy Cities, was won by team of students from Ryerson University which proposed transformed the

transformation of a whole neighborhood consisting of old shopping strips and a low-rise housing estate by covering all existing buildings with productive roofs and walls. Visionary proposals were not limited to students; Chris Hardwicke, a Toronto architect, proposed Ravine City/Farm City, a detailed vision for the transformation of some of Toronto's many ravines into new low-rise housing that cascades down the slope with a series of cultivated terraced roofs.

While many conceptual proposals have been suggested in the past years, many more realistic ones have been also conceived for different real sites across Toronto. The remainder of this section will concentrate on realized case studies. Additional projects have been proposed but not realized yet. In Downsview Park, the potential for using one the enormous flat roof of a former aeronautic building for a large farm was explored but not pursued. On a smaller scale, a new community center was designed to include a small community garden with raised beds on part of its roof – this is still planned in the building currently under construction.

At this time, in Toronto, there is already a wide diversity of realized rooftop project, from container rooftop growing spaces to more farm-like conditions that use different forms of growing media applied directly on top of a soil-ready roofing surface. Some roofs combine these two strategies. In addition, some roofs are fairly closed off to visitors and some are purposely designed to be either teaching or demonstration gardens that provide interest, pleasure, and incentives for people to try this themselves. The remainder of this section will provide a panorama of these projects, according to the type context for the roof. The projects will be grouped into six main groups. Some of the projects will be analyzed to highlight planning and design dimensions.

2.1 The school garden

Five non-profit organizations have allied to champion the creation of a productive garden in every school in Toronto. Realistically, many of the schools will not have growing space on ground level, so it made sense for the potential of rooftops to be explored at some schools. So far, rooftop projects are very few and small, but one of them stands out.

One of the non-profits in this initiative, Foodshare, runs schoolyard farming projects teaching students to run market gardens. In partnership with Toronto's Eastdale Collegiate School, they operate a large container rooftop garden called GrownRoofTop. This school building has a 1000 m2 roof space originally built as an outdoor tennis court area, which is very fortunate because, to create this original tennis court, the roof had to be engineered to be strong and tolerate foot traffic. In addition, a high parapet and proper fire egress make this an ideal roof for a teaching garden. Designed with a café/event area, most of the roof is filled with hundreds of large modular growing containers built from highly durable thermally modified wood and filled with soil. Originally, it was thought that these containers would be moved for events, increasing the dining area or adapting for a variety of curricular or seasonal reasons. However, once placed, these containers were never relocated. The students learn growing, harvesting, cooking and marketing the food.

2.2 The university garden

Several universities in Canada now have rooftop growing projects, though the nature of these projects varies greatly. In Toronto, both universities have such projects, illustrating well this variety. The University of Toronto's was begun with a small pilot project on the roof of the Engineering building in 2009. The 'sky garden' comprises a container gardening (semi-hydroponic) system with

linked reservoir containers that uses a drip irrigation system for watering. The containers, made by Quebec-based BioTop, resemble a standard windowbox and are relatively lightweight. The "bioponic" hybrid growing system uses plastic slotted inserts (called culture baskets) that hold the root systems in a granular medium, not ordinary soil, providing access to water in a bottom reservoir. Participating students have been experimenting with a variety of crops and other variables to develop moveable, lightweight rooftop gardening systems. Now hives of honeybees augment the rooftop vegetable gardening.

Ryerson University meanwhile has set up a proper urban farm after starting with several smaller ground-level sites run by a student-focused garden group called Rye's HomeGrown. A small farm-like rooftop productive garden on the university's engineering building was created by adding soil, replacing daylilies that had populated an extensive green roof. Ryerson's Grounds Maintenance department no longer has to maintain the green roof, to keep it free from trees taking root, etc. Rye's HomeGrown was fortunate to have access to a roof that was built to support a green roof, although an extensive green roof with sedum or flowers is not designed in the same way a soil-based farm would be designed. The biggest hurdle is that the roof was not designed for people to access it regularly to farm or visit. The university had to invest in higher fencing since the roof parapets were too low to safely allow human occupation, and access to the roof strictly requires being guided there by the coordinator or one of her trained assistants. A service elevator and a fire stair access the roof, helping transport produce on harvest days, but making it inconvenient for allowing people to tour the innovative garden site. Run by a professional urban farmer and a host of student volunteers, the hands-on learning component is as rewarding as the high yield which is given to the volunteers, sold in the on-campus farmers' market and used in the school cafeteria.

2.3 The community space garden

Increasingly, the rooftop is sometimes seen as a potential community space, serving for outreach, education, socializing, and other purposes. In Toronto, two contrasting examples illustrate the range of ways in which a gardening-focused rooftop can act as a space for community-building.

AccessPoint on Danforth Community Hub is a community health center established by Access Alliance, a not-for-profit organization that provides a number of services (from basic health advice to employment training to support to recent immigrants. This community hub was established by transforming an abandoned low-rise tile manufacturer and retail store. Seeking to address a variety of health improvement needs through gardening, Access Alliance decided to create a large teaching garden on part of the roof. Taking advantage of the fact that half the building was one floor higher than the other half, the architect was able to create a highly accessible garden, even with an elevator. While it is not open to the general public, it is used by a wide variety of users of the health center for hands-on activities. The placement of different types of materials in the garden was carefully based on the instructions from the building engineer so as to distribute loads appropriately. Hence small trees, a trellised shade structure, teaching objects and a sitting area are placed where the roof structure can withhold that weight.

A few subway stations away along Danforth Avenue can be found the Carrot Green Roof, an even more fully publicly reachable multipurpose rooftop space. It sits atop Carrot Common, a retail strip anchored by a well-known cooperative supermarket, the Big Carrot. When the roof developed a leak and had to be replaced, the board that governs the not-for-profit cooperative decided to invest into

transforming the space into a usable space. The result is a hybrid space, including an equipped outdoor kitchen, a gathering space for a variety of activities (including meetings and even a summer play). The largest part of the roof is devoted to a demonstration garden that is intended to show many growing techniques for edible, medicinal and herbal plants that can be cultivated successfully on the roof. The variety of plants is related partly to the varying load capacity of the roof. Thus different container techniques are placed against strong bearing walls, while the thinnest part of the roof is used for light herbs. An open stair from the outside was added to ensure full public access – on nice days, eaters can thus grab lunch from the supermarket and eat while watching the garden.

2.4 The residents' amenity garden

A trend that has particularly emerged in recent years in Toronto and in other cities is that of gardening as an amenity for building residents. This is an interesting trend as it has physical consequences for many types of buildings by reconceiving the cultivated landscape as a space for direct intervention by residents in a building, who become active rather than passive users of the landscape. Four different examples illustrate this phenomenon in its diversity.

- In the largest transformation of a social housing area in Canada, Regent Park, the first building to be constructed is One Oak, a 10-story apartment building for seniors. The roof of this building was nearly entirely covered by raised beds that are tall enough for the elderly residents to access them without bending. By designing these beds from the start, they could be built with solid stone facing that gives the rooftop project an unusual solidity.
- This project was undertaken by the Daniels Corporation, a large developer that is starting to integrate raised beds into their projects routinely. In particular, several of their condominium apartment complexes across Toronto now include such features, which they advertise as one amenity among others.
- Such productive rooftops and balconies are starting to be included in some social housing. One recent building, 60 Richmond East, was erected to target workers from the hospitality industry, in collaboration with a union that represents these workers. The unusual design includes, along with a teaching restaurant, some terraces that are intended for the residents of the building.
- A final example pushes the concept of residents. 401 Richmond Street is a former factory that has been adapted into artists' studios, offices for civil society organizations, and other tenants. The artists in particular, while not residing in the building, spend extended periods in it. Part of the roof of this solidly built brick building has been transformed into a lush garden that the building 'residents' use, including many edible plants.

2.5 The employees' amenity garden

Gardening is starting to be seen as an amenity for other groups too, including employees at various work settings. Providing workers with areas to grow food to supplement their income has an older history, but this practice had largely disappeared. The current revival of the staff garden is taking a different form: it is now approached as an amenity for employees, particularly at larger corporations – just like an office gym.

One recent example is the garden at the Toronto headquarters of Telus, one of the largest Canadian telecommunications companies. The recently constructed building includes several gathering spaces for employees, including a roof garden five floors above ground. This terrace as with other planted

terraces, also served for storm water catchment, as part of the strategies that earned the building LEED certification as a 'green' skyscraper. Low enough to avoid the extreme winds of its tower roof, the employee terrace also has enough sun exposure to be able to support plants in large containers. The parapets and egress requirements comply to safety codes and the walking surfaces are appropriate for general use. Loading was calculated for planters of varying depth when the space was designed. Under the impetus of a small group of committed employees, this space was transformed over the past three years into a space for production, not just for relaxation. Instead of just ornamental plants, they have hired a gardener to lead a group of volunteers from the company in creating a well-designed productive garden space. Clearly it is not producing enough quantity to contribute much to the diets of any of the employees, but as a demonstration space, it showcases easy-to-grow herbs and vegetables for the local climate. Volunteers learn how to grow and what to grow in their own future gardens. Others spend their break time in this pleasant space that demonstrates how edible landscaping can be both productive and attractive.

2.6 Restaurant garden

In Toronto as elsewhere, several restaurants have gotten into the practice of producing some of the food they transform into meals – often led by the chefs themselves. These include established restaurants like Parts & Labour, Vertical and Beast.

One notable pioneering rooftop productive garden predated the current trend to develop rooftop spaces for production. For more than a decade, the Fairmont Royal York Hotel, built in 1929 by the Canadian Pacific railway as a grand hotel, has used one of its roofs with southern exposure to produce greens, herbs and arctic berries for its restaurant. High platforms for the growing containers help the chefs to harvest easily on this oasis 18 stories high. A commitment to beekeeping has also provided honey for the restaurant. As with many projects where urban agriculture is added on a roof that is not designed for this activity, access is through a mechanical space, obviously not ideal for access by hotel or restaurant guests. Despite this awkward entry, touring the site has been a popular activity.

3. Challenges in setting up and operating a productive rooftop

The number of examples cited above using Toronto as a focus shows that, within a few short years, the inclusion of spaces for food production has become more common without being pigeonholed into a single type of production method, urban context, category of stakeholder, or other criteria. This shows the great variety of possibilities for creating places for urban agriculture on urban roofs. However, to realize these possibilities, a number of challenges had to be surmounted in these various examples. Here are some of the categories of challenges that we have identified across these examples and many other cases of rooftop food production that we have examined.

1. Finding/rebuilding the roof (particularly where an existing building is concerned)
2. Securing tenure for the roof (dealing with landlords, lawyers, funders…)
3. Getting permits to use the roof (zoning, construction permits…)
4. Ensuring safety on the roof (structural load, fencing, attaching objects…)
5. Delivering soil and water to the roof (figuring out appropriate/light soil, bringing up the soil, providing water sources…)
6. Incorporating ancillary structures on the roof (sheds, shade, seating…)

7. Securing physical access by growers to and from the roof (stairs/elevator, getting inputs up and harvest down…)
8. Dealing with public demand for access to the roof (dealing with demand by volunteers and visitors, spatial separation between growers and public, accessible paths, event space, differences in access with type of production and garden purpose)
9. Gaining technical knowledge for growing on the roof (containers, extensive green roofs, intensive green roofs, greenhouses, growing mediums, watering issues…)
10. Dealing with growing conditions that are typical of roofs (sun, wind, snow…).

This long list shows that, to realize a rooftop that includes food production in one form or another, a number of challenges have to be dealt with. Some are infrastructural and technical in nature, others require addressing regulatory issues (such as bylaws and building codes). Moreover, many common cultivation challenges and practices have to be figured out to achieve any success in the specific growing conditions on a roof: season extension, appropriate crops, pollination, and so on.

Yet despite these numerous challenges, quite a few new productive rooftops have been implemented in recent years. This shows that on roofs, as with elsewhere in the built environment in the urban context, many different solutions can be found to the extensive list of challenges in this regard. Thus in Toronto, we can glimpse the outline of what may be possible above our heads, literally, in terms of urban agriculture.

H.C. Lee, R. Childsa, W. Hughes , "Sustainable Food Planning for Maidstone, Kent, UK", In: *Localizing urban food strategies. Farming cities and performing rurality.* 7th International Aesop Sustainable Food Planning Conference Proceedings, Torino, 7-9 October 2015, edited by Giuseppe Cinà and Egidio Dansero, Torino, Politecnico di Torino, 2015, pp 381-390. ISBN 978-88-8202-060-6

SUSTAINABLE FOOD PLANNING FOR MAIDSTONE, KENT, UK

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Abstract: The use of Geographic Information Systems (GIS) was explored for mapping habitats, wildlife, landscape and land use for Maidstone, Kent, UK. Through meetings with various stakeholders, maps were generated showing landscape character areas and habitat biodiversity for the Maidstone area, followed by a zoned characterisation of agricultural land types and areas of land available for food production, which suggests a total potential area of available land of 372 ha and 1899 ha in the urban and peri-urban zones respectively. Various factors affecting potential yields from this land are discussed, but require further study. It is suggested that next steps should include a detailed biodiversity inventory and the construction of an integrated assessment framework in order to produce a useful and sustainable food planning strategy for Maidstone.

1. Introduction

Farming in the UK is currently unable to feed all resident citizens (Lee, 2015). Furthermore, the balance of imported food has been demonstrated to be vulnerable to interruptions of supply (Defra, 2010). Whilst international trade in food continues to be an ongoing and important component of the national economy (Department for Business Innovation & Skills, 2013), it would seem prudent to explore measures to improve security of domestic supply if that trade should be interrupted. Whilst there have been discussions about Sustainable Intensification (SI) as a means of enhancing food security (Kuyper & Struik, 2014) (Tittonell, 2014) such a holistic approach has yet to be applied to urban and peri urban production, at least for developed nations (Lee, 2012). As nearly 80% of European, including UK, citizens live near to towns and cities (Antrop, 2004) there is clear potential to explore holistic sustainable food planning (SFP) for urban yield improvements *via* urban agriculture (UA). It is posited that this will best be achieved by using an array of tools that allow towns and cities to be surveyed and mapped. So far, published literature includes the use of surveys and photography, but as (Rupprecht & Byrne, 2014) note, more technical Geographic Information Systems (GIS)-augmented and other mixed method approaches are still scarce. GIS is seen as central to SFP, providing a means of analysing spatial relationships in enable more informed decision making (Freeman, 1999). This paper reports on a case study for the town of Maidstone (UK), which utilises maps and other information sources to start the process of SFP. Whilst there have been some attempts in Maidstone to develop land use strategies (MaidstoneBoroughCouncil, 2013), an integrated use of GIS maps for SFP is still needed and this paper presents the results of a collaborative project to start that process.

2. Materials and Methods

Maidstone, the county town of Kent, UK, was mapped using ArcGIS. This was verified *via* face-to-face meetings with KCC officials (especially Ms Ruth Childs), informal meetings with the HadLOW CARBON

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Community (HCC, 2015) and expert advice from staff at Hadlow College (especially Mr Alan Harvey, Mr Stefan Jordan, Mr Will Hughes) during 2014 and 2015. The project outcomes were intended to:

1. Review a range of ArcGIS mediated maps, to cover Habitats, Wildlife Designation, Landscape Characters, Land Use;
2. Develop a tighter focus upon Agricultural Land types, and the generation of a detailed map-based assessment of land areas available for food production;
3. Consider the factors affecting the optimal urban and peri urban yield potential for Maidstone;
4. Speculate on the way forward as SFPs are developed more thoroughly by reviewing existing knowledge and options for future action.

The maps shown here were generated by data from ArcGIS version 10.2.2 overlaid upon OS 1:25,000 base maps (Figures 1 and 2), Edina Digimap using a 2007 land use classification (Figure 3) and ArcMap to isolate land-use attributes and drape over a 3D model using ArcScene (Figure 4).
Maps shown in this paper are as screen saves, due to the large memory requirements of the original files. As a conceptual introduction, Figure 1a shows the location of Hadlow College and the study site town, Maidstone in Kent, UK and 1b shows an aerial photo of the Maidstone study site.

Figure 1a. Map of Kent to show study site of Maidstone. Source: (HadlowCollege, 2015)

In Figure 1b it can be seen that the town is bordered by the M20 to the north and interfaces with rural land on other sides. One major river (the Medway) flows through the town. There is a clear

delineation between the inner urban zone of Maidstone housing and adjoining land for agriculture and horticulture, though evidence of sprawl. Some ribbon development of housing is also evident, and this leads to one clear satellite site - Royal British Legion village in the north-west corner of Figure 1. This layout is broadly typical of many UK town and city plans, where 'green belt' land surrounding urban centres has had only partial success in limiting urban sprawl (Hennig, et al., 2015). The interest for this paper is how the layout of Maidstone can be understood holistically, to enable the SFP process to start. This assumes that the primary aim is the food production potential of the town, and Figure 1 indicates at least one site where allotments are already being managed. The challenge is how to develop a SFP approach which maps the extension of this and other types of local food growing across the town, whilst balancing that against the other needs of citizens.

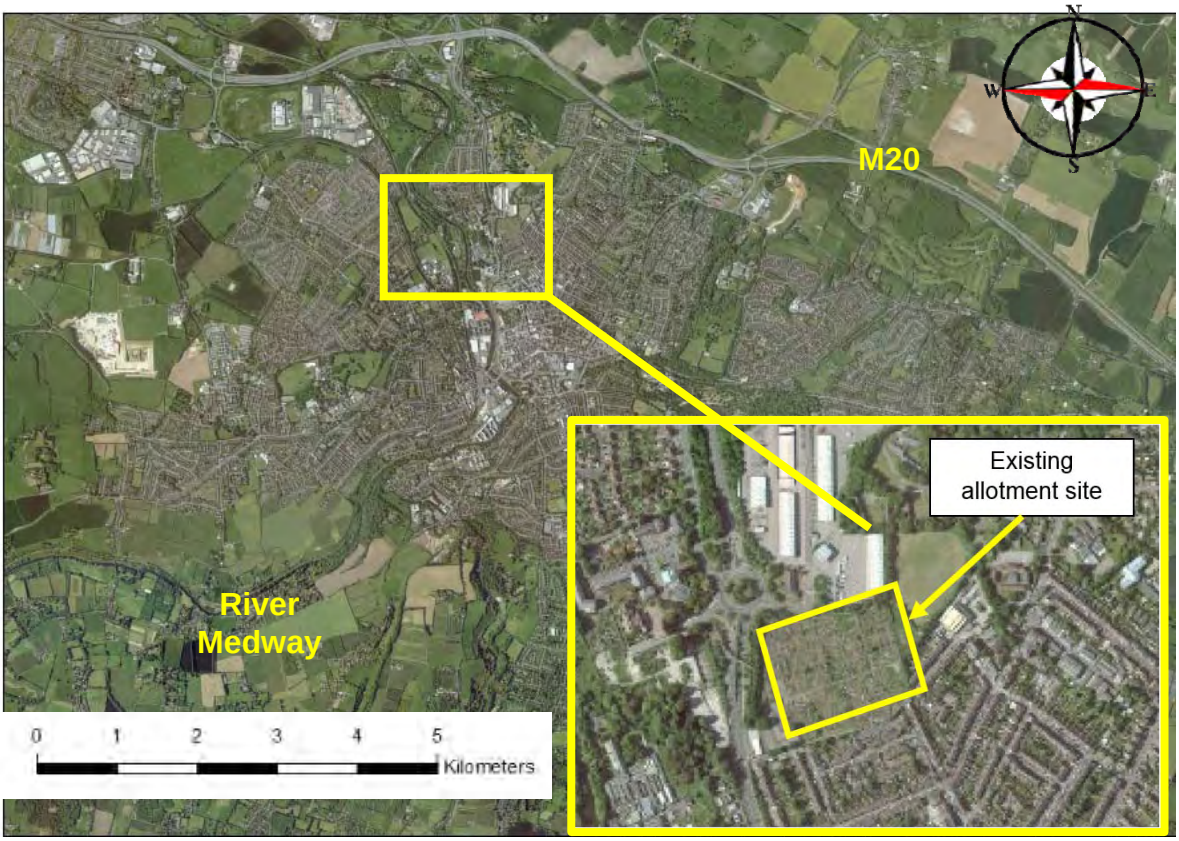

Figure 1b. Aerial photograph of Maidstone, showing M20 motorway across northern border. The town is surrounded by agricultural land and has the river Medway flowing through it. An existing allotment site is marked. Source: Childs, KCC

3. Results and discussion

Consultations

The various informal meetings with stakeholders described above took place in Hadlow College (HadlowCollege, 2015) on the main campus but also at venues in the village of Hadlow, which is situated in west Kent, approximately 15km from Maidstone (Figure 1a). Discussions also occurred at College sustainability workshops, which involved staff, students and residents of the village and nearby. There is much potential for further engagement with residents of Maidstone for a full SFP and the authors are keenly aware of the need for this.

The maps

The maps presented here attempt to lead towards a consideration of Maidstone as an integrated system, comprising a wide collection of plants and animals, varied landscapes and habitats, and how this links to food production potential.

Figure 2. shows landscape character areas across the town and indicates a shallow valley (vale) to the north, which contains sections of the motorway. To the east and south, landscapes are dominated by heath farmland and fruit production, respectively. To the west the landscape is dominated mostly by a suburban extension from the town and one satellite development (Royal British Legion village) as noted for Figure 1b. Within the fringes of the urban zone can be seen four parks - clockwise Oakwood, Invicta, Vintners and Mote.

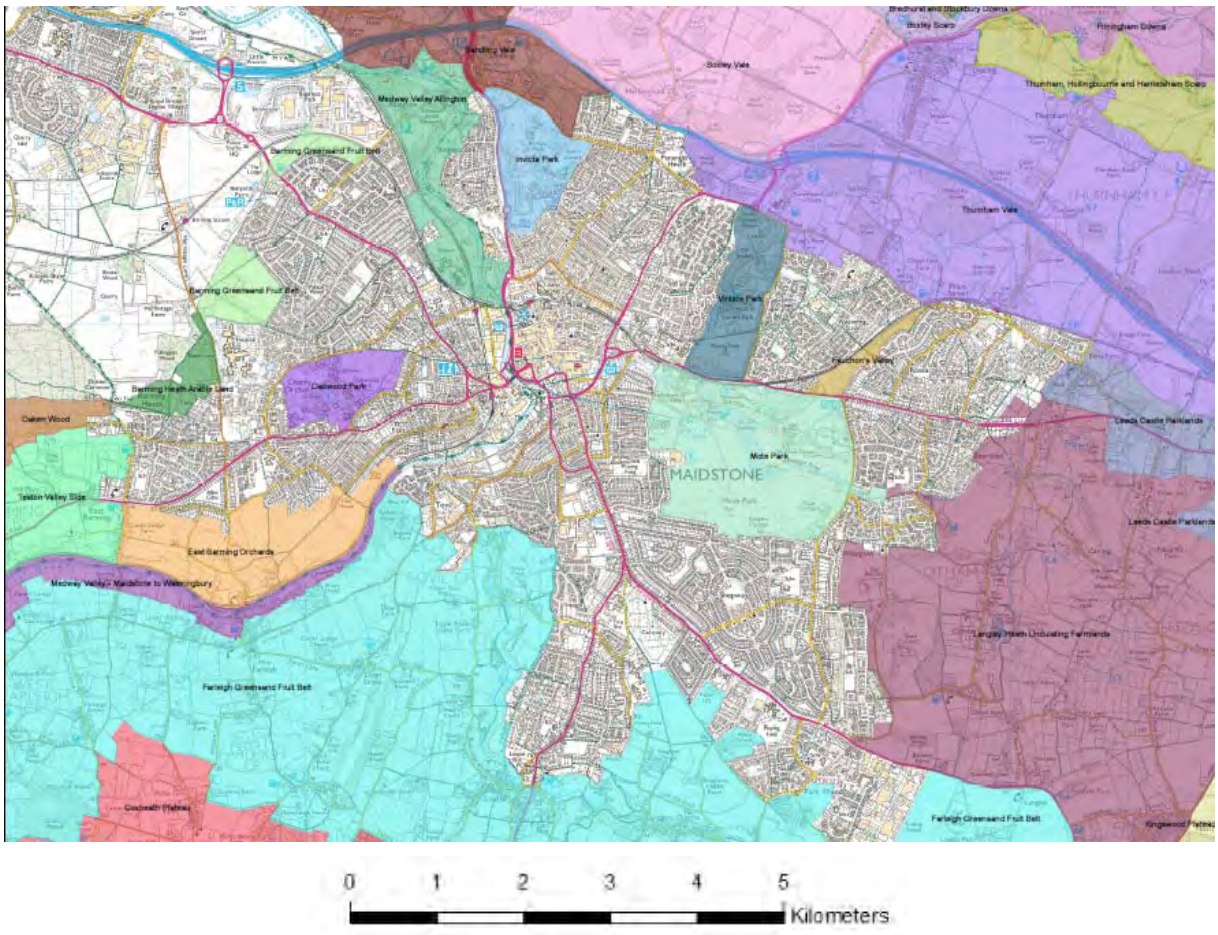

Figure 2. Maidstone Landscape Character Areas. Source: Childs, KCC

The diversity of all non-managed species (ranging across mammals, birds, invertebrates, plants, fungi) is of considerable interest and is well known to be dependent upon the diversity of habitats available (Freeman, 1999). This is shown in Figure 3 and indicates considerable biodiversity. An attempt to generate an inventory of species for Maidstone has not so far been achieved but is considered to be an important component of a systems approach to SFP.

Other research has established the importance of urban biodiversity (Farinha-Marques, et al., 2011) and is supported by a recent major review of green space planning in cities (Haaland & van den Bosch, 2015). The latter has highlighted the significance of 'densification' for biodiversity although

positive or negative trends for this are contrary and unclear. The inner zone for Maidstone is quite densely populated by people (though exact data are currently unavailable), and little is known about habitat and species biodiversity. The land surrounding the town is more heterogeneous in terms of habitats and is probably more biodiverse. This is reviewed by (La Rosa, et al., 2014) from a European perspective, who refer to the: *"…relationship between the agricultural landscape and the city [which] is reflected in the particular contemporary peri-urban landscapes, where residential low-density settlements are intertwined with farmlands that have been partially modified and reduced by urbanisation."* (p. 290).

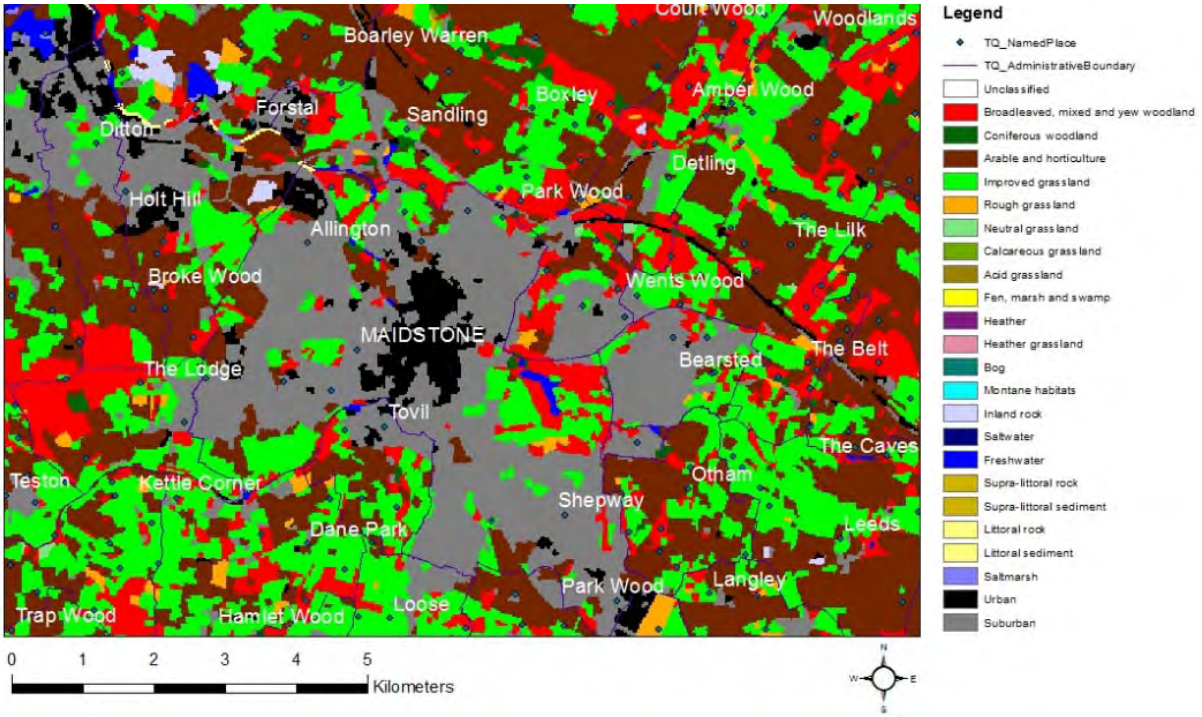

Figure 3. Map of habitat diversity for Maidstone. Source: Hughes, Natural Environment Research Council

Whilst well known species of vegetables and fruit may have use for food production, many others will be present for wildlife and aesthetic reasons (Altieri, 1999). Additionally, a more thorough understanding of the biodiversity of Maidstone is seen as important, since such species have value for local landscapes and human appreciation - i.e. quality of life (Egoh, et al., 2007) and urban zones in general are known to contribute useful ecological services, such as:

1. *"Supporting services (biodiversity, habitat, soil formation, ecological memory, seed dispersal, pollination, storage and cycling of nutrients);*
2. *Cultural services (recreation, enhancement of property value, community cohesion, source of knowledge);*
3. *Provisioning services (food, water, fuel); and*
4. *Regulating services (carbon sink, microclimate control, flood prevention, noise reduction, temperature modulation, pollution control, protection of water quality,etc.)." (Farinha-Marques, et al., 2011), 253.*

The next stage of this study is the generation of Agricultural Land types and land areas available for food production. This is shown in Figure 4.

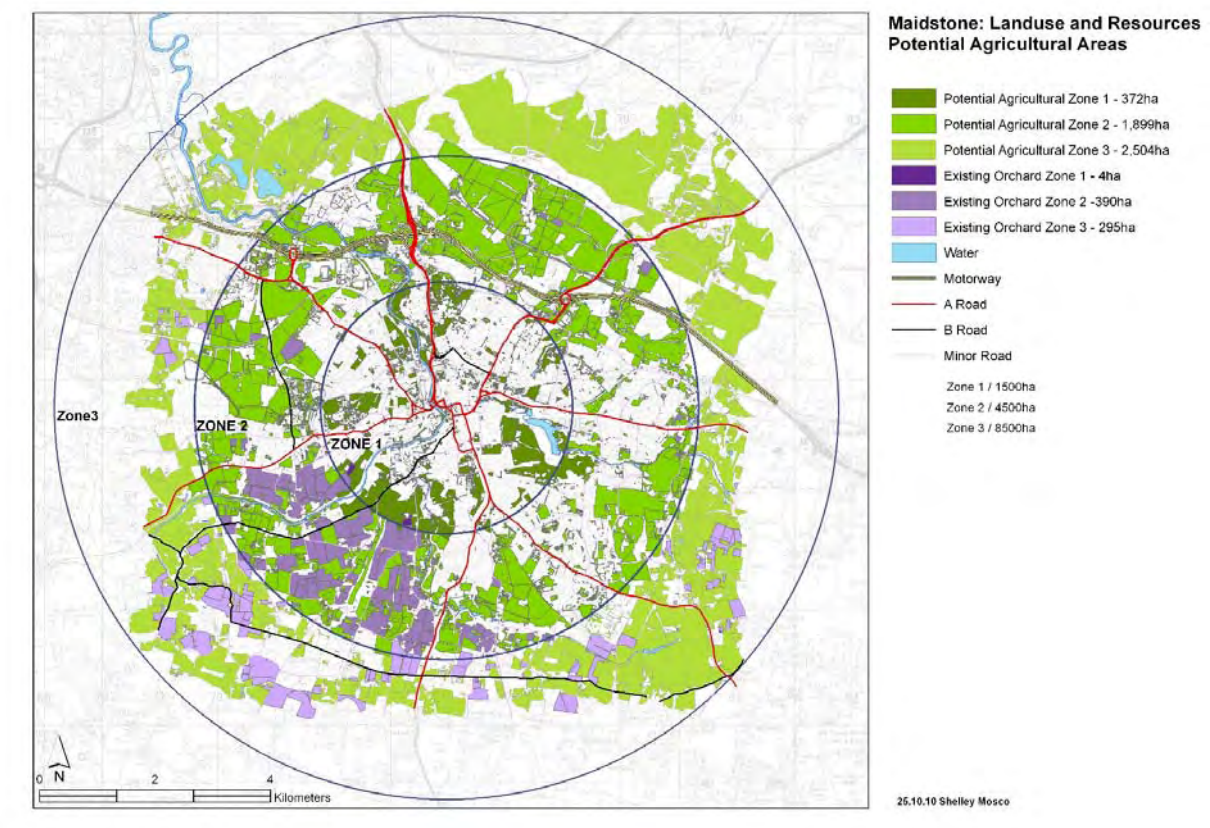

Figure 4. Agricultural Land types and land areas available for food production. Source: Mosco, University of Greenwich.

This map can be seen to include zones 1-3. This has been adapted from that by Growing Communities (GrowingCommunities, 2015), a London based community food growing organisation. They refer to a zone system for cities: 0 = urban domestic, 1 = urban traded, 2 = peri urban, 3 = rural hinterland, 4 = rest of UK, 5 = rest of Europe, 6 = further out. We have adapted this in Figure 4 to show our interpretation of zone 1 as their 0 and 1 combined and our zones 2 and 3 the same as theirs. City or town zoning for food planning has been poorly published elsewhere but is seen here as a useful means of rationalising food planning policies, since zones 1 and 2 are posited as considerably different: zone 1 has a higher density of citizens, town or city centre shopping areas which are often traffic free and less space for growing food, whilst zone 2 has a lower density, more commercial land use as trading sites, edge of city/town supermarkets etc. and more available land. There is no fixed formula for exactly where to allocate these zones on a town or city map, so those in Figure 4 are currently admitted as approximate and requires further study to rationalise a more consistent approach. For this paper, calculations for Zone 3 – the rural hinterland – are not pursued due to lack of accurate area data for Maidstone.

Figure 4 suggests a total potential area of land available for growing food as:

Zone 1 – 372 ha

Zone 2 – 1,899 ha

The factors affecting the optimal urban and peri urban yield potential for Maidstone

This paper reports the start of a process of urban agriculture (UA) yield determinations for Maidstone. Very little data exist for other urban projects: some have been reported by (Lee, 2012)

for unprotected (open plot) fruit and vegetable production, where yields varied from about 20-40 $t.ha^{-1}.year^{-1}$. This high variability is further affected by potential increases due to protected management under glass or polythene type covers, where colleagues have reported up to ten times that of the yield in open plots (Harvey, 2015).
Other factors affecting potential yields are numerous and shown in Table 1

Table 1. Examples from the literature of research on factors affecting UA

Factors affecting potential UA yields	Sources
Method of production – e.g. raised beds, open v. protected, hydroponics, soilless media, green roofs with concentrated fertility v. more extensive open plots	(Paranjpe, et al., 2008); (Vogl, et al., 2003); (Chenani, et al., 2015)
Efficiency of nutrient provision for crops – chemical/synthetic or organic	(Cui, et al., 2015)
Methods of weed, pest and disease management for crops – chemical/synthetic or organic	(Tomlinson, et al., 2015)
Livestock – species and breed, space, housing, feed, welfare, security etc.	(Huang & Drescher, 2015)
Water availability for irrigation as required for crops and livestock	(Minhas, et al., 2015); (Barthel & Isendahl, 2013)
Energy available – fossil/renewable, labour, biomass etc.	(Springer, 2012); (Denny, 2012a)
Choice of vegetable and fruit species and cultivar	(Moniruzzaman, 2015)
Seasonality -time of year that cropping takes place	(Denny, 2012a) (Denny, 2012b)
Post-harvest treatment, storage, processing	(Vedovato, et al., 2015)
Urban food transport	(Denny, 2012a) (Denny, 2012b)
Waste management	(Minhas, et al., 2015)
Relative presence or absence of soil contaminants	(Izquierdo, et al., 2015)
Knowledge, experience and health of participants	(Munoz-Plaza, et al., 2013)
Conflicts with other land needs – aesthetic, recreation, sport, wildlife etc.	(Moroney & Jones, 2006); (Millard, 2004)
Other socio-political factors such as theft, vandalism, refugees, cultural diversity, local political priorities etc.	(Porter, et al., 2014); (Cabannes & Raposo, 2013)
Implications of climate change and extreme weather	(Lisle, 2010)

Further studies are required for Maidstone to clarify many of the above factors. A wide range of stakeholders need to be interviewed, including allotment holders, community project members and local government officials. Additionally, some demonstration projects – already proposed by (Lee, et al., 2014) - are required in the town to explore the local factors affecting yields and obtain a realistic assessment of yield possibilities. Thus, no confident estimates can currently be made for likely yields of UA in Maidstone until the above issues have been investigated further.

A critique of determining a SFP for Maidstone
There are about 113,000 people living in Maidstone (KCC, 2015) and feeding them from production generated within zones 1 and 2 will be an enormous challenge. To help move towards a viable plan for this, a SFP for Maidstone needs to be investigated within an agroecological context. There have already been some excellent studies, such as that for Almere, Netherlands, by (Jansma, et al., 2012), where various management scenarios were considered in terms of energy dynamics, and combined with a useful assessment of local food consumption patterns. A wider and more detailed consideration by (Ravetz, 2000) used an integrated assessment (IA) approach to urban sustainability, constructed schematics for 'material metabolism' (see Figure 4 in that paper) and then an IA framework (Figure 5 in that paper). These ideas are an excellent attempt to develop a more holistic framework for sustainable development in cities. It is suggested here that Jansma's and especially

Ravetz's ideas can be further developed for the generation of a SFP plan for Maidstone which involves:

- A detailed, spatial biodiversity inventory across zones 1 and 2 of the town to look for key indicators of sustainability for UA, such as beneficial species;
- An exploration of material metabolism options – especially mass balance flow,[4] nutrient budgets, as recently demonstrated for P in ecological agriculture by (Wu, et al., 2015) and water balance modelling as demonstrated by (Branger, et al., 2013);
- Building this into an IA – which in essence is an ecosystem study of stocks and flows of key components;
- Seeking outcomes for a SFP: how can we generate a useful food planning strategy for Maidstone that optimises the benefits for citizens in terms of amenity and landscape attractiveness, yet actually feeds people efficiently in terms of inputs *v.* outputs?

4. Conclusions

- A GIS-mediated study of Maidstone, Kent, UK has attempted to clarify landscape character areas, habitat diversity and land available for urban agriculture;
- The development of a Sustainable Food Plan for Maidstone is discussed as the next step, involving a detailed biodiversity inventory and the construction of an integrated assessment framework.

5. Acknowledgements

The authors are grateful to Shelley Mosco (University of Greenwich) for the ArcGIS map in Figure 4 and Rosalind Fisher (Hadlow College) for helpful contributions to the text.

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[4] "The law of conservation of matter states that matter is conserved - that is, neither created nor destroyed. Thus, if we know the amount of material that enters a chain of processes, and keep an account of all the amounts in different paths, we can calculate quantities of materials that are hard to measure. For example, we can calculate the amount of material entering the atmosphere if we know the amounts that went in, the transformations, and the waste streams to land and water. This method is called the Mass or Material Balance technique." See http://environ.andrew.cmu.edu/m3/s4/matbalance.shtml

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Katrin Bohn, André Viljoen, "Second nature and urban agriculture: a cultural framework for emerging food policies", In: *Localizing urban food strategies. Farming cities and performing rurality.* 7th International Aesop Sustainable Food Planning Conference Proceedings, Torino, 7-9 October 2015, edited by Giuseppe Cinà and Egidio Dansero, Torino, Politecnico di Torino, 2015, pp 391-398. ISBN 978-88-8202-060-6

SECOND NATURE AND URBAN AGRICULTURE: A CULTURAL FRAMEWORK FOR EMERGING FOOD POLICIES

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Keywords: Urban Space Production; Urban Food Production; Ecological Place Making; Urban Transformations; Continuous Productive Urban Landscape (CPUL)

Abstract: *Given the increasing attention of research, practice and policy to urban food strategies, the paper explores appropriate frameworks for placing these strategies' spatial aspects into cultural contexts. Within the AHRC-funded research network* Urban Transformations, *we have debated current policy-driven responses to the definition of urban food strategies and the significance both may have on spatial quality. We noticed that, whilst a new common language is developing in relation to food systems governance and planning, a cultural framework has become (and always was) equally important for the planning and design of food-productive urban space.*
Such cultural frameworks are much needed to enable the steady linking of urban food strategies to space making processes - including urban agriculture - and both of them to users' desires, routines and capacities. This is especially true within education and research where qualitative approaches are indispensable if lasting change in our collective aims for food-productive urban spaces is to be achieved. We contend that more practice-based theory - and philosophy - is required to successfully initiate space-focused urban food strategies as well as to back them up with supporting policy in the longer term.
In recent writing, the concept of Second Nature *has been introduced to discuss, from different angles, the future of urban landscape in relation to the future of urban food production. This paper explores whether and how the concept of* Second Nature *could contribute to a cultural framework which, in turn, can support the formulation of a durable urban-space-focused food policy.*

1. Introducing *Second Nature*

> *'… Instead I do believe with Adorno that everywhere where the same word means something different,* "the oneness of the word reminds us of the oneness of the issue however hidden it may be" *(Adorno 1954: 3). One must not understand the differences between the various usages of the term Second Nature as different definitions, but instead as different linguistic and conceptual sedimentations of the issue that is meant with the term Second Nature.'*
> (Hogh 2011: 1)

To put it simply, the food-productive city, town or metropolitan region – i.e. an entity including urban agriculture - requires three things:

- it needs to boast **urban landscapes that produce food** (and digest food waste),
- it needs an **urban population that likes this food** and wants to work with it,
- it needs **purpose-built, food-focused interconnections** between its productive urban landscape and its food-producing population.

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Each requirement - maybe slightly differently described - is known to involved planners, practitioners and researchers since the last 20 or 30 years. The benefits of urban agriculture have now also widely been accepted, and cities are now frequently talking about the need to readjust their current urban food systems. Recent developments in practical implementation have taken the subject beyond the pure case study stage into policy consideration with thousands of projects worldwide to show urban food growing, experiment with it and consume its fresh produce. Still, there is no widespread implementation. And there is no widespread acceptance. What is missing?
How do we more fully achieve each and all of the above requirements in the near future? Is there an overarching theory or philosophy that enables us to discuss *all* these aspects in a joint-up manner? Can this theory, philosophy reach a wide range of citizens better than the existing theories?
With this is mind, the authors started a few years ago to investigate the usefulness of the *Second Nature* concept to further the case for urban agriculture and food-productive landscapes (Viljoen and Bohn 2014). We wanted to establish whether and how exemplary meanings of *Second Nature* could inform our own assumption of the all-encompassing potential of the term:

> *The future of urban landscape can be linked to the future of urban food production. Food production happens on cultivated land. Cultivated land is man-made, be it urban or rural. The man-made has been linked to the concept of* Second Nature [---> one meaning]. *(Re-) introducing food-productive landscapes into urban sites may allow for new infrastructures and ecologies which can be considered that urban site's* Second Nature [---> another meaning]. *The production of food – sowing, tending, harvesting, but also processing, preparing - constitutes for many people a very embedded, regular activity, a custom, and, even more so, that food's consumption as exemplified in people's diverse, but distinct food cultures and eating habits. A personal custom, a habit can be seen as the person's* Second Nature [---> a third meaning]...

These three exemplary interpretations are themselves interlinked, but could the term, the concept *'Second Nature'* indeed form the basis of a culturally-driven urban agriculture discourse? Could it convey to the urban farmer, the policy-maker, to the researcher and educator – and, above all, to the wider public - what we mean when we imagine the future city to boast of continuous productive urban landscapes? And, by doing so, can this strengthen the policy development towards urban food strategies from a qualitative, spatial point of view?

2. Three interpretations of Second Nature

The concept of *Second Nature* has numerous meanings of whom we have chosen three, major ones, that seem especially relevant to discussions on the future of urban food production:

***** *Second Nature* describes **BEHAVIOUR**: embedded, normalised habits and customs – everyday activities – that take place regularly, without a thought
---> [Second Nature as (part of) human nature **]**
---> habit ---> custom ---> everyday activities.

***** *Second Nature* refers to **THE MAN-MADE**: especially to man-made space – usually urban – surrounding us in a similar way to *'first nature',* the natural
---> [Second Nature as anti-nature **]**
---> the urban ---> the urban defined as '*assemblies and encounters'* ---> non-nature.

***** *Second Nature* proposes **A NEW WILDERNESS**: the re-introduction into the urban of new landscapes that focus on ecologies and infrastructure
---> [Second Nature as designed nature **]**
---> ecologies ---> ecological systems ---> infrastructure.

Each of the three interpretations of *Second Nature*, from their specific angles, seems to be able to explain, reflect and compliment strategies or desires behind the current and projected practices of urban agriculture and their qualitative effects on urban food production as well as on urban space production.

2.1 Second Nature as (part of) human nature ---> BEHAVIOUR ---> HABIT

One of the first usages of the term is attributed to Greek philosopher Aristotle who, around 330 BC, wrote:

> *'It is easier to alter one's habit than to change one's nature. For the very reason why habits are hard to change is that they are a sort of second nature, as Euenus says* — "Train men but long enough to what you will, And that shall be their nature in the end."'
> (Aristotle 330 BC: VII. 10, 5)

Whilst Aristotle's observation on human behaviour has no direct relation to food, it not only introduces the idea of habit and its inseparableness to the "natural characteristics" of humans, but also suggests that habits are mouldable, transformable. Either way, our cultivated and cultural acts of food production, food processing, food consumption etc. are probably some of the easiest examples to refer to when looking for practical application of Aristotle's thought.

In the early 19th century, German philosopher Georg Wilhelm Friedrich Hegel produced one of the most extensive investigations into the behaviour-related interpretation of *Second Nature* as part of his writings on human habit:

> *'[H]abit has quite rightly been said to be second nature, for it is nature in that it is an immediate being of the soul, and a second nature in that the soul posits it as an immediacy, in that it consists of inner formulation and transforming of corporeity pertaining to both the determinations of feeling as such and to embodied presentations and volitions.'*
> (Hegel 1830: §410A)

We make a note of this reading of *Second Nature* as a habit - as an *'immediacy'* - because this concept interests us in relation to food and people. We will come back to it later on.

2.2. Second Nature as anti-nature ---> THE MAN-MADE ---> THE URBAN

300 years after Aristotle, around 45 BC, the term was used by Roman orator Marcus Tullius Cicero delivering one of today's most powerful spatial images in relation to *Second Nature*. It was Cirero who at such early time in history singled out the effects of human productivity on nature and on the urban environment. He delivered the first interpretation of *Second Nature* referring qualitatively to man-made urban space:

> *'…we sow cereals and plant trees; we irrigate our lands to fertilize them. We fortify river-banks, and straighten or divert the courses of rivers. In short, by the work of our hands we strive to create a sort of second nature within the world of nature.'*
> (Cicero 45 BC: §152)

Even though Cicero's quote is nowadays well known amongst urban planners and designers, it was, according to German philosopher Norbert Rath, only in the early 19th century – i.e. at a similar time to Hegel's work - that the term *'Second Nature'* started again to be studied intensively as meaning more than normalised habits by also being used to define the man-made, the cultured, as a development of the natural. These studies suggested that culture represents a somewhat higher, but different entity. Rath also describes that the contraposition of "nature" and "culture", as it was still sustained in philosophy at the beginning of the 20th century, *'could no longer be upheld towards the century's end'* (Rath 1996).

Henri Lefebvre's interpretation of *Second Nature* is helpful when envisioning a sustainable urban future and questioning methods for its design. For Lefebvre, urban environments are socially productive environments, and they are *'of second nature'*. According to Erik Swyngedouw and Nikolas Heynen, it is this notion that *'paves the way to understanding the complex mix of political, economic and social processes that shape, reshape and reshape again urban landscapes'* (Swyngedouw and Heynen 2003). Again not referring to food, but to the social production of urban environments instead, Lefebvre suggests:

> *'Nature, destroyed as such, has already had to be reconstructed at another level, the level of "second nature" i.e. the town and the urban. The town, anti-nature or non-nature and yet second nature, heralds the future world, the world of the generalised urban. Nature, as the sum of particularities which are external to each other and dispersed in space, dies. It gives way to produced space, to the urban. The urban, defined as assemblies and encounters, is therefore the simultaneity (or centrality) of all that exists socially.'*
> (Lefebvre 1976: 15)

What at first sight seems to be like a death blow to urban agriculture, could be equally seen as supporting its development. Focusing on social space - on the man-made, according to Cicero - food may be far removed from Lefebvre's thinking. However, we make another note of his notion of *'produced space'* in the *Second Nature* as he understands is - the urban. We will come back to it later.

2.3. Second Nature as designed nature ---> A NEW WILDERNESS ---> ECOLOGIES

Very recently, in 2009 and 2010, landscape architects Matthew Skjonsberg and Adriaan Geuze have reappropriated the term *'Second Nature'* in their writings about the future of urban landscapes:

> *'Our redefinition of the term "second nature" takes both Cicero's definition and behavioral connotations into account, but it differs in that for us "second nature" specifically describes a designed nature created in adjacency to existing urbanisation, capable of absorbing future city growth into itself while maintaining ecological systemic continuity.'*
> (Geuze and Skjonsberg 2010: 25)

For Geuze and Skjonsberg, the concept of *Second Nature* could provide a new strategy for an infrastructural landscape urbanism that redefines the relation between city and nature. Here, *'the ambition of second nature is the radically humane reformulation of the relationship between the urban and rural, one that amplifies civilisation's cultural legacy'* (Geuze and Skjonsberg 2010). Skjonsberg and Geuze don't speak about food, but we make yet another note , this time of these authors' notion of a *'designed nature'* and of the infrastructural dimension of *Second Nature*. We will come back to it later.

3. A framework for productive urban landscapes

So, can urban agriculture be part of a *Second Nature* – in this term's various meanings - to people, cities and urban landscapes in the 21st century? If yes, can or should planners, architects, designers play a role in making urban agriculture our *Second Nature*, given that their professions are engaged with the production of man-made space as well as with influencing people's behaviour?

The interdependencies of *First Nature* and *Second Nature* most significantly influence the authors' thinking about productive urban landscapes. It is the term 'productive' that establishes a valuable link between the urban and the landscape – or, in a way, between the "first" and the "second" - both of which, often, are still considered opposites in the public perception of space.

In relation to urban agriculture, there seems to be great opportunity for the *'town..., yet second nature', [that] 'heralds the future world'*, as Lefebvre said, to become productive and, at the same time, for that town's inhabitants to make a sustaining production process their own *Second Nature*. Such new lifestyle choices re-introduce experiences of *First Nature* into the urban, whilst, at the same time, generating a new type of urban space, of *Second Nature*. Both transformations have the potential to lead within the urban realm to a greater unity of nature, in a designed form, and culture.

One may say, that, in general, urban food strategies aim for such qualities. However, how do we reach the supportive public perception and active public participation necessary to implement these strategies or even just to fully develop them? How can we maintain public interest across longer timespans? And even with enough public interest, how do we ascertain the strong spatial focus which spurred those planners and architects who, more than 30 years ago, started to put the food question onto the table?

It is a great achievement that, internationally, food policy is starting to be created and addressed. This is a slow process due to the complexity of food issues as well as to the still widespread lack of acceptance. The discussed cultural framework for productive urban landscapes needs to branch out substantially in order to capture the breath of the urban food debate.

Within the AHRC-funded research network *Urban Transformations*, we have debated current policy-driven responses to the definition of urban food strategies and the significance both may have on spatial quality. We noticed that, whilst a new common language is developing in relation to food systems governance and planning, a cultural framework has become (and always was) equally important for the planning and design of food-productive urban space.

Following on from their investigations, the authors argue that an extended *Second Nature* concept can contribute to the cultural framework in question by addressing three realms significant to urban food systems planning and design (as per AESOP call):

*** PLACE ---->** *Second Nature* can aid to (re-) construct cultural identity and values in relation to food and urban agriculture and to enhance the cultural potential of new relationships between the urban and the rural **----> THE MAN-MADE**

*** SOCIAL INNOVATION ---->** *Second Nature* can create new ways of supporting public involvement in the shaping of productive urban space and ignite opportunities and alliances between unlikely partners **----> BEHAVIOUR**

*** INFRASTRUCTURE ---->** *Second Nature* can provide a framework to discuss, implement and assess the physical urban agriculture allowing for a bio-diverse and continuous productive urban landscape **----> A NEW WILDERNESS**.

Geuze and Skjonsberg, Hegel, Lefebvre, Cicero and Aristotle: All the writing discussed here – apart from our own – does not include food even though it also does not exclude it. However, the same writing taken together creates a web of thought centred around *Second Nature* and concerning space and lifestyle that, at the same time, provides ample networks and immediate connections for the subject of urban food.

From the authors' perspective, Skjonsberg and Geuze's concept of *Second Nature* - as a new designed, infrastructural "natural" landscape reshaping existing urban space '*while maintaining ecological systemic continuity*' (Geuze and Skjonsberg 2010) - can well be aligned with concepts around food-productive urban space, such as the CPUL concept (Viljoen 2005). The benefits would be mutual: One the one side, the landscape architects' notion of a *'designed nature'* receives with the food subject a strong impulse for its envisioned ecologies spreading across all seasons and ranging from seeding a landscape to composting it. The human becomes active, productive part of this *Second Nature* rather than remaining observer or consumer of it. On the other side, the integration of dramatic typologies of nature and the superposition of various layers of infrastructure services as envisaged by Geuze and Skjonsberg, can wider the reach of mostly food-centred productive urban landscapes. For both sides, planners and urban/architectural designers will be at the centre of translating theory into practice.

Thinking about food-growing activities as becoming people's *Second Nature* is fundamental to the longer lasting success of urban agriculture. Whenever ideas and emerging projects around urban agriculture are presented – to the wider public as well as to expert audiences – the required human processes and interactions will be questioned. *'Individual and collective behaviour'* as well as *'behaviour change'* are always on the agenda when discussing urban food strategies. To be able to address lifestyle and daily routines with reference to Lefebvre, Hegel or Aristotle will be of great advantage. People as well as institutions can find themselves in accounts of routines, pleasures and historical precedences. Whilst proponents of more sustainable urban food systems may anyway have argued along such lines, drawing on philosophical thought will strenghten their arguments and begin to place them among other fundamental societal theories.

With the steady growth of urban populations as well as urban and metropolitan areas the impact of infrastructure and building construction, i.e. of one reading of *Second Nature*, will continue to

increase. Urban space production is entirely man-made, and drawing on philosophers such as Cicero and Lefebvre will enable an informed discourse about origin, present and future of such man-made urban fabric. But man-made is not like man-made. The question is how that fabric is being produced and which aims it endevors to achieve. Once more, we can see how urban and architectural design – and especially food-system conscious design – can influence and determine the spatial qualities of our environments. To be man-made is the great virtue of urban agriculture. Cities might enter a new era of Second Nature, when the man-made coincides with the natural and the cultured in what will constitute the food baskets of urban populations.

4. Conclusions

Whilst most of the theory that exists around urban agriculture and productive urban landscapes stems from a planning and design perspective, it often remains unconnected to other spheres of urban life. Policy therefore often overlooks the spatial necessities of urban food growing. Additionally, large numbers of the public remain unreached, and even when reached, they often shy away from confronting the necessary food-focused transformations that will strongly impact on everyday life and cities' cultures and identities.

Cultural frameworks are needed to enable the steady linking of urban food strategies to space making processes - including urban agriculture - and both of them to users' desires, routines and capacities.

The term and concept *'Second Nature'* - because of its versatility and polemical capacity – can break down the multiple barriers between the public, city administrators, politicians and food-connected industries and allow discussion, dispute and commonly shared visions of a food-literate urban future.

Linking the concept's origins in Ancient Rome (Cicero 45 BC) via its role in philosophical discussions in the 20th century (Lefebvre 1976) to the future of open space planning in contemporary cities (Geuze and Skjonsberg 2010) can serve to ground, describe and speculate on the fundamental and radical transformations to urban form and functions that will be a consequence of adapting to the multiple challenges of 21st century food supply.

By extending its main readings – Behaviour, The Man-Made, A New Wilderness – to include food production, the *Second Nature* concept is able to support a more widespread understanding of the multiple interdependencies of issues as diverse as spatial quality, urban space production, everyday activity and pleasure, food sovereignty, urban resilience, sustainability and urban landscape and architectural design - always in relation to food.

The usefulness of the Second Nature concept has been explored and tested on practical examples as part of the research network Urban Transformations. Three projects in Switzerland, Germany and the UK show how food-related transformations can be better explained and understood when referring to Second Nature. This is especially important for future education and research where qualitative approaches are indispensable if lasting change in our collective aims for food-productive urban spaces is to be achieved.

The concept of *Second Nature* can contribute to a cultural framework for the planned and designed production of food in and on urban space. This, in turn and maybe only later, can support the formulation of a lasting urban-space-focused food policy.

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Biancamaria Torquati, Giulia Giacchè, Chiara Paffarini, "Panorama of urban agriculture within the city of Perugia (Italy)", In: *Localizing urban food strategies. Farming cities and performing rurality.* 7th International Aesop Sustainable Food Planning Conference Proceedings, Torino, 7-9 October 2015, edited by Giuseppe Cinà and Egidio Dansero, Torino, Politecnico di Torino, 2015, pp 399-413. ISBN 978-88-8202-060-6

PANORAMA OF URBAN AGRICULTURE WITHIN THE CITY OF PERUGIA (ITALY)

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Keywords: urban agriculture typologies, societal benefits, governance, Perugia.

Abstract: Agriculture has always existed within the city but new relationships between cities and agriculture are emerging, and new geometries of spaces are arising. While in the late nineties, family or allotment gardens started to spread up, over the years other types of urban agriculture (UA) arose. UA performs several functions, besides that of food supply, as an instrument of civil activism, a place for educational or social activities, rehabilitation and integration and it responds to different goals according to the actors involved, to spaces and socio-economical contexts. The aim of this study is to identify the goals of UA and the social benefits generated in order to detect the potential of its development. The main questions are: Do different types of UA play different roles? Do different types of UA have different value of societal benefits? What policies and actions are in place? We interviewed the promoters of 5 projects of UA within Perugia municipalities to understand the origin, benefits and goals of the projects and public policies in place and expected. The overview shows the diversity of actors and the multifunctional nature of the projects that have the ambition to draw on different objectives. The main goal of these projects is not economic, while different issues are addressed: cultural, educational, therapeutical, social cohesion. The initiatives are supported by different sectors of public policies (agricultural, social-care, educational, environmental). Several actions (creation of multimedia meeting platforms for actors and spaces) and tools (ex. a plan for temporary use of space management) are proposed to enhance the UA within the city.

1. Introduction

Urban agriculture (UA) has strong historical roots and over the years the linkages among cities and agricultures have evolved and new geometries of spaces are arising. During the years several types of UA have taken shape around the world, related to different socio-economic and territorial contexts and many authors deal with its characterisation. Simt et al (1996/ updated in 2001) and van Veenhuizen and Danso (2007) outline a rather detailed and complex UA in the world, but they avoid any kind of generalization and theoretical conceptualization describing actors, spaces, functions and impact.

Cohen et al (2012) underline that each UA project arises in response to the particular needs and opportunities of a given community, organization, and they identified four types of urban agriculture sites (institutional farms and gardens, commercial farms, community gardens, and community farms) within the city of New York. Newly, within the COST-Action TD1106 on "Urban Agriculture Europe" (UAE) and starting from the actors involved and functions performed, UA has been unfolded on two levels (farming and gardening) and three main categories: Urban food gardening, Urban Farming and not Urban oriented farming. In particular for Urban food gardening means "Gardening activities with mostly low economic dependence on material outputs but making use of agricultural procedures for

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achieving other, mostly social goals", while for Urban Farming means "Intentionally materialized business models taking advantage of the proximity to the city by offering local/regional agricultural products or services.

A wide bibliography demonstrates that UA can provide substantial health, social, ecological, and economic benefits to communities.
Concerning the economic aspects few studies point out that UA promotes economic direct impact as the creation of job, business incubation, skills training (Smit et al., 1996; Feenstra et al., 1999; Conner et al., 2008; Kobayashi et al., 2010; Metcalf and Widener, 2011; Vitiello and Wolf-Powers, 2014) or indirect impact considering the cost savings thank to the growing of food (Blair et al., 1991; Suarez-Balcazar, 2006). Patel (1991) listed some socio-economic benefits.
Concerning the social impact several studies reveal that UA promotes social capital and social interaction. Most of the studies focus on community gardens and their role for gathering and socializing (Patel, 1991; Saldivar-Tanaka and Krasny, 2004; Teig et al., 2009) or in improving interracial relationships or in decreasing crime (Shinew et al., 2004; Ferris et al. 2001). Concerning the health impact researches show that UA increases the consumption of fresh fruit and vegetable among participants (Parmer et al., 2009; McCormack et al., 2010) and the greening is a benefit outcome in terms of visual quality and human health and well-being (Smardon, 1988; East et al., 2009).
The qualitative analyses are more numerous than the quantitative ones, and the first are usually focused on a specific case study or a particular aspect. Some authors starting from an empirical survey in order to evaluate the benefit generated determining quantitative data as the increase of the consumption of fruit and vegetables (Alaimo et al. 2008) or level of self-sufficiency (Pourias, 2014). Cohen et al. (2012) proposed an interesting metric framework to evaluate the benefits of UA proposing some indicators for each category of benefit (economic, health, social and ecological).
In this paper we quantify the societal benefits generated by UA focusing on the urban food gardening initiatives within the city of Perugia, referring to the methodology developed within the working group "Entrepreneurial models of urban agriculture" of UAE Cost-action. After selecting different types of UA within the Urban food gardening category, we take into account four categories of societal benefits: social, economic, environmental and cultural. The results obtained allow to describe the diversity of UA typologies and propose a strategy for developing UA within the city considering the actors involved and their suggestions.
In this context our research questions are: what are the goals and the societal benefits of UA initiatives? Do different types of UA play different roles? Do different types of UA have different value of societal benefits? What policies and actions are in place?
The research method of this paper has been developed in the second paragraph. In paragraph 3 the empirical analysis is illustrated and in paragraph 4 the results have been presented which are then discussed in the paragraph 5. In the last paragraph some final remarks are included.

2. Research Methods

This paper is a first outcome of a research still in progress and it is based on the results of an empirical investigation conducted from January to August 2015 in Perugia.
The city of Perugia was chosen for several reasons related to the characteristics of the city and the interest for this topic. First of all, Perugia, capital city of Umbria Region with 165,668 inhabitants (ISTAT, 2015), is one out of 105 medium-sized cities Italian cities that have been assigned a functional and strategic role within the European development policies (Tortorella, 2013). Secondly, the

Province of Perugia fostered in the seventies one of the first public program for promoting UA, and in the last years several projects are arising: community gardens promoted by local associations and the university, a synergistic therapeutical garden promoted by a social cooperative and city farms where citizens can grow fresh produce, with the help of farmers.
Before starting the survey a preliminary review[4] has been conducted and we identified 7 typologies of UA within the urban settlement and in the surrounding (1 km from the border of the city), as defined by the UAE Cost- Action (Tab.1).

Table 1 - Typologies of Urban food gardening in the City of Perugia and case studies

Typologies of Urban Food Gardening	**Case studies**
Family garden	50 private gardens[5]
Allotment garden	Social Garden of Santa Margherita Park and Social Garden of Ponte della Pietra
Allotment garden in local food farm	Elaia farm
Educational garden	University Garden
Therapeutic garden	Synergistic gardens
Community garden	Ortobello
Squatter garden	No
Other garden types	Orto di Porta Eburnea

We have not taken into account the private gardens and the "Orto di Porta Eburnea" considering that their performed functions that are strictly private or projects that were born less than a month before the time of survey.
The investigation is based on a qualitative methodology using the techniques of participant observation and semi-structured interviews. The observation has always been done taking notes of the situation considering the actors, the speeches, the practices and the dynamics between them.
Data were collected through semi-structured interviews, using a questionnaire (Alfranca *et al*., 2013)[6] organized in six parts: socio-economic data, origin and goals of the project, social benefits of urban agriculture, public policies in place and needs and ideas to the development of the project or initiatives.
From January to June 2015, twenty people involved in the five UA projects types selected have been interviewed (urban farmers, representatives of institutions and associations and the users). The data were analysed through a qualitative analysis of the responses and the societal benefits were evaluated on the basis of eight benefit indicators (production, occupation, volunteering, educational activities, rehabilitation and care activities, agrobiodiversity, landscape and cultural heritage maintenance cost), belonging to four macro-categories (economic, social, environment and cultural

[4]Made through photo interpretation, visits and interviews with key stakeholders.
[5] Estimated by photo interpretation
[6] The questionnaire was developed by participants at the Working Group on Entrepreneurial Model within the UAE COST-Action

heritage) (Polling et al., 2014). For each indicator six value classes have been determined in order to compare the indicators and measure the weight taken by each of them (Tab.2). The indicators have been established by empirical investigation conducted during the UAE Cost Action (Polling et al., 2015).

Table 2. Macro-categories, indicators and six levels visualising societal benefits

Macro-categories	Classes /indicators	level 0	level 1	level 2	level 3	level 4	level 5
ECONOMIC	Production value (€ per year)[7]	< / = 1,000	>1,000 – 5,000	> 5,000-20,000	>20,000-100,000	> 100,000 – 500,000	> 500,000
	Paid full-time jobs (Person per year, in full-time equivalent)	No	< 0.25	>0.25 – 1	> 1– 5	> 5– 10	> 10
SOCIAL	Non-paid full-time jobs (Person per year, in full-time equivalent)	No	< 0.25	>0.25 – 1	>1– 5	>5 – 10	> 10
	Number of hours dedicated to social activities (person-hours per year)	0	< 100	>100-1,000	>1,000 - 5,000	>5,000 - 10,000	> 10,000
	Number of hours dedicated to educational activities (person-hours per year)	0	< 100	>100 - 1,000	>1,000 - 5,000	>5,000 - 10,000	> 10,000
ENVIRONMENTAL	Agrobiodiversity (number of different races and species produced)	1	2 -5	6 - 10	11 - 20	21 – 30	> 30
	Managed green open space land (ha per year)	0	< 0.1	>0.1 - 1	>1- 10	>10 - 50	> 50
CULTURAL HERITAGE	Maintenance costs preserving historical buildings and natural monuments (€ per year)	No	< 5,000	>5,000-20,000	>20,000 – 50,000	>50,000-100,000	> 100,000

Source: Alfranca, O. et al., 2013

The production value was estimated considering a standard level of productivity (3 kg of crop per square meter) and a value price (1 euro per kg). The price is too low considering that the production is organic but we prefer to establish fixed values considering that all actors were not able to define the quantities produced and their market value.
Information on goals and public policies in place or expected was extracted from the interviews.

[7] Estimated a production of 3kg per square meter sold for 1 €/kg

3. The UA Projects investigated

Allotment gardens

During the 70's,the Province of Perugia promoted the first social program for the creation of two allotment gardens located in the suburbs of the city. In this period of time, entire rural families, especially former sharecroppers, migrated to the cities. In particular in the Umbria Region they migrated to Perugia, the chief town of the Region, searching better conditions of life and work and aspiring to the improvement of their social status. On the contrary the reality often did not respond to their expectations. The former farmers started to work on factories and they lived in a situation of marginalization and exclusion in the peripheral areas of the city. In order to improve this situation of marginalization and to reduce the traumatic separation from the countryside that gets worse with retirement, the Perugia Province created few allotment gardens. So the Province carved up an area in the suburb of the city, Ponte della Pietra district, assigned plots to retired people for gardening: an opportunity to occupy their leisure time and to regain confidence in their own abilities.

A resolution of 6th July 1976 was drawn up to define the directions of allocation and organization agreements. The Province, assigned to applicants a lot of 150 square meters for one year the assignment time was automatically renewed. The institution provided land, water and a tool shed. The retiree, in turn, committed to cultivate the lot, provide tools, seeds and other materials. The first funding allowance of 10 million liras covered the building of 30 lots, considering that the investment required to build each lot was about 500-600 thousand liras. Following the great number of applications to the program, the Province decided to create more lots in Ponte della Pietra and extend the project to another area which belongs to the former farm of the Santa Margherita psychiatric hospital (closed by the time). The Resolution 167 of June 4th 1991 envisaged the enlargement of the program in this area and some orientations to the management of the gardens that should be conducted activating committees and defining management regulations.

Over the years, the Province created a total of 340 lots of which 198, located in Ponte della Pietra.

A further review of the Regulation 167 was done in 2011. Two are the main additions: compulsory organic method of cultivation and 5% of the lots assigned to subjects with disabilities. 95% of lots is always assigned to retired over 65 years-old residents of the city of Perugia. The allocation, provided for four years, would be raffled at end of the period if the number of available lots is less than the number of applicants.

The technicians of the Province, that manage the program, pointed out that in May 2015 in Ponte della Pietra were 198 lots cultivated and one of them is assigned to a person with psycho-physical disabilities and in the Santa Margherita area there were 106 lots 5 of them unoccupied. So in total there are 309 lots a bit less than the 340 initial lots.

The profile of participants is different in the two zones. In Ponte della Pietra the participants live in the neighbouring areas and are for the most part former factory workers. They belong to a lower-middle income bracket and 34 are women (17% of the total). In this area conflicts and tensions among users are frequent.

Santa Margherita allotment garden is mostly attended by former professors or public employees. They have an average income and they live in the city center or in the suburbs (as Ponte San Giovanni or Ponte Felcino). 33 are women (30% total). The conflicts between the participants are not so frequent and for three years they have also been planning a party each September.

Over the years, despite the goal of the program is unchanged, the profile of the participants changed. Forty years ago, when the program started, the participant already had a previous experience with farming in fact most of them had a rural origin, in recent years the "new" retired people in most cases did not have any contact with agriculture before and are on their first experience. Usually the

users give up to cultivate only for health reasons or inability to continue the activities, with rare the waivers for lack of interest.
The program is currently running and is orientated to retired people with the aim to "*keep them in their social environment and encourage employment activities which stimulate participation in collective life*" (Article 1 of Resolution 167). The managers of the Province underline that the program has a social purpose, but for the participants also other goals are important as: self-consumption, food security, environmental protection, leisure and recovery of traditions and culture (Tab.3). The sale of produce is not allowed.
The managing staff point out that in both areas there have been cases of theft and vandalism as in fact those are both marginal areas and unfenced, even though the presence of the gardens provides some kind of safeguard for the territory. In both areas a space to stimulate meetings and socialization is missing and should be provided.
As for the social benefits of this program (Fig.1), the economic aspects are more relevant in terms of production value, considering the extension of the area and the production of fresh organic vegetables, than in term of employment, considering that the participation is free and voluntary and there are only two staff technicians of the Province that are paid to follow the program.
The social aspects are very relevant in term of social activities, considering the purpose of the project and the numbers of people involved and in terms of volunteering, not as relevant are the educational activities that are not organised by the users. There is only one association that sometimes organises some casual school visits.
The environmental aspects in terms of agro-biodiversity is high considering that the organic method of production and the function that is self-consumption so the diversity and variety of crop lots guarantee a better supply of fresh vegetables, aromatic and medicinal herbs. The total area occupied is quite big so also the open spaces managed have a high value.

Allotment garden in local food farm
The project "AgricityUmbria" promoted the creation of a few allotment gardens within nine farms. The project is the result of a wide partnership among nine farms, the Technology Agribusiness Park of Umbria, the association of producers "Impresa Verde" and the Department of Agricultural, Food and Environmental Sciences of University of Perugia as coordinator. The project was financed by the measure 1.2.4 of the Rural Development Plan of the Umbria Region (2007-2013) on "Cooperation for development of new products, processes and technologies in the agriculture and food and forestry sectors". At the beginning, in January 2015, nine farms, located in the peri-urban areas of several Umbrian city centres, have been involved in this project. The project had ten months lifetime (until September 2015). Eight out of nine farms provided a part of their land divided in lots of variable size to be assigned to city-dwellers. 18,000 square meters in total are involved in the project. Only one farm, Elaia farm, is located in the peri-urban area of the city of Perugia.
The project was promoted for spreading the "rural culture", respect for the environment and the food culture and the gardens were designed as a green space for leisure and connection with the farmers and the agriculture. The gardens built in the two day-care centers involved in the project, assumed an important role in social inclusion for the young autistic people and rehabilitation for disabled young people. We presented the allotment garden realized within the Elaia Farm that it is located very close to the city centre of Perugia.
The farm provided an area of 3,000 square meters that has been divided in lots of different sizes (between 100 and 150 square meters each) according to the participant request; the irrigation water was pumped from a small artificial lake, located near to the lots. All the lots were cultivated with organic agriculture. The farmer and the farm workers prepared the soil, built the garden paths and

planted the plants. During the project lifetime, the tools to cultivate the horticultural plants and the aromatic herbs were available for everyone in the farm. All the costs - for work, land, and tools - were covered by the project funding, as the city-dwellers that decided to manage a plot into the urban garden of Elaia did not have to face any cost during the AgricityUmbria project lifetime. Twenty-one lots of land were prepared within the farm and 15 families have participated in the project. In particular participants included twelve children/teenagers, one family without children, five retired people (a couple and two single men and one single woman) and one group of three friends.

Various are the objectives of the project, which differ according to the actors. The farmers diversify their activity to have an income supply. For the city-dwellers (Tab.3) the main objective was the self-production of fresh products and aromatic herbs. Specifically all the families decided to manage the assigned lot to help their family income, especially those with a single-income.

The secondary goal for the families was the educational aspect: the horticultural activities represent a way to enjoy the connection with nature, particularly important for the children. In fact these agricultural activities had a strong educational function: they made the children able to understand where the food they eat comes from, and they helped to build and reinforce the respect for the environment. However the city dwellers that have cultivated the farm lots have established good relationships exchanging suggestions and knowledge on horticultural practices.

During the meetings among the farmers, the project coordinators and the participants, it was pointed out an important result: the teenagers improved their initial interest by asking specific questions on horticulture and agriculture, demonstrating an increasing sensitivity to the topic. They have also expressed their willingness to continue the horticultural activities after the end of the project.

A family with a five years old child was assigned a single lot of land to cultivate and the experience was very educational for all of them, especially for the child: he demonstrated to be very interested in the activities and amused by the new experience, mainly because he had the chance to share it with his parents and grandparents.

Another lot of land was cultivated by a young couple who lives very close to Elaia; the girl, who was unemployed, lived the participation in the project as a great opportunity of joining her personal passion for horticulture and agricultural work in general, with the actual necessity of improving her means for family livelihood. During the project the retired couple was in its first experience with agriculture: they were very motivated to participate at the project, both of them attracted by the idea of eating healthy, fresh, better-tasting products and to do daily physical activity outdoor. The retired couple involved two friends of them, a paediatrician and a lawyer both retired; who decided to cultivate further plots into the Elaia urban garden.

The retired man that was assigned with another lot of land had been a farmer in his teenage, before moving from the country to the city area during the industrial boom. He decided to participate to AgricityUmbria project both to grow fresh products "getting his hands dirty" and to share his knowledge and his passion for gardening and to transmit them to the younger generations.

Another plot of land was managed by three friends who were approaching to horticulture for the first time: they wanted to try to produce their own organic vegetables, and, not less important, to spend valuable time together outdoors.

The participation of Elaia to the AgricityUmbria project was primarily a way to diversify the activities of the farm, in a multifunctional perspective. Indeed, although the project was an experimental activity with a nine months lifetime, it represented a relevant opportunity to connect the farm with the inhabitants of Perugia. The farmer would like to carry out the project and he estimated the cost of 1.20 €/square metres a year for that ones who are going to manage the lot after the end of the

project. This cost is calculated to cover the plot rent and the irrigation water; for example 60 € is the rent cost for 50 square metres a year lot of land. Additional cost (from 70 to 90 €) is required for the water system according to the size of plots. The city-dwellers that have participated to AgricityUmbria project will continue to manage the urban garden plots into Elaia farm paying a rent for using land and water.
The project redraws the connection between agriculture and cities by establishing a new relationship between producer and city dwellers, including training on issues of food security, fairness of price, integration and social inclusion of weak people. The project has also proved a new opportunity to offer a service that fits perfectly into the multifunctionality concept for farms located in urban and peri-urban areas and so it could be an income support. AgricityUmbria project is pilot for Perugia while similar initiatives was arranged in other Italian cities (Bevagna, Padua, Milan) and in Europe (Aachen, Germany).

Community garden
Another project analysed is the Ortobello community garden. It is the first running community garden within the city of Perugia. The project was promoted within the Caro Vicolo (Dear Alley) Project started in 2014 from the collaboration between the Umbra Institute[8] and the Borgo Bello Association[9]. The Umbria Institute hosts American students for short period courses on various theoretical and practical issues. In 2014, within the course on sustainable architecture some American students have the possibility to work on urban projects in collaboration with the Borgo Bello Association. They started thinking about the revitalization of the Borgo Bello area and the requalification of the alleys within the district.
They selected Fiorenzuola Street, an abandoned and dangerous lane, dimly lit and prone to unlawful uses. The students started to embellish the street with paintings including, a paint on the wall, Saint Ercolano, the patron of the city, who holds a tomato on their hands. Then the process of reflection about the improvement of the quality of the space continued. The semester later, the two Professors that hold the courses on sustainable architecture propose to develop with the students and the Borgo Bello Association a participatory planning activity using the place-making method. They decided to improve the quality of the urban space of the area creating a community garden. Once kept this shared decision they thought how to do it, considering the limited space, a rectangular area of around 24 square meters, and the typology of the area, a crossing point at the exit of escalators. On the 15th of April 2015, after few months of theoretical and practical workshops the garden was created. They realized four bins to cultivate and two benches to sit on and everything realized with wooden pallets. The space was decorated with flowers and pinwheels made with recycled materials. They haven't a formal concession for the use of space that is public yet. The old administration had granted the formal patronage to initiative and the use of the space that it had not been formalized though. The dialogue with the new administration, elected in 2014, is in progress but the department in charge is changed. Before it was the department of "Urban Center" now it is the "Urban Decor".
The participants, about twenty those most dedicated, meet once a week, on Tuesday evening, to make some labours (ex. planting, maintenance, etc.) and take joint decisions (ex. which plants to plant, how to organize the garden, the organisation of events for promoting educational and recreational activities, etc.). In the garden there is a showcase and inside there is a notebook where the participants can indicate the turn of watering to avoid overlapping or long periods of drought.

[8] The Umbra Institute was founded in 1999 in Perugia in cooperation with Arcadia University. The center offers academic programs for higher education for students of American colleges and universities.
[9] Borgo Bello is the association of residents and friends of the neighborhood of Corso Cavour and Borgo XX Giugno. The association offers monthly cultural and social events.

In order to understand the collective perception about the goals of the project, 10 participants have been interviewed collectively. According to their opinion, as the Table 3 shows, the main purpose of the garden is the redevelopment of urban space and a significant importance is given to social activities; educational and recreational roles and to environmental protection.
As for the societal benefits detected (Fig.1), the higher value was attributed to the agro-biodiversity considering the high number of species cultivated. Also the social aspects are relevant related to other, in particular the voluntary work and the social and educational activities will tend to increase in importance over the course of the project that is only active for a few months. On the contrary the economic aspects are irrelevant.
The participants of Ortobello community garden imagine that the garden itself could expand on the private adjacent space and there are discussing with the owner to establish an agreement for the free use of the area. They also aspire to the diffusion of community gardens that could spread up, leading to the creation of several community gardens, which could invade the entire neighbourhood and the city as the case of Todmorden in England. Obviously, they considered the municipal administration as the main interlocutor, attending from them a support for these initiatives.
The participants of Ortobello community garden are in contact with the University of Perugia where an idea to realize another garden within the Faculty of Agriculture. The idea came from the desire by the Department of Agricultural Sciences, Food and Environmental to reactivate the students' gardens, more or less abandoned in 2012. They realized, in June 2015, five batches of four squares meters each that could be cultivated by members of the association with the students of the Faculty of Agriculture. The main goal of garden is the social integration among students and the residents of Borgo Bello, the area where the faculty is located. This collaboration emerges for a dual motivation on the one hand to ensure the vegetable garden during the summer when students normally are not there and at the same time create a space for integration and social cohesion between students and city-dwellers. The Department of Agricultural sciences would like to achieve a greater number of lots and cultivate the entire area also activating few greenhouses for producing seeds that now are in a state of decay. At the moment, this initiative does not have specific funding.

Therapeutic garden

Another project it is the synergistic gardens. This is a therapeutic garden carried on by the *Nuova Dimensione* (New Dimension) social cooperative. The cooperative runs a day care center, the *Casa Famiglia Taralla* (Family Home Taralla) for people with mental health problems. During the morning, two social workers conduct activities in the garden involving seven guests of various ages.
The project was created in 2012 thanks to the enthusiasm of a social worker. In 2010 he attended a two years course on hortotherapy at the Hortotherapy School of Monza. Then he proposed to the cooperative to realize a synergistic garden within their center. The local health unit has allowed him to carry on this project investing his time on it. Over the last three years the project grows extending out of a total of 7,000 square meters composed of two big lots.
The main goal of this project (Tab.3) is therapeutic but other goals are considered important as: educational, social, protection of environment, cultural; considering the strong ties sought with local food traditions. Commercial and food security are less important. The social worker underlines that one of the objectives that the program achieved is the working integration. The social operator involved the people less problematic and more interested on these activities on the maintenance works of other areas and one of them it is the "Giardino dei Semplici" in Assisi. The Assisi Nature Council Association takes in charge the cost of the garden's maintenance that is realized by the New Dimension Cooperative. The social worker proposed to the Italian Environment Fund (FAI) the creation of a synergic vegetable garden. During few months between 2014-2015, the social worker

and three guest of the daily care centre worked on the project (from the ideation to the realization) of the garden. It was opened on June 7th 2015 and it has as main objectives educational and ornamental purposes. The Assisi Nature Council Association financed this project.
These experiences show that gardening could be a real job opportunities for people who could be hardly allocated in the job market.
Concerning the societal benefits (Fig.1) that the project generates, it is not surprising to note the positive repercussions in economic aspects in terms of production and employment. Both aspects could be improved thanks to major investments in term of financial and human resources. The social activities could be also more relevant if the project could involve more people.
The environmental impact are major in term of agrobiodiversity considering that the method of cultivation is synergistic therefore higher is the diversity of species that are planted following the intercropping and rotation techniques.
The social worker points out that there is enormous potential for growth and development and diversification, focusing on the services supply (as plant production, seed breeding, transformation, flower nursery, etc.). He also underlines that they could extend the cultivated area considering the large space available within the Santa Margherita Park where they are located. For the moment, however, the project reaches its limit considering the number of people and hours invested. It would require a greater investment in (h/man) and economic resources (ex. To restore an old building that they use as a shed for tools and the purchase of the latter).

4. Discussion

This overview shows the diversity of the promoter actors (institutional, private firms, farmers, citizens, universities) and the multifunctional nature of this type of projects that have the ambition to draw up different objectives.
These initiatives of UA involved different actors and their main goal is not economic while different social issues are addressed (cultural, educational, therapeutical, social cohesion and so on) according to the project and not related to typologies (Tab.3).

Tab. 3 The goals of UA projects

	Allotment garden in local Food Farm (Elaia Farm)	**Allotment Garden (Social Gardens)**	**Therapeutic Garden (synergistic gardens)**	**Community Garden (Ortobello)**
Main goal	Income integration for farmer / production of fresh products for the participants	social integration	Social-care rehabilitation	Requalification of urban abandoned space
secondary goals	Self-consumption, food security, environmental protection, leisure and recovery traditions and culture	self consumption, food security, environmental protection, leisure and recovery traditions and culture	social and education, protection of environment, leisure and recovery traditions and culture	Social and education, protection of environment, leisure and recovery traditions and culture

In fact it can be noted that the same type has different goals, for example the allotment gardens present as main goals different focus but they have in contrast to other typologies the food security and self sufficiency as secondary goals. It is noteworthy that all projects have as secondary goals the protection of environment, leisure and the recovery of traditions and local culture. The method of

cultivation is organic and in most of the projects local varieties are cultivated and the participants rediscover the pleasure of producing and cooking their own food. The production is oriented to improve self-consumption and education and recreational activities rather than to market the products. Nobody indicated the production of energy as a goal of theirs activity.
The figure 1 shows the UA initiatives produce different benefits related to economic, social, environmental and cultural heritage aspects.

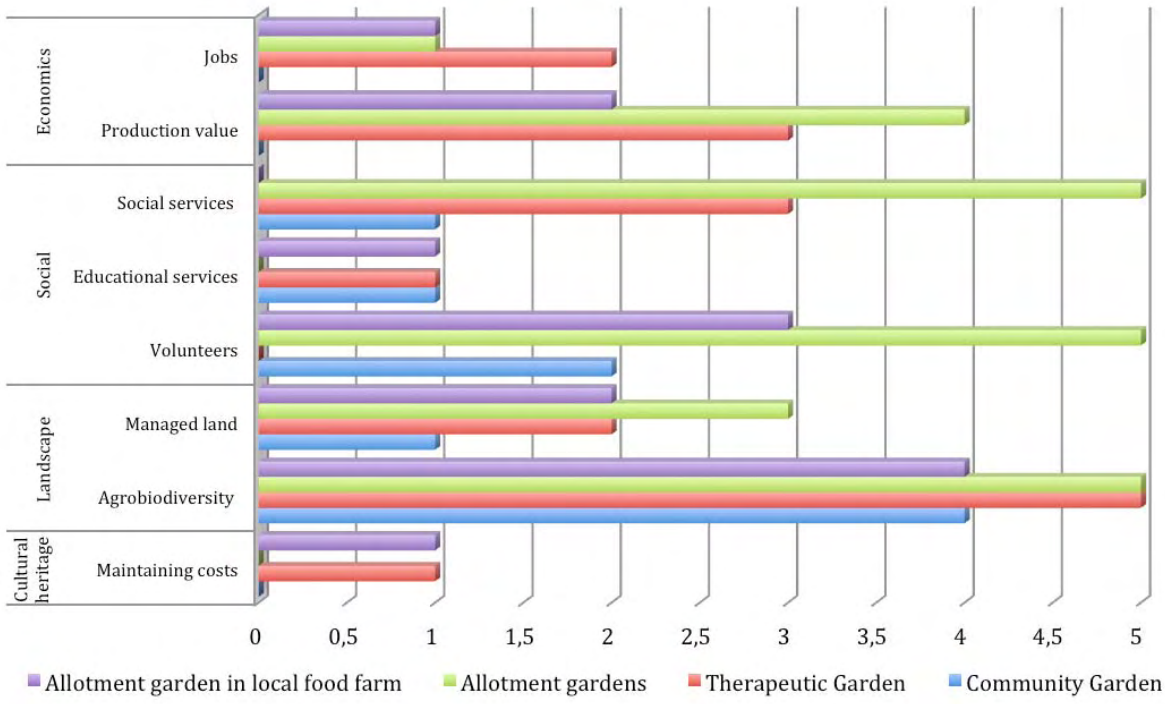

Figure 1. The societal benefits of UA projects

Concerning the economic aspects (jobs and production value) the results vary related to the size of cultivated area and number of people employed. The production generally does not cover the needs of people involved especially in the wintertime considering that for most of the people involved it is a part-time and recreational activity that they prefer do in the spring and summertime. As for the production value, the participants are not able to quantify their production because it can vary during the seasons according to the time invested and the weather and the skills needed. The value of the production indicator should be rethought on the basis of the experiences and a survey of the organic products market. In fact, according to the observation made during the search it was found that the quantity produced varies related to the experiences of the people and the time invested. Important to underline that only five people (social worker, the two staff of the province and the farmer of Elaia farm) are paid for working within these initiatives that are based above all on volunteer work. Moreover it is possible to create new possibilities and paid-jobs on this sector (ex. social worker specialists on hortotherapy, facilitators of strategic planning, gardeners to maintain edible community gardens, ect.).
The social aspects are relevant in all experiences considering the number of people involved directly and indirectly in the practice of UA and in the activities (educational and social) and the impact on their lives. The Ortobello community garden presents a very low value considering the limited

extension and the focus of the project. Also the AgricityUmbria project has had an interesting social aspect; in fact, even if it was a pilot project with only ten months lifetime, it was an opportunity to bring together different city dwellers (like retired people, family with children, single and so on). Concerning the environmental aspects in most of the cases the indicator with the highest value is the agro-biodiversity because of the method of production that is organic and with a high variety of species cultivated.
The cultural heritage aspect is not relevant because the initiatives are not located in a cultural and historical site and there aren't historical buildings to maintain.
Only a few initiatives are supported by a political sphere, which varies (agricultural, social-care, education, environment, urban planning, ect.) according to the project. In the case of the cities of Perugia it is interesting to note that the initiatives are supported by the Culture and Social Promotion Service of the Province that supports the allotment garden program; the Local Health Unit that support the synergistic garden allowing two operators to engage in this activity and the Rural Development Plan of the Region that oriented some resources to the AgriCityUmbria project.

5. Final Remarks

The questionnaire was useful to understand the goals of the different experiences of UA in the city of Perugia and also to identify and quantify their societal benefits. As pointed out in the discussion the economics aspects concerning the production value is not easy to define and a method should be chosen to calculate it.
The societal benefits that we took into account did not consider the health aspects that should be integrated.
The results of the analysis confirm that urban horticulture from the original purpose of food production have since evolved (La Malfa, 1997; Hynes and Howe, 2004; La Malfa et al., 2009) assuming aesthetic and recreational, educational (Taylor et al., 1998; Wells, 2000), social (Westphal, 2003; Tei et al., 2009) or therapeutic functions (Crouch, 2000; Lorenzini and Lenzi, 2003) in relation to the economic and socio-cultural changed context (Tei and Gianquinto, 2010). The majority of respondents consider that while many private and public subjects are engaged in urban agriculture, until today there is no citywide policy or plan to coordinate the different projects. It is the responsibility of the administration to design a policy and a strategic vision to implement UA within the city.
Newly the municipality of Perugia demonstrates more interest in developing UA within the city and the last 29th of September the Vice Mayor of the municipality of Perugia announced that they have identified 12 public areas available to cultivate. The idea is based on the Regional Law of Umbria Region 3/2014, which promotes the destination of the urban and peri-urban areas owned by the municipality to "social gardens" privileging the people that want to cultivate for charity or self-consumption using organic method.
The support of Regional Policy was fundamental for the Elaia case study because the AgricityUmbria project was financed by Rural Development Plan of the Umbria Region (2007-2013).
The results of the project (in terms of social aspects, creating knowledge on horticultural activities, educating to consume vegetables and last but not least creating income support for farmers) have showed the high interest both of the city dwellers and the Policy makers concerning UA in Umbria Region. It is hoped that this interest will strengthen in the next Rural Development Plan of the Umbria Region (2014-2020). This survey can give some orientations to develop AU within the city based on the needs expressed and the public policies in place or potential. However these experiences seem to be isolated from each other. Several projects are located in the same areas and

they are not connected (as synergistic gardens and allotment garden of Santa Margherita). This fragmentation does not allow either the creation of a network of exchange (know-how, tools, etc.) and collaboration (ex. the cooperative new dimension would need a support in human and economic resources and the retired people would perhaps time to help and cooperate with the social workers) and it is not conducive to the disclosure of these experiences. The municipality through the implementation of appropriate tools could carry out this function of connection among initiatives, disseminating the good practices. For example a platform, where indicated the spaces and experiences underway emphasizing strengths and needs, could be realized considering the increasing use of technology. For the dissemination of practices and increased knowledge they may also be organized the open day by opening these facilities to the citizens and tourists can see and experience for a day to be farmers in the city. The agricultural practice has shown over the years, starting from the pedagogical theories of John Dewey, the dissemination of civic values (respect public space, learn to stand in public and relate to others, etc) (Ralston, 2012).

Moreover it would be important to enhance and improve the measures for the realization and implementation of those initiatives through regional funds (ex. Rural Development Plan), and to increase and invest in human resources (ex. operators of health local unit or persons who receive income citizenship, refugees, etc.) in this sector. Moreover could be encouraged the use of the intra-urban spaces (ex. Regulation of green, activating a call for the management of temporary public spaces as the Pla Bruits of Barcelona) for agricultural activities.

Over the years the changing socio-economic conditions should lead to a reflection on the function of the gardens and of the social categories, to be admitted to this experience. It would necessary to think how to make this experience more rational updating it to changing needs. Today UA could be improving also as support to families in economic difficulties and in food insecure state. So the social program of Province could be extended at this category in addition to retired people. To realise these strategies and reflecting on this reality the involvement in all local public institutions (municipalities, unit of local health, province, region, ect) is critical. Furthermore the institutions showed certain inertia could change thanks to the thrust of sensitize of city-dwellers, several regional or local territorial issues (as. safety of urban areas, degradation of environments, economic crisis, ect).

It is necessary now take advantage of this moment of intense activity, creativity, ideas and actors involved in order to improve connections and synergy to implement these initiatives. Furthermore we show that to develop these initiatives and to multiply the experiences of UA within the city the institutions, private citizens, associations and farmers should operate in more synergistic and efficient way.

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Ana Maria Viegas Firmino, "Learning and Tips for more Sustainable Urban Allotments in Portugal", In: *Localizing urban food strategies. Farming cities and performing rurality.* 7th International Aesop Sustainable Food Planning Conference Proceedings, Torino, 7-9 October 2015, edited by Giuseppe Cinà and Egidio Dansero, Torino, Politecnico di Torino, 2015, pp 414-426. ISBN 978-88-8202-060-6

LEARNING AND TIPS FOR MORE SUSTAINABLE URBAN ALLOTMENTS IN PORTUGAL

Ana Maria Viegas Firmino

Keywords: urban allotments, gentrification, good practices, holeriturisme, Portugal

Abstract: The recent interest in planning horticultural gardens in urban and peri-urban areas in Portugal, confronts us with incongruent effects, a tricky situation that generates controversial discussions. On the one hand, we can accept wholeheartedly the setting up of infrastructure, such as water, sheds for tools, rainwater catchments and fences, but on the other hand it is regrettable that people who always worked a certain plot of land, although possibly illegally, must often look for an alternative location, because either they do not know how to apply for a plot, they do not want to accept the regulations inherent to the planned horticultural park, or they refuse to pay to go on using the plot. This creates a gentrification of the gardeners associated with the planning and legalization of the plots that has not been properly studied. This affects mainly immigrants and older people, who work informally plots that they do not own, but which are fundamental to their self-sufficiency even if only partially. These plots are usually located along the main roads around the larger cities, and these gardeners are often blamed for producing products that are polluted by the fumes expelled by the vehicles and by the sewage water used in irrigation.
The paper will discuss as to what can be done so that CPUL's can continue to fulfill the strategic task to feed the cities and do not become a mere playground for the middle classes and will give good examples on how to contribute to social inclusion.

1. Introductory Remark

In the thirties, when Lisbon enlarged its built area to the North (the New Avenues Quarter) the buildings were planned in order to offer a small backyard, where the neighbors could plant cabbages, salads, flowers, or even breed a couple of small animals such as chicken, rabbits, pigeons … Some of these gardens still exist, surprising the visitors with the presence of fruit trees, occasionally olive trees (for instance in Defensores de Chaves Avenue or Rom Avenue). However little by little, many backyards were transformed into garages or were covered with concrete, much easier to keep (no weeds, nor watering). According to Mata (2014) over the last decades the poor environmental conditions, were, together with real state issues, expensive (land) prices, reduced availability of good public spaces and decline in associated quality of life, responsible for the abandonment of the inner city of Lisbon by its inhabitants.

In order to revert this situation a "Green Plan" was launched in 1997, under the coordination of Ribeiro Telles, where a new element of the urban planning was created – the Urban Ecological Structure, as a subarea of the Urban Green Structure (Ribeiro Telles, 1997, p. 126). This was intended to guarantee a better functioning of the fundamental ecosystems and larger biological diversity.

The Urban Allotments and Backyards are here presented as an important typology that contribute to a better environmental quality of the city, and should be emptied of any edification or impermeable pavement and be covered by vegetation. Ribeiro Telles considered that the non-observation of these premises would drive to a more and more dusty city, dryer and hotter in Summer and colder in

Winter (ibid, p. 130). Besides these small green patches are important step stones for the urban avifauna.

Thus in 2008, and based on the Green Plan, the Lisbon City Council adopted some preventive measures in the Master Plan and in 2012 the New Master Plan "includes several specific work fields of the "Green Plan" such as Urban Allotments, Green Structure Areas, Water Cycle improvements, among others", Figure 1 (Mata, 2014, p. 1).

http://www.urbanallotments.eu/fileadmin/uag/media/Lisbon/2-GVSF-CML-paper_COST-LNEC_FINAL.pdf
Figure 1 – Urban Allotments Gardens Program for Lisbon 2011 – 2017. Source: Mata, D. 2014, p. 3

The actual trend to create horticultural parks and other green areas in the city is a valid contribution to a better environmental quality and offers leisure and recreational spaces to its inhabitants. But is this being achieved at the expense of the former users of these areas (even if often they are not their legal owners) and do the new gardeners really contribute to the so much praised food security, or do these urban parks constitute a nice piece of design whose multifunctional activities are indeed reducing the areas formerly effectively cultivated by people who needed them for their nutrition? And what can be done to integrate the most needy and bring some added value to these areas? This is what will be discussed next based on literature review, consultation of information available on the internet, as well as interviews with gardeners at "Quinta da Granja", technician of the Municipality of Lisbon and the coordinator of the project "Hortas do Mundo".

1.1 Gentrification in the organized Urban Allotments?

The majority of the urban allotments inside and around Lisbon occupy derelict land and they are cultivated by elderly people, often retired, such as in Quinta da Granja, or younger people employed or unemployed as in Chelas Valley. Recently young and more educated people have also shown interest in having a plot, namely the groups working on permaculture. According to the areas, a predominance of migrants, namely from Cape Verde, may occur.

Mata (2014, p. 2) informs that "before 2011 all urban allotments were spontaneous on the Landscape" but their area has been decreasing as follows (Table 1):

Table 1. Urban Allotments in Lisbon (Ha)

Year	*Area (Ha)*
1987	*304*
1995	*190*
2014	*84*

Source: Adapted from Mata, 2014, p. 2

Nowadays from the existing 84,0 hectares of urban allotments in Lisbon almost 12,0 hectares are constituted by organized municipal parcels being located in 8 Municipal Urban Allotments Parks, some of them such as the one of Chelas Valley, of considerable size (16 ha and about 200 parcels) and 20 new urban allotment parks are planned in Lisbon up to 2017. According to the same source Lisbon has still 70 ha of other types of agriculture, such as olive trees, cereals and pastures for cattle.

The construction of buildings and large infra-structures has contributed to the destruction of many spontaneous allotments that illegally occupied land not owned by the gardeners. Indeed it is common to find such plots along the motorways and railroads as well as in the interstices of the built fabric, often close to social quarters, where people with low income and/or spare time due to retirement or unemployment cultivate a diversity of crops basic to their food needs. They are easily identifiable since these gardeners use all kind of waste to create hedges, build improvised sheds and rain catchments. Some of these invents are very ingenious and functional (see examples in Figures 2 and 3).

However both are jerry-built structures that may easily hurt the sensibility of some who have a different interpretation of landscape in spite of the fact that they accomplish three very important premises propelled for sustainable development: reduction, reuse and recycling!

As Matos, R. and Batista, D. write (n/d, p. 1) "the landscape reflects the free creative action of man as a result of an anthropogenic action aimed at changing nature towards the useful and the beauty. Landscape is an aesthetic but also an ethical reality because it is linked to an action and to a human being in his own environment and community". Thus what we find in these spontaneous urban allotments corresponds to the feeling of their gardeners which, whether we like it or not, represents their way of living and being. We can, in a certain way, compare it to the "graffitis", formerly considered vandalism but that evolved into what is called today "urban art/street art", an artistic expression with participation in festivals and financed by some municipalities (Figure 4).

Figure 2. Rainwater catchment in Apelação Quarter, Loures Municipality, North of Lisbon

Figure 3. Containers made of large plastic bottles in Guimarães, near Porto (North of Portugal).

Figure 4. Spontaneous urban allotments and "urban art" in the social quarter of Apelação (Loures)

Perhaps someday the same will happen with these spontaneous gardens!

In regards to the quality of their products, they are blamed for using water from dubious sources such as sewerage systems, since most of these plots have no drinking water; air pollution, caused by vehicles along the main roads, are additional problems that may occur as is the accumulation of waste.

However air pollution also occurs in other areas of the city, namely Alta de Lisboa, where a relatively recent urban allotment succeeded in winning prizes, in spite of the fact that it is polluted by carbon dioxide from the motorway running alongside its boundaries and the kerosene from the planes that operate at the nearby airport. In this case nobody seems to be worried with the pollution! Is it because this is a planned infrastructure? As a positive remark, part of this garden is accessible to people in wheelchairs who can work the plots, since these were built as raised plant beds, designed to suit their special needs.

Indeed pollution is a serious problem that affects many urban areas, as stated by Costa (2015, p. 8) quoting examples of studies carried out in cities such as Berlin, where levels of heavy metals (cadmium, lead, zinc, nickel, chromium) in salad items produced mainly in allotments close to the roads with more traffic were above the concentrations found in the same products on sale in the supermarkets (Säumel et al, 2012).

Pinto (2007) conducted a similar research in Braga, North Portugal, looking for the presence of heavy metals in salad items produced in 5 allotments inside the urban perimeter and 3 located outside. He found out that inside the urban perimeter the values of cadmium, lead and zinc in salad items and in the soils were higher than in the outside ring. These studies raise the question of food safety in urban areas in general, and not only in the marginal spontaneous allotments, mainly cultivated by

immigrants, although these, being often located along the roads, may be more affected, but not only these, as the example of the urban allotment of Alta de Lisboa shows.
Finally the gardeners who cultivate land that does not belong to them, are often disregarded although they may have more or less consent from the legal owner or who work the land for a long period without having been pursued by the law, which according to usucapio principle entitles them as its future owners. Notwithstanding in general they are a vulnerable population who ignore their legal rights and prefer to look for another plot.

The fact that, when integrated into a legalized urban allotment, these gardeners have to respect a list of regulations (and pay a certain amount of money, even if this is calculated according to their income and do not exceed about 70 Euros/Year) and still face precariousness in the use of the plot, since they may not be entitled to continue after a certain period of time, contributes to gentrification, because some of them will not match the "model" and will leave.
Even if this may not be the intention of the municipality, there is a change in the profile of the actors and their submission to the dominant power, as discussed by Giroud (2015).
Last but not the least, not only the ethnical groups and less favored/elderly people face problems to be part of some urban allotments. Communities that advocate a different model of society, such as those who practice permaculture as a life philosophy, may incur in conflicts. "Horta do Monte" (The Vegetable Garden from Monte) took over a small steeply sloping plot that had been previously cultivated during three years by a group of young people. They presented themselves as having a project different from the other traditional urban allotments because they were a collectivity open to the public with pedagogical activities aimed at promoting healthy and sustainable life styles in the city. They had a blogspot, which in the meanwhile has been discontinued, where they presented their activities (Figure 5).

Figure 5. Images of the Community "A Horta do Monte", Graça, Lisbon
Source: Errore. Riferimento a collegamento ipertestuale non valido., in: Loupa Ramos, I. et al., 2011

The decision of Lisbon's municipality to rehabilitate the area, faced them with the dilemma of staying and accepting the conditions that were offered by the Municipality (but diverged from their fundamental principles) or leave. First they tried to fight for the project that during three years they had been implementing in the area. Their intention was not to own the plot but only to spontaneously work in a place that pleased them and where they had planted about 500 perennial species.

Although they have been informed by the municipality that they could continue in the place if they agreed with the conditions, they could not accept that the machines would destroy everything they had planted, namely fruit trees, neither did they agree with the terms of the contract that gave them no guarantee to stay for a long period nor allowed them to plant new trees.
The day the municipality started pulling out the trees with the bulldozers some of their members opposed this action. The confrontation with the police was unavoidable (Figure 6).
In a work about ethics and aesthetics of allotment gardens, Matos (2013, p. 1) writes about the "work that has been developed to regulate, to improve and to include" spaces such as Quinta da Granja and Chelas Valley allotment gardens in the city planning, "both in terms of ethics – social, environmental, emotional and economical aspects – and in terms of aesthetics – namely its importance in the urban regeneration and city design".
In spite of the recognition that it is not easy to deal with situations such as the described above with Horta do Monte, it is important to recall the emotional link that usually ties all those who care for Nature and who have planted something. Crouch explains that "because an allotment provides a means of freedom to deploy effort in relation to numerous constraints as well as dreams and possibilities, what results on a plot of land can be an expression of many feelings and encounters between people and the ground they use. In this way the plot holder produces a representation of his or her own life; a temporary, changing aesthetic worked with influences even the best plant cultivation cannot control" (Crouch, 2003, p. 2).

Figure 6. Confrontations between police and supporter of Horta do Monte (2013) http://www.publico.pt/local/noticia/dois-detidos-e-tres-feridos-em-desocupacao-de-horta-comunitaria-em-lisboa-1598320

The example of Horta do Monte presented here aims at stressing the susceptibility of such actions and the difficulty in getting unanimity, as it is clear from the reading of the dialogues in the blogs, where some welcome the intervention of the municipality and others condemn it. Basically it is once more the aesthetic (and hygienic) elements that seem to play in favor of the municipal decision, which can be summarized in comments, such as: "the area is well organized, free from rubbish and makes good use of a small steeply sloping piece of land" opposing to those who support the emotional and material investment carried out by the former gardeners. Notwithstanding the Horta do Monte community gave rise to the Horta do Mundo (World's Vegetable Garden) and keep active organizing workshops on how to create a vertical vegetable garden on the balcony according to permaculture, how to prepare meals according to the Ayurvedic principles or how to produce artisanal soaps. But, at the moment, they are a "World's Vegetable Garden" without a garden of their own! (Figure 7).

"The World's Vegetable Garden, we "Cultivate" People is a collective of permaculture which promotes healthy and sustainable life styles. Permeated by a creative and constructive spirit we work out solutions that contribute to a more human and responsible society at the social, cultural and environmental level.

Figure 7 . The "World's Vegetable Garden" Logo and presentation

1.2 Urban Agriculture: more than only food production

The fact that more than half the world's population live in cities, and in 2030 this may reach 60%, raises much concern about the supply of food to a growing population that is not involved in the production. However "although urban agriculture refers, in general, to activities connected to the

production of fresh vegetables in the city, it does not mean that it has to be strictly related to production; urban agriculture is also fundamental in including ecological, cultural, recreational and aesthetic concerns, related to the landscape. This means, urban agriculture can integrate, and be, a structuring continuum that assures the occurrence of the processes and flows of the various systems that constitute the landscape" (Matos, n/d, p. 459).

The design of the urban allotments and horticultural parks in Lisbon follow the Continuous Productive Urban Landscape (CPUL) concept, designed by Viljoen and Bohn in 1998, which advocates the creation of a network of multifunctional open spaces giving urban agriculture a complement and support of the constructed environment. They aim at a multifunctionality that may attract different people, not only the gardeners themselves but also those looking for a moment of relaxation, practice of sport, conviviality with friends, a pause for coffee, a walk in contact with Nature. Thus, and according to their location, these parks offer to the local population something that may be of their interest.

One of the largest pieces of equipment built in one of such parks in Lisbon was the Skate Park Rock in Rio, located in the Urban Park of Chelas Valley, comprising 2000 square meters where the young can practice skateboarding, BMX and inline skating, side by side with the largest horticultural park in the country (16 ha).

The fact that Chelas has many social quarters where life is not always easy, and is frequented by a large number of youth, restless, many unemployed, explains this initiative which intends to keep them occupied and contribute to a better image of the area. But why not involve them in gardening too? That is what social agriculture is for!

Although it is understandable the choice made by the municipality, this shows that, at least in densely populated areas such as the Metropolitan Area of Lisbon, urban agriculture has a modest contribution to supply the food necessary to guarantee the certainty of food security to its population, because there is not enough land available and many of the gardeners enjoy gardening for pleasure and not for need, which may not be motivation enough to try to maximize their production. However urban agriculture is important also for other benefits as Matos explains: "- Social (leisure, fomenting local groups, therapy for individuals with special needs, rehabilitation of youngsters). - Environmental (renewal of abandoned urban spaces, diversification of the usage of urban land, increase of biodiversity, preservation of the water, soil and air cycle, reduction of the carbon footprint). - Human (promotion of sociability through the encouragement of personal qualities such as altruism, the improvement of the quality of life through social interaction, health benefits through physical exercise, better food quality and greater diversity) - Economical (stimulus of the local economies, creation of employment and wealth, directly or indirectly). - Emotional (due to the interruption that it can provide to the monotonous and grey everyday life of the citizens, allowing them to realize the real dimension of time)" (Matos, n/d, p. 467).

2. Learning with the examples

2.1 The urban allotments of Braga and Póvoa de Lanhoso in Portugal

Examples of successful projects undertaken by solidarity institutions and municipalities, include one in Braga and another in Póvoa de Lanhoso (both in North Portugal) that contribute to the social inclusion of low income and socially stigmatized families.

The first project is named "Garden of Knowledge", and aims to combine the clients' training to their learning capacity throughout life. It was an initiative of the Portuguese Red Cross, Delegation of Braga, through its Community Centre in Vila de Pedro, and included 16 family plots (200 m2/plot) and a training course on organic farming (200 hours). The project was based on the characteristics and expectations of the beneficiary families, and included a technical project for organic horticultural production. According to its authors the "Garden of Knowledge","an intelligent park and an innovative project with a sustainable proposal" has given these families "a great sense of motivation, commitment and willingness to participate, improving the social relations with the local community. The project by stimulating the families' skills and self-esteem, by providing training, creating duties and stimulating their compliance to schedules, as well as promoting environmental awareness and teamwork, has showed a great opportunity towards social insertion" (Silva et al., 2015, p. 2). Besides "the technical strategy aimed to be maximized in its structure, organization and individual space sizes

to allow the maximum production of food for the families as well as to help the family income by selling their surplus” (ibid, 2015, p. 2).

The second project started in 2010 in the municipality of Póvoa de Lanhoso, which presents itself as a pioneer in social allotments in Portugal and is certified as organic operator since 2006. Due to the endeavor of Natália Costa (2015), organic farming has been promoted in different projects, namely Biologic@, which was financed by the European Union. The municipality has a 0,5 ha vegetable garden where 17 beneficiaries of the Social Insertion Income (RSI) work 3,5 hours/day once or twice a week. They do not get a wage for their work but they receive a basket with products from the vegetable garden at the end of the week. Most of the beneficiaries are between 41 and 50 years old and are unemployed. Two of them are retired.

The beneficiaries work under the supervision of the project coordinator, who also gives them training in organic farming.

Both examples show good practices that can be implemented in order to integrate socially and economically people with lower income.

Figure 8. Social Allotment in Póvoa de Lanhoso
Foto: Natália Costa

2.2 Social City: an example from Germany (Dessau-Rosslau)

Social City is presented by Glaze et al (2014, 59) as a program of an area based policy which intends to wash off the stigmatization of a certain quarter contributing to its better image. Urban Gardens are often part of the program. In Germany, the Ministry of Environment, Nature Protection, Construction and Nuclear Security promotes projects of urban gardens, such as the Garden of Senses, in Desslau-Rosslau (Sachsen – Anhalt), which intends to offer a diversity of activities that cover themes such as biological diversity, Earth conservation, healthy food, identification of fruits, salads and spices, construction of birds' nests in an area . It created a social network that supports its activities and it is financed by regional enterprises and individuals. The success of the garden is achieved not only by the project manager and four workers but also with the community that contributes with labour and materials.

Besides it has a an intensive activity through protocols established with different official entities, such as the Ministry of Culture and the Ministry of Environment and many social associations at a regional level and with schools.

This is a very successful project that in the future, when in Portugal, citizens will be more mobilized to this kind of initiative, may inspire groups such as the "World's Vegetable Garden" to start similar projects.

2.3 Holeriturisme: a tip to diversify services in the urban allotments

Holeriturisme, which means "vegetable tourism" (from the Latin word holus, meaning vegetable) has been developed since 2009 in the Baix Llobregat Agricultural Park (BLAP), a protected farmland in the metropolitan area of Barcelona, as a strategy to reinforce links between BLAP producers and nearby consumers. According to Paül et al (2013, p. 115) this alliance promotes alternative food networks (AFNs) and it has also been presented as "a new form of agritourism, because it incorporates a leisure dimension". The interviewees consider holeriturisme as a "pretext" or "excuse" to promote specific vegetables to consumers. A daily package includes:

1) A visit to farms and an explanation by the farmers of what organic farming is and whether the farmer is certified;
2) A visit to an interactive museum exhibition where the visitors will get information about each agricultural product used in the holeriturisme experience;
3) A cooking and tasting workshop based on the seasonal products;
4) A restaurant meal using local produce (adapted from Paül, 2013, p. 119 – 120).

The experience intends to make the consumer aware of the differences between the locally produced food and that which has to travel from far, as well as the advantages of consuming the products available in each season.

3. Conclusions

The purpose of this paper was to show that some interventions in areas where spontaneous allotments existed may contribute to gentrification, even if in general not many people will be affected. Indeed elderly people, who are not willing to change their gardening practice to adapt it to the urban allotment regulations, are usually the most affected, or those who do not agree in paying

for a plot that they already cultivated for free, although this price is not very expensive, taking into account the advantages of the infrastructures that are offered.

Some people may also disagree with the intervention during the rehabilitation, due to the destruction of the existing trees and plants and for the fact that they are not allowed to install permanent crops since their occupancy of the plot is ephemeral.

In the second part of the paper some examples are given of good practices that contribute to integrate people with less income in social agriculture, contributing to their food supply and self-esteem.

The Garden of Senses, an example from Germany, shows a different form of organization, based on a bottom up approach, self-sufficient in resources and mobilizing the local community, offering a large variety of activities, especially for schools.

Finally holeriturisme is presented as an initiative that may bring visitors to the horticultural parks, who will buy the local products and will learn about the advantages of eating according to the seasons and can complement the income of the people involved. However, as we have seen in these examples, people have to get organized in associations and be less individualist, a lesson that many Portuguese still have to learn!

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Acknowledgement:
The author wishes to thank to Graham Reed for editing this text.

Melika Levelt, Aleid van der Schrier, "Logistics drivers and barriers in urban agriculture", In: *Localizing urban food strategies. Farming cities and performing rurality.* 7th International Aesop Sustainable Food Planning Conference Proceedings, Torino, 7-9 October 2015, edited by Giuseppe Cinà and Egidio Dansero, Torino, Politecnico di Torino, 2015, pp 427-439. ISBN 978-88-8202-060-6

LOGISTICS DRIVERS AND BARRIERS IN URBAN AGRICULTURE

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Abstract: Although urban agriculture as a way to come to sustainable urban food systems can be questioned and we have to be aware not falling into a 'local trap' regarding its benefits (Born & Purcell, 2006), initiatives for urban agriculture emerge all over the world. Some of these primarily focus on achieving social and educational goals while others try to become an (high tech) alternative to existing food supply chains.
Whichever the goals of urban agriculture, in practice many of these initiatives have difficulties in their (logistics) operations. Research on urban agriculture and local-for-local food supply chains mainly focuses on environmental and economic benefits, alternative production techniques, short food supply chains (logistics infrastructure) or socio-economic benefits of urban agriculture. So far, the alignment of urban agriculture goals with the chosen logistics concept – which includes more aspects than only infrastructure – has not gained much attention.
This paper tries to fill this gap through an exploration of urban agriculture projects – both low and high tech – from around the world by using the integrated logistics concept (Van Goor et al., 2003). The main question to be answered in this paper is: to what extend can the integrated logistics concept contribute to understanding logistics drivers and barriers of urban agriculture projects? To answer this question, different urban agriculture projects were studied through information on their websites and an internet based questionnaire with key players in these projects. Our exploration shows that the ILC is a useful tool for determining logistics drivers and barriers and that there is much potential in using this concept when planning for successful urban agriculture projects.

1. Introduction

Urban food systems have evolved over time. Historically food was produced at the edge of town, as infrastructure to transport food over long distances was lacking. With the advances in industrialism infrastructure improved and food production moved further away from cities. Production methods became highly efficient and by sourcing globally consumers could have a complete set of products all year round. Nowadays, a new food movement is erupting, where consumers are regaining interest in the origin and production methods of food. This is one of the causes for food production to return to cities (Steel, 2009).

In the book 'Farming the City' (Miazzo & Minkjan, 2013) several experts give their view on urban agriculture. Morgan states that "feeding the city in a sustainable fashion – in ways that are economically efficient, socially just and ecologically sound – is one of the quintessential challenges of the 21st century", while Bohn & Viljoen argue that "commercial-scale production will be necessary if urban agriculture is to have a quantifiable impact on food production, whilst personalised production is very significant from a social and behaviour change perspective." Both statements have an indirect link to logistics. Economically efficient (less costs, higher revenues), ecologically sound (less food miles, sustainable production methods, circularity) and commercial-scale production all suggest that financial viability, and thus reducing inter alia *logistics* costs and *logistics* impact, is important for the success of urban agriculture projects. However, looking at urban farming literature and practice,

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logistics does not seem to get much attention beyond the issue of the design of logistics infrastructure i.e. the location of sourcing, processing and delivery and the transportation of goods. However, to really improve the logistics of urban agriculture and to make it a driver for the achievement of the company mission and strategy, we argue in this paper, one has to look beyond logistics design and also take issues like the logistics control system, information system and personnel into consideration. To do this, we introduce the Integrated Logistics Concept (Van Goor et al., 2003) and show how it can help to design logistics in such a way that it is aligned with the broader goals and strategies urban agriculture businesses have.

2. Urban Agriculture

Although extensive research has been done, an unambiguous definition of urban agriculture is hard to find. The RUAF Foundation (2015) shortly defines urban agriculture as "the growing of plants and the raising of animals within and around cities". Ruaf uses the terms inner-urban and peri-urban and stresses that the main difference between urban agriculture and rural agriculture is the impact on the urban economic and ecological system. Veenhuizen (2006) refers to urban agriculture as being 'located within or on the fringe of a city and comprises of a variety of production systems, ranging from subsistence production and processing at household level to fully commercialised agriculture'. Smit et al. (2001) divide urban agriculture in four constituent parts: core, corridor, wedge and periphery. The core refers to the inner city, while the periphery signifies the urban-rural fringe or the land surrounding the city. Van der Schans (2013) uses a similar division, adding 'building' as an extra inner city dimension. Mougeot (2000) argues that urban agriculture consists of several conceptual building blocks. One of these building blocks is location, which covers intra-urban and peri-urban areas. From all these definitions it becomes clear that urban agriculture reaches from inner city to city fringe. However, boundaries of the city fringe are either not defined explicitly or differ per study. Moustier (1998, cited in Mougeot 2000) for example uses the maximum distance from where the city centre can be supplied with perishables within one day, while others set a certain radius around one central point, like 30 or 50 kilometres from the city centre. For the case of The Netherlands, being a small country with cities having far less than 1 million inhabitants, these distance definitions would result in most of the country being defined as urban agriculture, while in reality most commercial farms are located in rural areas. To make up for the different characteristics and sizes of cities around the world we decided to refer to the definition of Veenhuizen (2006) and define the city fringe as being inside the official city boundaries.

Terms often related to urban agriculture are local-for-local and short food supply chains. As with the definition of urban agriculture, the definitions of 'local' and 'short' differ per study. Bosona & Gebresenbet (2011) define local food as "food produced, retailed and consumed mainly in the specific area". Kremer & DeLiberty (2011) conclude that "local food system are not merely a delineated geography or a flow of consumer goods from production to consumption, they are natural and social networks formed through common knowledge and understanding of particular places embedded in their localities". Aubry & Kebir (2013) developed a typology defining short supply chains based on organized proximity and geographical proximity. According to this study short supply chains include amongst others selling to local markets and professionals, farmer's markets, on-farm selling and box schemes. Since no standard definition could be found we choose for our study to follow the definition the selected urban agriculture initiatives use themselves for 'local' or 'short'.

3. Urban agriculture location and market orientation typology

When looking at farming projects in general two dimensions can be defined: its location and its market orientation. The location of farmers can be inner city, the city fringe or rural, while the market orientation can either be 'feeding the city' or 'feeding the world'. By confronting these two dimensions a matrix as shown in figure 1 evolves.

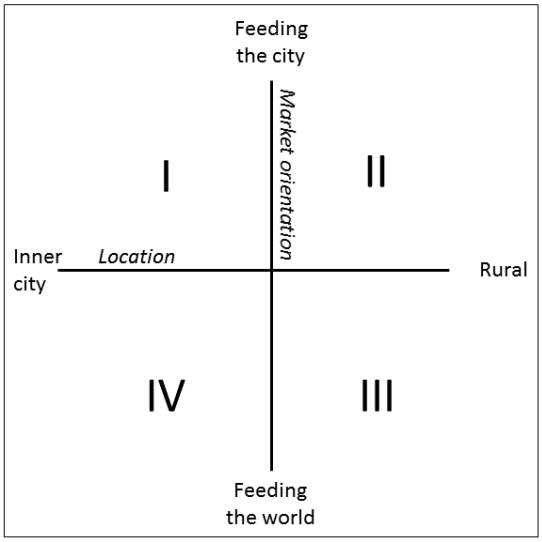

Figure 1: Urban agriculture location and market orientation typology

Quadrant I can be regarded as being urban agriculture. Farmers produce within city limits and sell to local consumers. Local-for-local initiatives belong to the upper part of the matrix, but could be covering quadrant I and II, as rural farms selling within a state or (small) country could be defined as being local.

The market orientation of farming projects may differ. The rapid industrialization and globalization of the last decades drove farms out of the city into rural areas, where they became large scale highly efficient enterprises, producing a high output. High percentages of this output were exported and were directed to 'feeding the world' (quadrant III). Nowadays some rural farmers move towards quadrant II as they diversify their market strategy by making the national market or even the local market (farmer's shop or local farmer's market) more important. Also, some farmers operating at the city fringe or close to the inner city, who primarily focused on the world market, now try to reach the local market through local-for-local concepts. This means they move from quadrant IV to I. These two shifts are part of an increase in farmers participating in short food supply chains. The move towards the top of figure 1 is driven by trends like the dissatisfaction with the conventional food system (van der Schans, 2010) and the de-alienation of city dwellers from their food (McClintock, 2010). These trends have also resulted in newly established urban agriculture projects that are focused on the local market (quadrant I), be it low-tech community driven vegetable gardens or high-tech vertical farming solutions producing niche products which are highly perishable.

The shift towards the upper part of our figure can count on elaborate research interest. Extensive research has and is currently being done on the logistics implications of this shift. An objective many urban agriculture projects have is to reduce environmental impact. Sourcing locally is seen as one of the major contributors to this reduction. Shortening of supply chains (Aubry & Kebir, 2013, Bosona &

Gebresenbet, 2011; Visser et al., 2013, Ilbery and Maye, 2006; Coley et al., 2009) and the reduction in number of food miles and the potential advantages to sustainability (Smith, 2008) are well researched areas. In researches like these, different logistics infrastructures for including local food in existing food supply chains are analysed. Research on newly established inner city and city-fringe urban agriculture mainly focuses on environmental and economic impact of urban agriculture (Sanyé-Mengual et al., 2012; Nationale Federatie Stadsgerichte landbouw, 2013; Miazzo & Minkjan, 2013), alternative production techniques (Mulder & den Besten, 2015) or socio-economic benefits of local food systems (e.g. Kneafsey et al., 2013; Abma et al., 2013). It is hard to find literature on the logistics challenges of starting a farming initiative, focusing on the local market in an inner city to city fringe setting. What we do know is that for the case of small holder producers in Thailand (Boselie (2002), referred to in Trienekens et al. (2003)) it "has proven to be difficult […] to become a supplier within the retail market segment" because of "small production volumes, the inability to supply year-round, and the non-transparent farming practices" (Trienekens 2003, p. 7). These urban agriculture characteristics lead to logistics challenges, as "in most cases of food distribution systems for local food shops and localised farmers markets, where individual companies run their own vans or small trucks, logistics is relatively inefficient and fragmented" (Bosona & Gebresenbet 2011, p. 294).

Thus, although research has been in different contexts, it suggests that given the characteristics of urban agriculture (limited scale and limited (year-round) assortment) optimising urban agriculture logistics is challenging. Research that has been done has mainly been on the logistics infrastructures and their impact on sustainability issues.
However, for the design of logistics in line with company goals, these researches have the shortcoming that the focus on logistics infrastructure disregards other important logistics aspects that do have an effect on efficiency and sustainability of the logistics of the company. This paper introduces the use of the Integrated Logistics Concept (ILC) as a way to see how logistics can be designed beyond logistics infrastructure to align it with the overall missions, goals and strategies of urban agriculture businesses. This approach also helps to identify logistics drivers and barriers. In the rest of this paper we first introduce the ILC. Then five examples of urban agriculture are described and analyzed by applying the concept. This study should be seen as a first testing ground, based on student research, for the feasibility of using this concept for urban agriculture businesses to improve their logistics.

4. Research methodology

In this research five urban agriculture projects were evaluated by third year bachelor students. The urban agriculture cases were selected based on the following criteria:

- The farm should fit quadrant I of the typology: located inner-city or in the city fringe and have enough scale to have a significant contribution to 'feeding the city'. The intention was to include projects from different countries and different continents;
- The farm should produce its own crops;
- The farm should sell its crops to the local market.

Additionally, both low-tech and high-tech farms were chosen.
It was found that not many of the existing urban agriculture projects meet all these criteria. Although The Netherlands have a lot of inner-city urban agriculture projects, only few have a local-for-local market orientation. The Dutch projects are mainly community driven, have a socio-economic character and cater for the need to reconnect to where our food comes from. Additionally, The

Netherlands do have several examples of box schemes, where boxes filled with local produce are delivered to consumers (HelloFresh, BeeBox and Willem & Drees). However, these businesses do not produce crops themselves, but operate as logistics service providers. As such they are not the focus of our research. Furthermore, we only selected cases in developed countries, although we realize that in developing countries interesting cases exist too.

An internet search resulted in the selection of the following five urban agriculture projects:
- Lufa Farms in Montreal - Canada
- Sky Greens Vertical Farming in Singapore
- Greensgrow Farms in Philedelphia - USA
- Ceres Fair Food in Melbourne - Australia
- Fresh City Farms in Toronto - Canada

Next, all aspects of the ILC were described, based on information found on the internet. It turned out that the publicly available information was not enough to provide a detailed (logistics) description of the projects, so an additional questionnaire was sent out by the authors to key persons within the projects. The questionnaire was based on the checklist for the ILC, as developed by Ploos van Amstel (2008). Three of the farms filled out the questionnaire.

5. Integrated Logistics Concept

Logistics plays an important role in the competitive advantages of companies. This also applies to food producers, since "efficient logistics management has a positive impact on the success of food producers, because logistics activities greatly affect the profit of producers, the price of food products and the satisfaction of consumers" (Brimer, 1995). To gain competitive logistics advantages companies need to have a well-defined relationship between their strategies, their logistics mission and their logistics concepts. In practice however, incorporation of logistics concepts in strategies and operational plans seems to be quite difficult. The ILC (Van Goor et al., 2003) is a way to structure the logistics organization and operation of a firm. It bridges the gap between the general competitive strategy of a firm and the logistics operation. Figure 2 shows the framework for integrated competitive logistics.

The framework starts with the company's **competitive strategy**. The most well-known strategies are cost-leadership and differentiation (Porter, 1985). In a cost-leadership strategy a company strives to reduce the total costs of the company, while a differentiation strategy focuses on enhancing the product or service of the company by adopting a unique sales approach. Van der Schans (2015) applied the competitive strategy concept to urban agriculture projects and added three other urban agriculture strategies, being diversification (offering additional functions to cover the costs), reclaiming the commons (involving city dwellers in the project e.g. by community supported agriculture, co-financing, working at the farm) and experience (experience has more added value than the products alone). Having a clear competitive strategy helps companies to gain competitive advantages and be more profitable. Normally, it is advised to pursue one strategy. However, urban agriculture projects often use a combination of different strategies. Urban agriculture projects generally have much broader goals than gaining competitive advantage. Of course, reducing cost and having a unique selling point is important, but socio-economic factors also play an important role in their strategies.

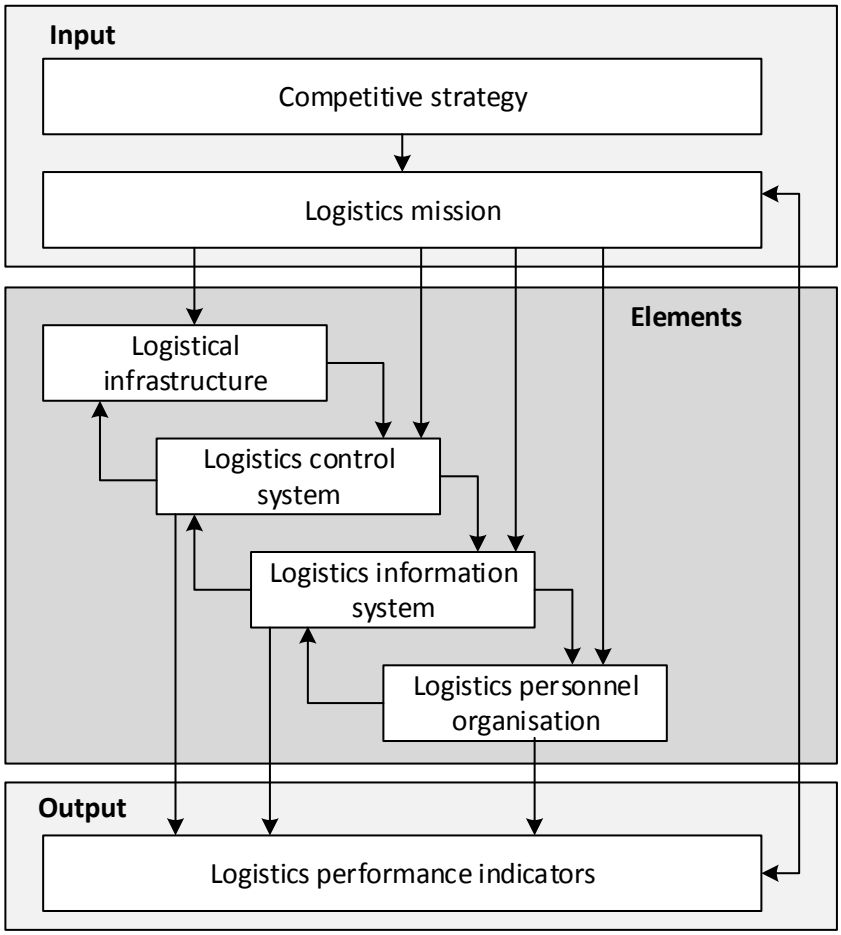

Figure 2: Integrated competitive logistics framework (Van Goor et al., 2003)

Once the strategy is chosen, following the logistics concept, it is translated to a **logistics mission or logistics objectives**. If, for example, the competitive strategy of a company is cost-leadership, the logistics objectives are related to a reduction of the overall costs associated with the logistics operation, like reduction of inventory costs, reduction of transportation costs and/or reduction in production costs.

The competitive strategy and the logistics mission are the inputs for the design of the **four elements of the logistics concept**: the logistics infrastructure, the logistics control system, the logistics information system and the logistics personnel organisation. These decisions are related to each other and are hierarchical. The quality of the company's logistics concept can be measured by the logistics performance indicators.

First, the **logistics infrastructure** has to be determined. As Van Goor et al. (2003) state "the logistics infrastructure is a model of the physical flow of goods, services and information of an organisation in its most rudimentary form". The logistics infrastructure models the complete supply chain, showing all actors (like production facilities, warehouses and stores).

Second, once the logistics infrastructure is in place the **logistics control system** has to be designed. This is the system that controls the physical flow of goods. This is about sourcing, production and distribution planning and decisions on whether and how these plans are shared with other actors in

the logistics chain. Also forecasts are considered here. For the part of the logistics chain where customer orders are not known forecast techniques have to be selected and implemented.

Third, directly related to the design of planning and control is the **logistics information system**. It has to be determined which ICT tools will be used to support the logistics operation. Also, it has to be determined *which* data is gathered and *how* this data is used and shared.

The **fourth** and last element in the concept is the **logistics personnel organisation**. The tasks and responsibilities of the logistics managers have to be determined. The choices made in the logistics planning and control and the logistics information system determine the type of personnel organisation a company needs.

Once all elements of the logistics concept are in place the performance of the logistics system will have to be assessed. By measuring the logistics performance indicators and linking them to the logistics objectives the quality of the system can be determined. The deviation of the measured indicators from the objectives requires evaluation and, if needed, adjustment of the design of the elements. Thus, design, implementation and use of the (integrated) logistics concepts can help firms to align their logistics goals and operations with their overall company goals. In our research we have made an inventory of the elements of the integrated logistics concept in five urban farming cases and looked to what extent these elements seemed to be aligned in these cases and where room for improvements seemed to exist.

6. Results

Publically available information on the internet was used to apply the ILC to the selected projects. It is noted that the following is our interpretation of the information found on internet.

Mission and competitive strategy
The competitive strategies mentioned on the web sites of the farms refer to the overall mission the farms have. As part of a mission to be sustainable, care for future generations or to enable to feed tomorrows citizens, differentiation is a strategy all farms have. The urban agriculture project tries to differentiate itself from the regular food systems by emphasizing the freshness, localness and sustainability of the produce. Lufa Farms, for example states "We grow food where people live and grow it more sustainably" (Lufa, 2015). The site of Sky Greens reads: "Ensuring food supply resilience is important to land-scarce countries such as Singapore." (Sky Greens, 2015). Fresh City Farms has the mission to connect food makers and eaters. They do this by farming in the city "and work with like-minded makers to deliver a food experience that respects our bodies, our planet and our shared tomorrow. By bringing makers and eaters closer together, we hope to rekindle the intimacy between people, land and food" (Fresh City Farms, 2015). Greensgrow's mission is "revitalizing livable communities through the practice of sustainable entrepreneurial urban agriculture" (Greensgrow, 2015), while Ceres Fair Food wants to "do good at every part in the food chain" (Ceres Fair Food, 2015).

Quite often the differentiation strategy is combined with diversification by adding functions like education and community building. Regaining commons and experience are also part of the overall strategy. Although 'affordable food supply' is mentioned quite often, a clear low cost strategy was not found in the analysed urban agriculture projects.

Logistics mission
The answers to our questionnaire reveal that translation of a general strategy into a logistics strategy did not take place. Also web sites do not explicitly state logistics mission of companies. However, for all five projects logistics aspects are mentioned. Most initiatives do have logistics strategies that fit into their general strategy, especially to the strategy of being:
- More sustainable
- More local
- More fresh

These aspects can be seen as the main drivers for the logistics design for urban agriculture projects. Logistics missions related to these drivers are:
- Proximity to end-user and reduce food miles
    - Grow food in the city (all farms)
    - Source as nearby as possible (Ceres Fair Food, Fresh City Farms)
    - If sourced abroad, bring produce as sustainable as possible to the distribution centre (Ceres Fair Food)
- Source from partners with same values (Lufa Farms)
- Minimize packaging (Ceres Fair Food, Greensgrow, Fresh City Farms)
- Deliver at the same day products are harvested (Lufa Farms)

The general missions in the field of sustainability are also translated into operational strategies for the production of food.
Also the nature of urban agriculture (limited scale and assortment) drives the logistics design. Because of the limited variety in crops in urban agriculture additional produce has to be sourced from other farmers / suppliers for being able to offer the customer a complete shopping basket. This aspect adds to the logistics complexity and might result in barriers for achieving optimal logistics performance.

Logistics infrastructure
As for the logistics infrastructure Lufa Farms, Greensgrow, Ceres Fair Food and Fresh City Farms source extra products to offer customers a broad assortment of goods. They use pick-up points for delivery to customers. Ceres Fair Food and Fresh City Farms offer additional home delivery services. Greensgrow also uses a farm stand and a mobile market to sell their produce. Sky Greens has its produce incorporated in the retail distribution structure of Fairprice supermarkets in Singapore. As for the delivery of the products from the farmers to the urban agriculture projects no information was found. It is not clear whether this flow of goods is being optimized.

For the logistics infrastructure the questionnaire added more detail to the publicly available information. In all three cases the farmers deliver their products to the warehouse or picking location either by themselves, by using logistics service providers or, in two cases, the initiative picks up the produce from the farmers themselves. In only one case the farmers combined their deliveries to increase logistics efficiency. Delivery frequency varies from 3 to 5 times a week. Two initiatives do not keep any stock, while one initiative keeps a small stock in their warehouse.
Delivery to the pick-up points are either done by using a logistics service provider (one) or by using own transport (two). Only one initiatives uses electrical bikes and/or cars. All initiatives combine deliveries to pick-up points in optimal delivery routes. In the choices for locations of pick-up points the logistics drivers that were mentioned earlier are translated by basing the location of the pick-up

points mainly on concentration of end-users (more local, more fresh), availability of location and optimization opportunities (more sustainable). Research done by Coley et al (2009) also suggests that an optimal location of pick-up points could be a driver to reduce carbon emission.

Farms seem to be aware of the logistics infrastructure and try to minimize transport kilometers for *their own part* of the supply chain. Optimization at supplying farms takes place less, which can be considered as a barrier for efficient supply chain logistics. Comparable results were found by Bosona and Gebresenbet (2011) in their Sweden study. They also signal improvement potential in the deliveries from farmers, resulting in positive effects on sustainability goals. Also optimization of transport mode or volume (amount that can be transported at one time and number of deliveries a week) seem to get less attention.

Logistics control system
In the logistics control system production planning and demand forecasting play an important role. From the websites it became clear that Sky Greens uses contract farming. In that way they know how much to produce. Greensgrow uses the number of CSA members as an indicator for expected demand, while Lufa Farms, Ceres Fair Food and Fresh City Farms can manage demand by adjusting the contents of the weekly bags. It is not clear whether the local farmers who deliver to these organisation, keep stock of the products offered at the online marketplace to cater for unexpected demand variations.

In the questionnaire all three initiatives stated that they forecast customer orders. Two initiatives also include the availability of farm land. Demand is regarded as being predictable, although unstable between months. Demand volatility is managed by either marketing (informing the consumer that they buy seasonal items, which are not always available), using historical data or adding a concurrent farm stand with extra items for sale. As such, although not explicitly mentioned, logistics control in the schemes we studied seems to focus on the prevention of over-production and thus loss of unsellable produce. However, the quality of the demand forecast or the amount of loss of produce is not being measured.

Logistics information sytstem
Our review of web sites and our questionnaire provide insights on logistics information systems for three cases. All initiatives use ICT to support their business. Only one initiative shares the customer orders with their suppliers by web portal on a daily basis. Compared to the other initiatives they use more advanced ICT systems to support their operation. For the other two initiatives ICT is limited to Microsoft office, combined with a transport and/or warehouse management system. But again, how much this logistics information system is dedicated towards achieving overall company goals remains unclear.

Logistics personnel organisation
The web sites of the initiatives and our questionnaire gave information on the logistics personnel organisation for two initiatives. One initiative employs a logistics manager, but the tasks of the logistics manager are not described. Another initiative has 8 employees working in logistics, four warehouse personnel and four in transportation. From this it can be concluded that the logistics function is not always explicitly defined, which makes it hard to have someone take responsibility for the logistics performance. This could be a barrier for improving logistics performance.

Logistics performance indicators

Logistics performance indicators (LPIs) are not mentioned explicitly in the publically available information. However, when applying the ILC, the LPIs should be related to the logistics mission and can thus be derived from this. Based on the missions found on the websites the following logistics performance areas seem to fit sustainability goals, goals of freshness and locality of produce well:

- Sustainability and locality:
  - Minimum use of gasoline / CO2 and offset of carbon emission
  - Minimize food miles/ vehicle movements
  - Minimal packaging material/ reuse of boxes
- Freshness:
  - Same day delivery/before 3pm

However, if and how initiatives measure and monitor these performance areas stays unclear. Only one initiative mentioned in the questionnaire that they measure costs per packed bag and costs per delivery. For the ILC to be fully implemented, companies should think what to measure and how these measurements relate to the logistics and overall goals.

7. Conclusion

This paper has introduced the Integrated Logistics Concept (ILC) as a way to gain insight in logistics drivers and barriers for urban agriculture initiatives. As stated earlier, this paper should be seen as a first attempt to use the concept for urban agriculture. Five urban agriculture initiatives were selected and analysed, based on publically available information on internet. To (partly) verify and extend the available information a questionnaire was sent out to the five selected projects. Three projects filled out and returned the questionnaire. Given the limited sample used only very tentative conclusions can be drawn.

The most important drivers for logistics design urban agriculture initiatives can be derived from their logistics missions. Drivers are: being more sustainable, sourcing and selling more local and delivering fresher produce. Moreover, the logistics design is also driven by the characteristics of urban agriculture, being limited scale and assortment. These drivers make urban agriculture logistics even more challenging.

Barriers that were found in this research are:

- No integrated logistics approach. A first general finding from our web search and questionnaire is that, just like in literature, the focus with respect to logistics of urban agriculture firms seems to be mostly on the logistics infrastructure. All other aspects included in the ILC get much less or no specific attention. From this it follows that there is a lack of alignment of overall goals and logistics goals and logistics design. This misalignment of the elements of the ILC forms a barrier for urban farming firms to optimally use logistics as a way to reach their company goals. Overall company mission and strategy should be translated in logistics goals, logistics infrastructure, logistics control, information system, and personnel organisation. Logistics infrastructure is more than network design. It also is about which modalities to use, how frequent, and about opportunities to integrate with other supply chains to make things even more efficient. But still then, no matter how efficient the logistics infrastructure is designed, with poor control losses might occur in the supply chain. Also a malfunctioning information system can lead to many inefficiencies. To manage all this someone has to be made

responsible for the performance of the logistics operation. In that way coherence between all logistics elements can be created, resulting in an aligned, measurable and successful logistics operations.

- A lack of a holistic view on logistics in the supply chain. From the outcomes of the questionnaire it became clear that in two of the three cases supplying farmers deliver their produce individually to the initiative's warehouse. In these cases load factors will not be optimal. This might be a barrier in achieving the formulated logistics goals, as low load factors result in higher logistics costs and higher environmental impact. It is important that, when optimising logistics, the whole supply chain is taken into consideration. Optimisation opportunities can be found in cooperation between different actors in the supply chain instead of optimizing only one link in the chain.
- Limited or no measurement of LPIs. For example, as we have seen, urban farming businesses are not fully aware of their logistics goals and their logistics performance indicators. On the web sites coherence between the strategies, goals and logistics performance indicators was difficult to find. Moreover, according to the answers to the questionnaire the LPIs that we identified are not measured, making it a barrier for optimal logistics performance.

Thus, although logistics is important in their operation – all initiatives have schemes with delivery from different farms and delivery to pick-up points or retailers (Skygreens) – logistics does not get much explicit attention. The ILC seems to be a powerful tool for designing and/or analysing logistics coherence and to make logistics a tool to reach company goals. Using the ILC helps make deliberate choices on the total logistics design, including what to measure, why to measure and how to measure the quality of the total logistics system and thus resolving potential logistics barriers.
Given the challenges urban agriculture initiatives face (being economically efficient, ecologically sound and financially viable) an integrated logistics approach is essential. The use of the ILC shows a lot of potential when planning for successful urban agriculture projects.

The results of this research are based on a very limited sample of urban agriculture initiatives. Further research could include an extension in cases and a more detailed analysis of how logistics is designed and organized. Furthermore it would be interesting to see, together with urban agriculture initiatives, how the ILC could be applied in practice. Special attention could be paid to determining the parameters that have to be adjusted in order to resolve the identified barriers. This is especially relevant when initiatives have to grow to a commercial scale and logistics becomes even more complex.

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