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Soft innovations and Alternative Food Networks for sustainable agrifood systems

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I feel it is an obligation to help
people understand the relation
of food to agriculture and the
relationship of food to culture

Alice Waters

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Introduction

Economics as a science is rooted on the concept of finite resources. While resources are limited, humans have unlimited wants, hence they have to choose and make trade-offs: in other words, we have to efficiently allocate resources. Notwithstanding this very basic concept, the contemporary mass production and consumption models do not take into account resource scarcity and behave as if there exist no limit to growth and consumption. Luckily, however, after a few decades of academic debate, the topic of sustainability has been mainstreamed in politics and society as well. While global institutions started discussing and promoting sustainability since the early 1980's, consumer awareness over sustainability issues is a more recent phenomenon, which has gained popularity since the early 2000's.

The adoption of sustainable lifestyles and consumption behaviours among a growing number of consumers pushes suppliers to offer alternative products and processes which consume less resources, generate less pollution, are more easily and safely disposed at the end of their lifecycle, i.e. are more sustainable. Moreover, not only environmental concerns drive these consumers' choices: indeed, they usually take into account different aspects of the sustainability spectrum, and include ethical and social considerations as well. The research presented in this document explores the contemporary trends in alternative and ethical consumption behaviours, in particular in the field of food choice. Nutrition in its nature is a basic human need and deeply rooted into all cultures, however inefficiencies and negative externalities of the global industrial food system are extremely costly. In response to the drawbacks of the green

revolution, governments, practitioners, and researchers explore alternative production systems, which are expected to be more sustainable. We are witnessing a soft form of agricultural innovation, not only based on technical progress, but also on social relationships and values. Hence, this research explores the motivations for consumers and producers to participate in Alternative Food Networks (AFNs), together with the individual and social gains which AFNs generate.

This document follows a three-paper structure. The first paper provides a broad review of the literature on agricultural economics and food production before and after sustainability became a leading concept, then provides an overview on present research trends linked to agrifood business and sustainable food production. The second paper presents an exploratory model to analyse consumer participation to, and satisfaction over AFNs. The spatial focus of this research is the Northeast Italy, as it is home to a broad variety of AFNs: farmers markets, community gardens, community-supported agriculture, box schemes, ethical purchasing groups. Finally, the third paper investigates the extreme trend of sustainable consumption and its spillovers, that is when consumers become producers: it reports a case study on the urban farming model of Ljubljana, and how urban farming, as a green infrastructure, contributes to build a sustainable city, generating goods, services, and amenities for the entire community.

Value creation and innovation in agriculture from the industrialisation to sustainability*

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Abstract

The role of agriculture evolves together with innovation and societal demands. All along human history, the changes in society and technology have determined different conceptions of the agricultural activity and the value it creates. Nowadays, the pursuit of sustainability and the necessity to feed a growing population imposes a rethinking of the basic paradigms. This paper will review the evolution of agricultural economics, with a particular focus on the concepts of sustainability and its implications. The conclusion highlights the upcoming challenges and the possible evolution of research in the field.

1. Introduction

The history of the humankind is closely tied to agriculture. The domestication of plants and the first farming attempts pushed the Neolithic Revolution, which dramatically changed many human cultures from a lifestyle of hunting and gathering to a sedentary one, and caused the population increase. Throughout history, agriculture has played a major role in promoting innovation, as the population increase has required increasing quantities of food to be produced with less effort and less resources: from the evolution of the plough to genetically modified organisms, all the fields of human knowledge have contributed to improve and refine farming and production technologies.

Even in the age of information technologies, the primary sector of the economy is extremely relevant in developing countries as well as in the most developed ones, due to its primary role of production of food and fibres. While on the one hand food provision is necessary for every human activity, on the other hand the importance of agriculture and food production and transformation is also determined by the collateral benefits of these activities.

The aim of this paper is to review the evolution of agricultural economics, in particular with respect to the relationship between agricultural innovation and the creation of value, and provide contextual explanation of this evolution. The research starts with a background introduction on early economic studies on agriculture until the first green revolution; the analysis continues with the concept of sustainability and the recent interest in multifunctional agriculture and ecosystem services. Finally, the new challenges for development, agriculture and research are highlighted.

2. Agriculture and value creation: from the physiocrats to the first green revolution

Immediately before the rise of classical economics, which began with the publication of Adam Smith's *The Wealth of Nations* in 1776, French physiocrats introduced the first well-developed economic theory. During the XVIII century national economies were almost completely based on agriculture, which explains the stress of physiocrats on agricultural labour. The *Tableau Economique* by François Quesnay represents the foundation of this school of thought, which identifies agriculture and agricultural labour as the only productive activity, hence the source of national wealth. The historical and economic context in which physiocracy was born makes reasonable to assume that an efficient agriculture was necessary for economic growth and development, however the upcoming industrial revolution dramatically changed the world. Charbit (2002) points out at the contradiction between the stress on *laissez-faire* and the necessity of political and institutional support as the main reason of the failure of the physiocrats, whose cultural crisis was exasperated by the industrial revolution and the subsequent ascent of classical economics.

The industrial revolution modified markets, manufacturing, society, power relationships, and of course agriculture. From the Great Britain to the rest of Europe and to the overseas colonies, the introduction of new techniques and instruments, the diffusion of enclosures and the concentration of property boosted productivity, determined the fall of food prices, and changed the agricultural landscape and its social system (Allen, 1981). Friedman and McMichael (1989) stress the importance of these changes in the context of the industrial revolution: cheap food for cities was necessary

to keep social peace and provide low cost labour to firms.

The process of industrialisation of agriculture slowly continued along the XIX century and the first half of the XX century, and definitely boomed after the second world war, with the so-called green revolution. The term 'green revolution' refers to the rapid changes in the global agriculture since 1960's. Three main elements drove the green revolution: first of all, huge investments and liquidity fostered the concentration of land ownership; secondly, the mechanisation of farming activities boosted efficiency; finally, research and investment in agronomics, genetics and chemistry led to the selection of the most productive varieties and the employment of chemical fertilisers and pesticides. The consequential increase in agricultural productivity and price reduction for food products, together with progresses in medical science, are the primary causes of the global population increase which characterised the XX century (Pingali, 2012).

Until this moment, the discussion on sustainability is strictly limited to the environmental movement (Kidd, 1992). The basic problem of economics, that is how to use the limited resources to satisfy the unlimited wants of men, did not appear particularly relevant in the agrifood system, and resources were assumed to be unlimited. From the Age of Discovery to more recent technological and scientific evolution, the positivist faith in progress was confronted by the scarcity problem only during crises, as for example wars or unpredictable climatic events. Costanza (2001) refers to this period as the “empty world” era of economics, during which the only limit to economic development was the creation of human-made capital. Figure 1 shows the conventional model of economics:

«The primary factors of production (land, labor, and capital) combine in the economic process to produce goods and services, usually measured as gross national product (GNP). GNP is divided into consumption, which is the sole contributor to individual utility and welfare, and investment, which goes into maintaining and increasing the capital stock. Preferences are fixed. In this model, the primary factors are perfect substitutes for each other, so “land” (including ecosystem services) can be almost ignored, and the lines between all the forms of capital are fuzzy» (Costanza, 2001, p. 460).

In this context, the relevance of agriculture is limited to its material productivity. Food production is important as it is either the source of national wealth, for the physiocrats, or the fuel for workers, during the industrial revolution. However, the radical social changes linked to important historical events will develop a new sensibility in the public opinion, and this will imply new problems to arise, hence the birth of new research streams.

(a) Conventional Model of the Economy

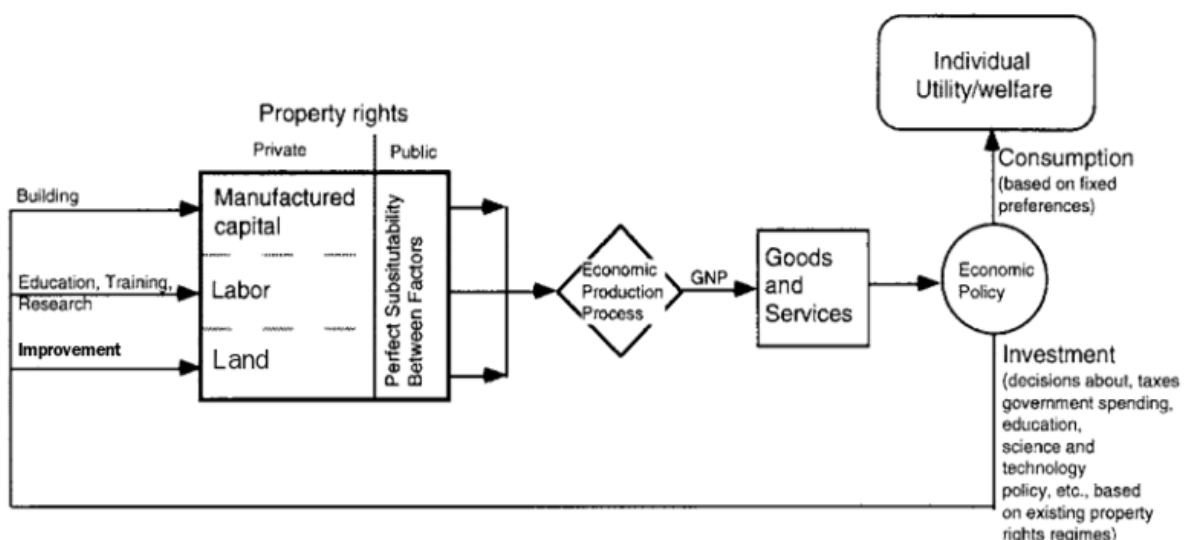


Figure 1: *Conventional model of the economy.* Source: Costanza, 2001.

3. The seek for sustainability

In 1973, during the Jewish celebration of the Yom Kippur, the Egyptian and Syrian army launched a surprise military campaign against Israel. After the first few difficult days, the Israeli army was able to reverse the situation, rapidly expanded its control over the land and neutralised the menace. As a reaction, Arab oil producing countries reduced oil exports and doubled prices: it was the first oil crisis. This historical milestone has changed again the world as we knew it. For the first time, Western countries developed a sense of instability of their production systems, and the issue of resource scarcity and the need for sustainability arose among the public opinion as well as the social scientists. Indeed, the term “sustainability” had already appeared as a major issue among MIT scholars and a few institutions since the end of the 60's (Kidd, 1992), and the 1972 United Nations Stockholm Conference on the Human Environment underlined how environmental degradation was a real threat to economic development and wellbeing at a global level (United Nations, 1972). Obviously, this new conscience had an impact also on research on agriculture and rural economy. Cleaver (1972) underlined the socioeconomic disequilibrium caused by the green revolution: it promoted property concentration among big landowners, who could bear huge investments, at the expenses of smallholders who were de facto excluded from the market; moreover, developing countries adopted competitive strategies in the short run, as for example monocultures, which turned out to be harmful for national economies in the long run.

These events, together with the new perception of precariousness, emphasised the need for more complete representations of the reality, and for an alternative

production system. However, only in the 80's the problem of sustainability acquired importance in policy planning. The Brundtland Commission, or Report of the World Commission on Environment and Development: Our Common Future introduced the idea of sustainable development, that is “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (United Nations, 1987, p. 41). Kahn (1995) completes the paradigm of sustainable development and defines its three pillars, as stated in the Agenda 21 (United Nations, 1992):

- *economic sustainability*, which has guided conventional development in the past, based on the assumption of unlimited resources and the idea of economic growth as a natural driver of convergence of standards of living;
- *social sustainability*, which refers to equity, empowerment, cultural identity, participation in public life, institutional stability, economic growth and poverty alleviation;
- *environmental sustainability*, that is the preservation of ecosystem integrity and biodiversity, implies that resources should be harvested no faster than they are generated and wastes emitted no faster than the absorption capacity of the environment.

More recently, the paradigm of sustainable development has been integrated with the fourth dimension of institutional sustainability (UNDPCSD, 1995), referring to the institutional elements which contribute to personal development, such as political participation, gender equality, education and social security. In this case, sustainable development is presented as a prism, as shown in Figure 3, in which each and every dimension constitutes a self-regulating system and is interlinked with the other three dimensions (Spangenberg, 2002).



Figure 2: *The paradigm of sustainable development.* Source: Khan, 1995.

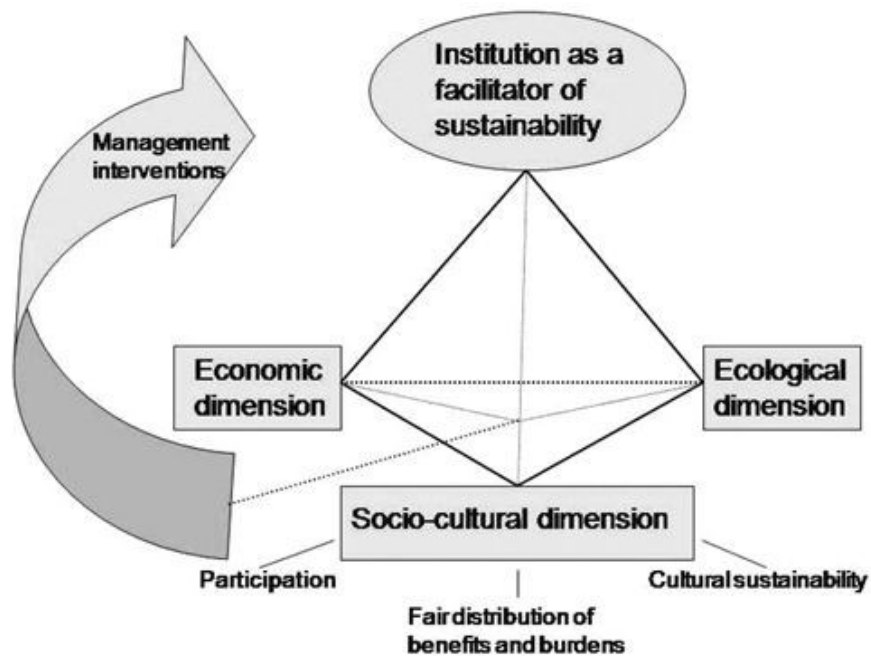


Figure 3: *The Prism of Sustainability.* Source: Puhakka et al., 2009.

Costanza (2001) depicts an alternative model of ecological economics. The basic forms of capital are expanded to four and include natural capital, human capital, manufactured capital and social capital; natural capital contributes to goods and services production and produces ecological services which contribute to human welfare; moreover, the model considers the negative impact of waste production by the economic process. The world he depicts is more complex, it captures the importance of natural capital, the negative impact of resource consumption and the needs of the postmodern society. In other words, under the expanded ecological economics model, “human welfare is a function of much more than the consumption of economic goods and services” (Costanza, 2001, p. 462).

The interest of scholars, policy makers and the public opinion over sustainability and resource depletion implies a new relationship with nature, and a reconsideration of production systems. This is particularly true for agriculture, as a solution to overcome the limits of the first green revolution (Horlings and Marsden, 2011). While agriculture is expected to satisfy the basic human need of nutrition, farming activities heavily exploit natural resources, in particular land and water; moreover, the unbalances of agricultural industrialisation play a major role in global socioeconomic disequilibria (United Nations Sustainable Development Solutions Network, 2013). Holt-Giménez and Altieri (2013) explain the development of the ecological conscience and the subsequent concern on environmental problems, such as biodiversity loss, landscape modification, and soil and water degradation.

A second green revolution is gradually appearing, a revolution which is expected to guarantee economic development based on the three pillars of sustainability. In literature, two main visions of the second green revolution emerge: from one point of view, innovation in agriculture will be driven by scientific progress, mainly in the fields

of genetics and biotechnologies (Den Herder *et al.*, 2010), while other scholars refer to a new holistic and multidisciplinary approach to combine technical and socioeconomic progress (Meena *et al.*, 2013). The second definition better captures the complexity of the issue, as nowadays the real problem is linked to redistribution, rather than solely production increase. Indeed, the world produces enough to feed 10 billion people (Food and Agriculture Organization for the United Nations, 2009); however, biofuel and livestock industries absorb a major share of total agricultural production, hence “the call to double food production by 2050 only applies if we continue to prioritize the growing population of livestock and automobiles over hungry people” (Holt-Giménez *et al.*, 2012).

The value of agriculture is no more linked solely to the production of food and fibres. It also includes the particular and close relationship between farming activity, natural resources and landscapes; moreover, it is related to the rediscovery of cultural values of tradition and nutrition, whose importance is growing in literature and among the society. New concepts and new frameworks are therefore required.

4. Ecosystem services and multifunctionality

Although the issue of sustainability emerged in literature during the second half of the XX century, alternatives to industrial agriculture can be found in earlier works. Harwood (1990) retraces the history of alternative farming systems from the birth of biodynamic agriculture in 1924 to the agroecology movement in the 80's. During the

following decade, two additional concepts arise: multifunctional agriculture and ecosystem services (Huang *et al.*, 2015).

The importance of multifunctionality in agriculture emerges after the Rio Earth Summit in 1992. Multifunctionality refers to additional functions of agriculture, besides the primary role of food and fibre production; in particular:

«agricultural activity can also shape the landscape, provide environmental benefits such as land conservation, the sustainable management of renewable natural resources and the preservation of biodiversity, and contribute to the socio-economic viability of many rural areas» (Maier and Shobayashi, 2001).

Van Huylenbroek *et al.* (2007) recognise the importance of multifunctionality as a unifying concept to bring together the productive role of agriculture and its complementary role in resource management and conservation. Moreover, they interpret multifunctionality as an engine for competitiveness, as “specific agricultural systems contribute to distinctive economic, natural, cultural and territorial subsystems” (Van Huylenbroek *et al.*, 2007, p. 29). In their analysis, multifunctionality emerges as the key element to build stronger production and food networks in order to satisfy at the same time rural wealth and social expectations. Finally, they suggest four major research lines to be developed: empirical research on general contributions of agriculture, besides food and fibre production; development of efficient and reliable indicators of multifunctionality; research on policy instruments and farm behaviour, which should also take into account non-commodity outcomes; research on multifunctionality as an asset for regional development.

The second concept, ecosystem services, dates back to 1981. Under a multidisciplinary perspective, based on ecology and economics, Ehrlich and Ehrlich

(1981) suggest that the relationship between human beings and nature should be corrected and reconsidered, taking into account the value of the services provided by nature. One of the most important publications in this field is *The value of the world's ecosystem services and natural capital* (Costanza *et al.*, 1997), in which ecosystem services are defined as “the benefits human population derive directly or indirectly from ecosystem functions”. The concept acquired importance in the political agenda after being included in the United Nations' Millennium Ecosystem Assessment (Reid *et al.*, 2005).

A recent paper by Huang *et al.* (2015) presents a review of the research in multifunctionality and ecosystem services. The analysis of scientific works on the topics suggest similar trends: they emerged in the 80's, slowly spread in the 90's, and finally flourished in 2000's. As the two scientific communities, which have developed around the two concepts, have a common vocabulary and share similar research approaches and questions, the authors suggest a common research framework in order to overcome the limits of both research streams. In particular, on the one hand multifunctionality focuses on the economic aspects of agriculture and does not adequately explain the role of biophysical processes in the evaluation of agricultural outputs; on the other hand, the evaluation of ecosystem services might be too abstract for practical use. For these reasons the authors call for a mutual exchange and understanding for the creation of a shared platform in which the farm-based joint-production model of multifunctional agriculture is enriched with the analysis of service and interactions based on ecosystem services research. The role a joint research framework is to focus on the farm as a decision unit, deepen the understanding and evaluation of agricultural outputs, and finally combine the ecological, social and economic dimensions.

While the theoretical analysis on innovative agriculture, multifunctionality and

ecosystem services is already organised in a clear and sound corpus, economic modelling and empirical analysis still represent a major challenge. Buysse *et al.* (2007) identify three problems related to performance measurement of multifunctional agriculture: definition of non-commodity output of agriculture; relationship between non-commodity output supply and societal demand, hence the estimation of demand curves; assessment of the farmer's response to governmental interventions. In the field of ecosystem services, Farber *et al.* (2002) recognise that market valuations do not adequately capture the social value produced by nature, therefore list six main valuation techniques: Avoided Cost, that is costs that would have been incurred by society in the absence of a service; Replacement Cost, or cost of replacement of a service with man-made systems; Factor Income, the impact of services on income; Travel Cost, which can reflect the implied value of a service; Hedonic Pricing, or the price people will pay for associated services; Contingent Valuation, which implies valuation of alternative scenarios. Similarly, Boyd and Banzhaf (2007) discuss the lack of standardised performance measures for ecosystem services, and propose a definition of final ecosystem service units: “final ecosystem services are components of nature, directly enjoyed, consumed or used to yield human well-being” (Boyd and Banzhaf, 2007, p. 619). This apparently simple definition presents a relevant implication: ecosystem services should be separated from non-ecological contributions to final goods and services, which leads to exclude, for example, recreational benefits and commercial harvest; as a consequence, the related units of measures should be more biophysical rather than social or economic. Although this definition appears parsimonious and strict, the bridge it builds among economic and biophysical analysis sheds a light on the complexity of the issue and testifies the importance of a multidisciplinary and cross-sectoral approach to the topic.

The relevance of sustainability, multifunctionality and ecosystem services for policy making and planning (Potter and Burney, 2002; Brower, 2004; Dobbs and Pretty, 2004; Havlik *et al.*, 2005), as well as for farming entrepreneurship and rural economies, in particular in developed countries, testifies the necessity of reliable and easily understandable measures of their impact on wealth and well-being, both at the individual and national level. This is particularly true for European Union, which considers multifunctionality as one of the pillars of the Common Agricultural Policy and the subsequent rural development and competitiveness strategy (Alfano and Cersosimo, 2009)

5. Emerging topics in agricultural economics

The production of non-commodity outputs and the socio-economic and environmental benefits related to agricultural activities modify the primary sector of the economy, the relationship between urban and rural areas, local food systems and culture. Farming activities evolve and innovate in order to adapt to the new trends and to gain or preserve competitiveness at both at national and farm level (Ferrari and Rambonilaza, 2009). Besides technological innovations, the new frontier of evolution in the agrifood industry is related to human resources, interactions and organization. This type of innovation, not linked to research and development, is referred to as soft innovation (Silva *et al.*, 2017). It includes the adoption of new solutions which modify relationships among the actors, either within the farm itself or across the farm and the general context in which it operates, such as the decision to enter new markets, new

strategical approaches to markets, alternative relationships with consumers, with the territory and local communities. As a consequence, the research evolves, focuses on new topics and asks new questions.

Provision of public goods – Multifunctional agriculture and ecosystem services require a deep understanding on the provision of public goods and their valuation. The main features of public goods are non-excludability and non-rivalry in consumption: in other words, no one can be excluded from the consumption of a public good, nor one's consumption reduces its availability to other individuals. Agriculture provides a wide range of local public goods, which are necessarily tied to the place and context in which they are produced. As a consequence, efficient policies should take into account local specificities and needs (Czyżewski and Kułyk, 2011). Research in this field provides frameworks for efficient policy-making (Marques-Perez *et al.*, 2014; Gomez-Limon *et al.*, 2013). Villanueva *et al.* (2014) propose a framework based on the DPSIR framework (European Environmental Agency, 1999), which is useful to analyse the production of public goods by agricultural activities to support public decision making and design and implementation of agricultural policies. Under this framework, farming activities alter social welfare as they can result in public goods, or positive variation of total welfare, or public bad, that is a reduction of social welfare; the analytic network process is used to analyse the production of public goods and their interaction, in order to identify the farmer's most influential decision and the subsequently most influenced public good. A similar approach results in clear informations on which aspects of the activity should be addressed to obtain higher efficiency and an increase in social welfare larger than the cost of the policy. Still, the lack of incentives for farmers in producing public goods and the government's seek for economic efficiency require better valuation mechanisms, in order to produce better informed decision and rational strategies.

Agriculture and cultural value – Pröpper and Haupts (2014) include cultural elements among the ecosystem services: in rural areas in particular, people and communities are part of the landscape which they live in, and non-material aspects account for a major share in individual valuation of nature. The subject is rather obscure: the concept of culture is undefined and difficult to use, and the stress on intangible elements may lead to biased results. Nevertheless, some scholars have tried to measure the cultural value of agriculture and the value-added it generates. Torquati *et al.* (2015) compare the economic performance of three Italian wine producers and the cultural content of their products. The results show that conservation of traditional cultural landscape is linked to higher profits, even though the wine industry presents specific features related to the “intangible content of the bottle”; moreover, the economic success is largely due to the ability to communicate the non-material values to the customers. The extension of similar analyses to other farming activities requires further progress in the research, based on a multidisciplinary approach which should start from a shared definition of culture.

Circular economy – In general terms, the concept of circular economy refers to the resilient use of resources, as for example producing durable goods which can be repaired, refurbished, reused, and their components easily recycled at the end of product life (Sauvé *et al.*, 2016). Circular economy is based on the 3R's principle: Reduction - that is the minimization of primary inputs and waste through the adoption of more efficient processes; Reuse – any operation to use again products and components for their original use; Recycle – the reprocessing of waste materials for new purposes (Ghisellini *et al.*, 2016). In the field of agriculture and food production, closing the circle of production implies the adoption of sustainable and conservative breeding and cultivation techniques (Ghisellini *et al.*, 2014), such as integrated farming,

organic farming, permaculture, grass-fed livestock (Baumont *et al.*, 2014). All these techniques require the reduction of external inputs in production and the reuse of waste to complete the nutrient cycle or to produce energy (Zabaniotou *et al.*, 2015). Current research on this field explores systemic issues (Borrello *et al.*, 2016), such as the redefinition of interactions among all the actors of the supply chain, as well as more specific aspects, for instance the analysis of supply chains (Bloemhof-Ruwaard *et al.*, 2016), waste management (Laso *et al.*, 2016), consumer studies (Borrello *et al.*, 2017).

Diversification, local food systems, community supported agriculture – In spite of the contemporary globalisation trends, agriculture is turning to localisation as a solution to the issues of sustainability and food security, both in developed and developing countries (Allen, 2010). This trend translates in market innovations and new organisational models, and the firm changes together with the farmer. Diversification seems to be the key for rural development and to guarantee new sources of income: besides traditional agricultural activity, nowadays farms produce and transform food, offer tourist services, cooperate with public administrations for state property management. This trend is driven by its undeniable advantages: as farmers diversify activities, they can rely on a more stable income flow, rather than a concentration of profits during the harvesting season and expenses for the rest of the year; the lack of strong intermediaries ensures more bargaining power to both consumers and producers and reduce transaction costs; the direct relationship with consumers builds brand reputation and value, in particular for small producers; diversification is a driver for employment, as new professionals are required (Traversac *et al.*, 2011; David *et al.*, 2010). At the same time, the social side of agricultural activity becomes more and more relevant and constitutes a new source of value. Research on community supported agriculture and farmers market grows as they spread in the economic and social life of

consumers. The positive impact of these two phenomena is relevant and demonstrated, as they educate customers, protect diversity of food products and build strong local food networks, while markets become valued community institutions (Brown and Miller, 2008). In spite of the growing literature on the topic of community supported agriculture and local food system, a number of issues require further investigation, in particular with respect to sustainability and ecological impact. Indeed, up to now the most relevant contributions mainly focus on the economic spillovers on farmers and community (Bloemmen *et al.*, 2015) or the creation of social capital (Bougherara *et al.*, 2009). Besides the benefits, some scholars highlight drawbacks and critical points, in particular the “local trap” (Born and Purcell, 2006), the self-exploitation and inadequate remuneration of farmers (Tegtmeier and Duffy, 2005; Galt, 2013). Hence, the impacts of community supported agriculture, in particular in the long run, require additional research. Moreover, deeper understanding of relevant aspects of environmental and social sustainability is necessary. Can community supported agriculture and local food systems guarantee food security? If compared to conventional farming, is community supported farming better performing in terms of land and resource conservation?

6. Conclusion

As this review demonstrates, the concept of agriculture and its role evolves together with society, its needs and relational patterns. During the ancient and modern era, the value of agriculture was determined by its ability to provide food, hence energy for human work. In the more recent times, the awareness over resource scarcity and

environmental depletion promoted a new concept of agriculture. Besides the primary activity of feeding a growing population, the value of agriculture has been linked to its ecological functions of land and resource preservation. Once the concept of sustainability has been completely defined with its three pillars, farming activities have acquired a new value. The social role of farming is the result of its ability to satisfy basic needs of human beings, protect natural landscape and resources and provide cultural and social values.

This evolution is necessarily related to innovation. The industrialisation applied to farming, the adoption of information technology, the diffusion of new entrepreneurial and organisational models, the creation of new markets, all demonstrate how innovation shapes rural activities and defines new meanings.

The pursuit of an equilibrium between feeding a growing world population and preserving natural resources raises the need for further research in the field of agricultural economics. The International Food Policy Research Institute (1995) foresees a 2020 world “*where malnutrition is absent, and where food originates from efficient, effective, and low-cost food and agricultural systems that are compatible with sustainable use and management of natural resources*”, however the realisation of a similar scenario requires several problems to be solved (Pinstrup-Andersen and Pandya-Lorch, 1998): widespread poverty and inadequate human development; increasing food demand in developing countries; underinvestments in agricultural research and difficult access to agricultural inputs; degradation of natural resources; inefficient markets and inadequate infrastructures.

Can alternative agriculture adequately combine environmental sustainability, productivity and efficiency while creating social and cultural value? How can technological and social innovation contribute to tackle the development challenges?

Research in the field should move towards contamination and multidisciplinary approaches: due to the complexity of the subject, efficient solutions and relevant information for policy makers require cooperation among economists, social scientists and technical experts.

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Consumer satisfaction over participation in AFNs: evidences from Northern Italy*

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Abstract

The emergence of Alternative Food Networks (AFNs) has drawn the attention of researchers from various fields, who try to understand and explain these new phenomena. The purpose of this paper is to explore how personal attitude and product quality perception influence relative satisfaction over participation in AFNs, therefore contributing to the literature on socially conscious consumerism.

Structural Equation Modeling is used to investigate the determinants of consumers' attitudes towards AFNs, its influence on perceived quality of food products, and their relative influence over satisfaction with participation in AFNs. A survey was conducted among 210 consumers participating in different forms of AFN. The analysis conducted with LISREL allowed testing the hypothesis proposed in a model via several fit measures.

The results from this study suggest that consumers' attitude towards AFNs directly influences the perceived quality of food products; moreover, the analysis confirms the relationship between these two elements and overall satisfaction with participation in AFNs. Finally, the research suggests adapting marketing strategies and framing communications to be coherent with consumers' regulatory focus.

1. Introduction

During the last two decades, rising concerns over sustainability and environmental issues among society have determined the diffusion of a new approach to shopping habits. This is particularly true in the case of food choice, as a growing number of concerned consumers try to consider local and global impacts of their daily routines. In recent years, the emergence of Alternative Food Networks (AFNs) has drawn the attention of researchers from various fields, who try to understand and explain these new phenomena. The AFN label refers to a variety of phenomena and schemes which offer an alternative to industrial food systems (De Luca *et al.*, 2016), such as farmers markets, in which farmers directly sell their products to consumers; buying groups and box schemes, as the Solidarity Purchase Groups (Gruppi di Acquisto Solidale – GAS) in Italy; Community Supported Agriculture (CSA) and local food chain agreements, through which consumers support local farmers and share risks and benefits of food production. All these organisational forms are characterised by shorter supply chains, direct links between producers and consumers, and among consumers themselves, existence of alternative food purchasing venues, commitment to sustainability in food production, distribution, and consumption (Favilli *et al.*, 2015; Galli *et al.*, 2015). The phenomenon of AFNs is on the rise in North America and Europe, and is booming in Italy in particular, as a consequence of the governmental strategies for the adoption of agricultural multifunctionality.

The research on AFNs focuses mainly on the ethical consumption, rural development, and supply chain perspectives (Pascucci *et al.*, 2016). The first research area explores the political and ethical commitment of critical consumers: in this sense,

AFNs are tools for citizens to raise awareness on environmental issues, reduce impacts of food consumption, preserve biodiversity, and support local rural communities (Blasi *et al.*, 2015). Secondly, the rural development stream focuses on the opportunity for small and medium farmers to diversify and stabilize income, hence generating positive spillovers for rural and urban communities; moreover, the embeddedness of agricultural activity into local cultures and economies might be the key to new food systems based on values and norms which manage landscape and resources in a sustainable manner (Brunori and Rossi, 2007). Third, the organizational perspective studies how new coordination mechanisms emerge and shorten the food supply chain through the means of trust and cooperation between consumers and producers (Galli *et al.*, 2015).

By contributing to the literature on ethical consumerism and participation in AFNs, this paper aims at exploring how personal attitude towards AFNs, together with food product quality perception, influences relative consumers' relative satisfaction. The analysis conducted with LISREL allowed testing the hypotheses proposed in the model via several fit measures, which suggest a good model fit, according to the literature. One of the key advantages of using a structural equation model lies in the chance to estimate not only direct effects, but also indirect effects among latent constructs (Bollen and Liang, 1989). A survey was conducted among 210 consumers participating in various forms of AFN, i.e. farmers' market customers, ethical purchasing group members, and short food supply chain agreement affiliates. The questionnaire consisted of three sections: an insight into personal and shopping habits; the reasons for and related satisfaction over participation in the specific AFN initiative; a demographics section to categorize answers.

2. Background

In order to produce an exhaustive description of consumer participation in AFNs, this multidimensional concept was examined and measured in reference to three main constructs and their relative interrelationships: attitude, perceived product quality, and satisfaction over participation.

Attitude towards AFNs – Consumer attitude towards a given behavior or a product is one of the main determinants of purchasing intention, which in turn is a good predictor of actual purchasing behavior (Ajzen, 1991). In marketing research, the ‘Attitude’ construct refers to a personal, either positive or negative, predisposition towards a product or a brand, built on a consumer’s personal beliefs, feelings, and intentions (Huang *et al.*, 2004). In the case of food choice, recent studies confirm the positive correlation between attitude and intention to buy (Savelli *et al.*, 2017). Çabuk *et al.* (2014) demonstrate the mediating role of attitude toward organic food on how health consciousness and environmental concern drive food choice. In this study, the items used to measure this construct were selected according to the survey by Archer *et al.* (2003) on latent consumers’ attitude to farmers’ markets in North West England.

Perceived product quality – Literature on consumer quality evaluation in marketing is broad and well developed. In the case of food choice, when evaluating quality, consumers consider both intrinsic and extrinsic product features. Intrinsic attributes refer to physical aspects of the product, e.g. colour, flavour, freshness; conversely, extrinsic features are embedded in the product but not in its physical part, as for example price, branding, origin (Espejel *et al.*, 2007). Quality assessment hence depends on both objective and subjective elements. In the case of search goods, quality

can easily be assessed prior to purchase; experience goods, on the contrary, present characteristics which are difficult to observe in advance; finally, credence goods do not directly convey information to consumers (Caswell and Mojduszka, 1996). These considerations suggest that quality evaluation encompasses elements which are not directly linked to the satisfaction of basic needs, but respond to personally and socially desirable features, such as limited environmental impact, ethical attributes, and geographical origin of the evaluated product (Migliore *et al.*, 2015). Among the broad number of validated scales available in the literature, we measured the ‘Perceived Product Quality’ construct using items drawn from Hansen (2005), with the inclusion of additional items specifically related to the AFN shopping experience, identified in the survey by Archer *et al.* (2003).

Satisfaction – The concept of consumer satisfaction is central in marketing, as it is the link between purchasing and post-purchasing behaviors, and one of the drivers of attitudinal change and brand loyalty (Churchill and Surprenant, 1982). The link between satisfaction and repurchase behavior seems to be clear and sound: an increase in satisfaction should push the consumer to buy again a given product (Chang *et al.*, 2014). However, the multidimensionality of the concept implies a less straightforward relationship: Nuttavuthisit and Thøgersen (2017) demonstrate that, besides physical and sensorial experiences, trust plays a major role in driving organic food choice; moreover, other elements such as perceived switching costs and lack of attractive alternatives may alter the judgement of the consumer (Aydin *et al.*, 2005). According to Kannan (2017), satisfaction reflects consumer’s happiness with an item or a service, with respect to the elements which constitute value for the consumer himself. Subsequently, we measured this construct referring to relative satisfaction over the reasons which led consumers to participate in AFNs.

3. Research framework

Starting from these premises, this study proposes a theoretical model to analyse the relationships between the three latent constructs. The theoretical framework is graphically represented in Figure 1 graphically represents the theoretical framework, with the proposed causal relationships among attitude towards AFNs, perceived product quality, and satisfaction.

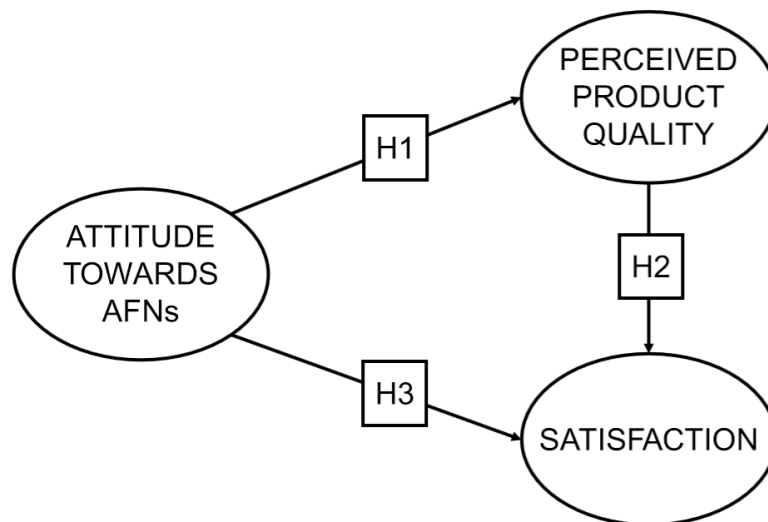


Figure 1: The proposed model

Given the measurement scale described for each latent construct, we propose the following hypotheses:

Hypothesis 1 (H1): The attitude of consumers towards Alternative Food Networks (ATTAFN) positively affects perceived quality (PQ) of products from AFNs.

Hypothesis 2 (H2): The perceived quality (PQ) of products from AFNs has a significant impact on consumers' Satisfaction (SAT).

Hypothesis 3 (H3): The attitude of consumers towards Alternative Food Networks (ATTAFN) has a significant impact on satisfaction (SAT).

4. Data and research methodology

A questionnaire was administered to different types of ethical consumers to gather information and data. The questionnaire was organized into three sections: an insight into personal and shopping habits; the reasons for and relative satisfaction over participation in the specific AFN initiative; a sociodemographic section to categorize answers. AFN participation determinants were measured through Likert scales with which respondents were asked to rate the importance of selected items as presented in the literature on ethical consumers (Chih-Ching and Yu-Mei, 2015; Franco and Marino, 2012; van Huylenbroek *et al.*, 2009), including social, environmental, health and economic aspects (Balderjahn *et al.*, 2013).

In total, 210 ad hoc questionnaires were collected between March and May 2016 in the *Friuli Venezia Giulia* region, in the North East of Italy: 57 were administered to the *Patto della Farina* (*i.e.* the ‘Flour Agreement’) participants, 84 to buying groups affiliates, and 69 to farmers’ market customers. Consumers were either directly contacted, in the *Patto della Farina* and buying groups cases, or randomly selected at farmers’ markets, in the provinces of Udine, Gorizia, and Trieste, which coincide with the geographical space of the *Patto della Farina* initiative. The decision to limit the geographical space of the research reflects the presence, within the mentioned area, of the three main models of AFN: short food supply chains, ethical purchase groups, and farmers’ markets.

The Patto della Farina initiative - The Patto della Farina is a short food supply chain agreement which aims at changing social and market relationships among consumers and producers, localised in the eastern area of Friuli Venezia Giulia. In 2014 the local *Forum per I Beni Comuni* (i.e. 'Forum for the Commons'), an association to promote ethical economies and environmental consciousness, supported the creation of an agreement between two local farmers, a miller, a baker, and a group of concerned consumers, for the production and transformation of organic flour and bread from ancient wheat varieties. At the beginning of the crop year, producers and consumers negotiate a fair price for the products, with the first transparently presenting production costs, and the latter committing to buy at least 10 kg of flour per family along the year; in this phase consumers pay in 10% of their total expense, as a liquidity base for producers. During the year, consumers are periodically updated on the production and get to visit the wheat fields and the participating businesses; they share the entrepreneurial risk and build relationships among them and with the producers. On the point of view of the consumers, the personal and economic commitment is counterbalanced by the warranty of a high-quality products sold at competitive prices; conversely, committed entrepreneurs have access to an alternative and more remunerative market. On a broader extent, this system generates positive externalities in terms of opportunities for local development, protection of rural communities, biodiversity and landscape preservation, and an overall contribution to community resilience.

Gruppi di acquisto solidale (GAS, i.e. ethical purchase groups, EPGs) – Italian EPGs are local organisations, with various degrees of structuration and formalisation, through which consumers organize and coordinate their buying decisions according to a set of shared values and criteria. It is a form of collective consumption based on

shared ethical values, ranging from social justice to environmentally friendly attitudes. The first EPGs date back to mid-1990's, even though they became more popular and widespread during the last decade. In general, the aim of EPGs is to create social links among their affiliates and between them and the EPG suppliers, which are chosen according to their compliance with the standards defined by the EPG participants. Compared to conventional buying groups, EPGs look not only for economic convenience, as they heavily stress the role of solidarity principles and political action of their activities and buying decisions (Graziano and Forno, 2012).

Farmers' markets – The diffusion of local food movements in 1990's pushed the rebirth of the old, and apparently dead, model of farmers' market as places where consumers could source locally grown food directly from producers, in response to global supply chains and large-scale retail trade. Consumers choose farmers' markets for different reasons: reduction of food miles, promotion of local and rural development, reward local farmers who adopt sustainable farming practices, sourcing of local food varieties. On the costumer side, farmers' markets offer a unique shopping experience and satisfy the demand for local, fresh, and healthy food; on the supply side, farmers have the chance to integrate their income, avoid intermediaries, and be aware of their consumer profile and desires (Dodds *et al.*, 2013).

Table 1 presents a summary of the social and demographic characteristics of the sample. The geographical distribution of the population shows a prevalence of urbanised consumers, with 58.1% of the sample living in the cities, and 41.9% coming from smaller towns and rural areas. The subgroups describe slightly differentiated trends: a large majority (83.3%) of buying group affiliates lives in small municipalities; farmers' market customers reflect the overall sample distribution; half of the Patto della Farina affiliates live in the main cities of the area.

Table 1: *Characteristics of the sample (N=210).*

<i>Characteristics</i>	<i>Classes</i>	<i>%</i>
Gender	Female	71,9
Age (years)	18-24	0,48
	25-34	14,29
	35-44	21,43
	45-54	27,62
	55-64	19,52
	≥65	16,67
Education	Primary school	3,33
	Lower secondary school	8,57
	High school	44,76
	University	31,90
	Post-graduate	11,43
Size of the household (individuals)	1	7,62
	2	35,71
	3	25,71
	≥4	30,95
	Family income (.000 €) (x)	$x < 15$
$15 < x < 28$		43,81
$28 < x < 55$		35,71
$55 < x < 75$		4,76
$x > 75$		1,9
Size of the residential community (y = inhabitants)	$y < 30000$	56,19
	$y > 30000$	43,81

Patto della Farina participants appear younger on average, in particular if compared to farmers' market customers. Critical consumers are generally well educated: almost half of the participants own a high school diploma, a third are graduated and more than 10% of the sample attended post graduate education: the figures appear interesting if compared to national educational trends, as less than 15% of Italians own a university degree, and postgraduates are extremely rare (ISTAT, 2015). Among the subgroups, higher levels of education emerge among the buying groups and *Patto della Farina* affiliates. Income distribution is homogeneous among the subgroups, with most respondents being part of the middle class.

5. Results and Discussion

Data analysis was carried out via Confirmatory Factor Analysis (CFA) to examine the reliability and validity of the measurement model. Thereafter, the hypotheses were tested via a structural equation model (SEM), because this method is more suitable for making explicit the latent structure of the causal relationships (Cohen *et al.*, 1990). The CFA for each measurement model was estimated using maximum likelihood to identify the three latent constructs. Standardized factor loadings of each measurement item (λ), reliability (Cronbach's α coefficient) and average variance extracted (AVE) for each latent factor are presented in Table 2.

Table 2: Reliability and AVE of Latent Constructs.

<i>Constructs and items</i>	<i>labels</i>	λ	α	<i>AVE</i>
Attitude towards AFNs	ATTAFN		0,74	0,52
Importance of the geographical origin of food	AFN1	0,78		
Importance of food safety	AFN2	0,86		
Frequency of purchase of local grown food	AFN3	0,47		
Perceived product quality	PQ		0,79	0,45
Expected overall quality	PQ1	0,62		
Importance of taste	PQ2	0,62		
Importance of organic production method	PQ3	0,59		
Importance of local origin	PQ4	0,72		
Importance of ethical content	PQ5	0,72		
Satisfaction	SAT		0,89	0,55
Overall quality	SAT1	0,74		
Taste	SAT2	0,73		
Organic production method	SAT3	0,64		
Local origin	SAT4	0,72		
Food Freshness	SAT5	0,79		
Ethical commitment	SAT6	0,74		
Low environmental impact	SAT7	0,80		

The Cronbach's alpha (α) of each construct is above the general threshold of 0.70, which indicates a high level of reliability or internal consistency in the measurement items (Nunnally, 1994). The AVE for each construct is above or very close to the cut-off point of 0.50, which suggests convergent validity (Hair *et al.*, 2010). The CFA results indicate that the measurement model possesses adequate fit and its associated measurement items are valid and reliable. It is possible to proceed with the formal implementation of the model and testing of the hypotheses.

The SEM was implemented with Linear Structural Relationships (LISREL), using the LISREL 9.1 software (Joreskog and Sorbom, 2012). The fit indexes of the proposed model are introduced in order to verify how well the hypothesised model reproduces the observed covariance matrix, using the Goodness of Fit Index (GFI) and Adjusted Goodness of Fit Index (AGFI), both proposed by Jöreskog and Sörbom (2001), and incremental fit indexes: the Normed Fit Index (NFI) proposed by Bentler and Bonnet (1980), the Comparative Fit Index (CFI), proposed by Bagozzi (1992) and the Root Mean Square Error of Approximation (RMSEA), proposed by Browne and Cudek (1993). The proposed fit indexes are summarised in Table 3.

Table 3: *Main indexes of model fitting.*

Global fit indexes	Value	gdl
GFI	0,83	
AGFI	0,80	
NFI	0,90	
CFI	0,92	
RMSEA (Test of Close Fit)	0,08	
χ^2	565,41	87

The results indicate a good fit between the model and the observed data and allow analysis of the assumptions of the hypothesis. Table 4 provides the path coefficient standardized estimates and corresponding t-values of the main direct effects. The existence of direct causal effects among the latent variables ATTAFN, PQ and SAT is supported by the fit indexes from the SEM analysis. The incremental fit indexes provide an indication of the good adaptation of the conceptual model: 0.90 for NFI and 0.92 for the CFI. An analysis of the indexes of the residues also provides useful insights regarding model fit. Shifting attention to the RMSEA the value of 0.08 is an acceptable indicator of adaptation.

Table 4: *Direct effects among constructs.*

Hypothesis	Estimate (Standardized γ)	s.e.	t
Direct effects			
(H1) ATTAFN→PQ	0,68	0,07	6,69
(H2) PQ→SAT	0,64	0,12	5,32
(H3) ATTAFN→SAT	0,19	0,07	1,93

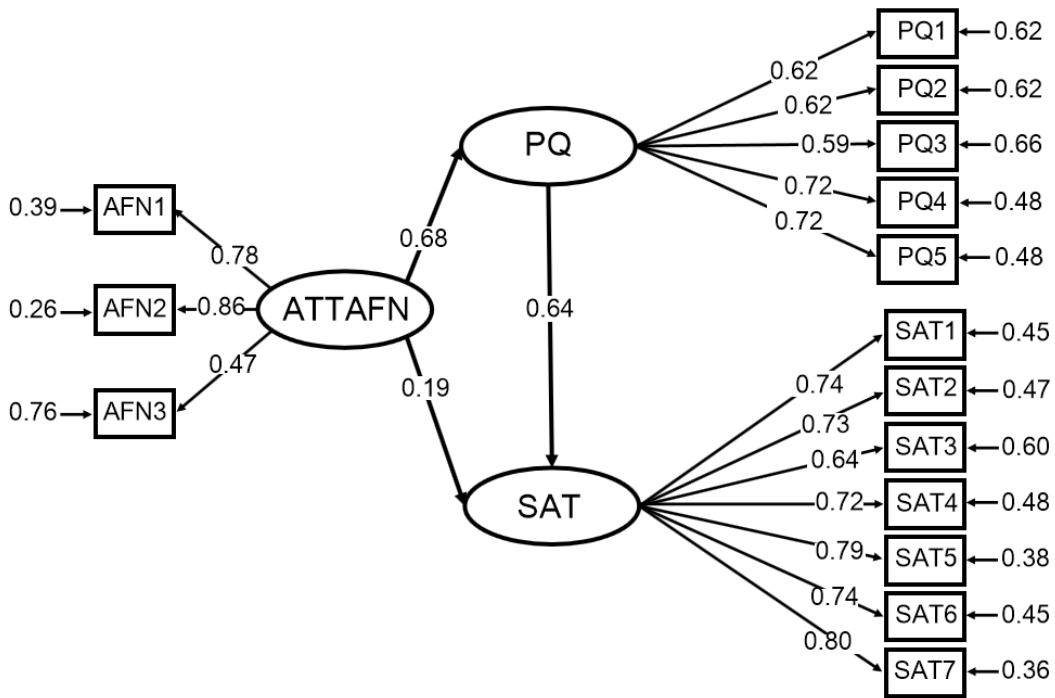


Figure 2: Path analysis of the proposed model

According to the results, H1 and H2 are strongly supported, while H3 is close to be rejected. The relationship between attitude of consumers towards AFNs (ATTAFN) and perceived quality (PQ) of products is significant ($\gamma = 0.68$, $t = 6.69$), supporting H1. At the same time, perceived quality (PQ) of products from AFN, positively affects customer satisfaction ($\beta = 0.64$, $t = 5.32$). The effect of attitude towards AFNs (ATTAFN) on satisfaction appears to be almost irrelevant ($\gamma = 0.19$, $t = 1.93$), while the indirect effect mediated by PQ seems to be more pronounced. Figure 2 presents the path analysis with the standardized estimates of causal relationships between latent constructs and their indicators.

In supporting the hypotheses, the model specifically depicts the responsiveness of consumers to product quality: a positive attitude towards AFNs influences consumers'

expectations over product quality and features; however, these expectations do not lead to judgment suspension. In fact, consumers who participate in AFNs build up expectations over precise product features which may satisfy their demand for search, experience, and credence goods, but in the end judgment and loyalty heavily depend on the experience.

6. Conclusions

The results from this study suggest that consumers' attitude towards AFNs directly influences the perceived quality of food products; moreover, the analysis confirms the relationship among these two elements and the overall satisfaction with the participation in AFNs, though highlighting the primary role of perceived product quality in the process of expectation formation. Given the nature of credence goods, however, the consumption experience is not sufficient to evaluate satisfaction over intangible features, such as ethical attributes, local origin of food, and effective adoption of organic farming. These considerations open up the possibility of further research to better understand the role of relationships between consumers and producers in building trust, commitment, and loyalty.

This research demonstrates the importance of correspondence between what constitutes value for the consumers and relative satisfaction. With respect to AFN consumers, the seek for credence goods in food products raises the need to adapt marketing strategies in order to effectively communicate intangible features, such as the social and environmental commitment of the producer, which could hardly be

experienced and evaluated otherwise. These considerations find support in the literature on food choice: Hsu and Chen (2014) demonstrate that framing communication to be coherent with consumers' regulatory focus positively influences their purchase intention toward organic food; similarly, Teng and Wang (2015) confirm the importance of the adoption of alternative communication channels to provide customers with correct and reliable information over organic food and production methods.

For these reasons, further research on perceived quality assessment is desirable to extend our knowledge of customer satisfaction over AFN affiliation. Notwithstanding the limitations of the research in terms of sample size and composition, the results pave the way to future studies on the determinants of critical consumers' psychological dynamics; moreover, the role of perceived quality as an antecedent of customer satisfaction deserves thorough assessment.

While this study focuses on a specific category of consumers, already sensitive to certain topics and issues, a generalization of the results should target conventional consumers as well. Future work will focus on general consumers' attitudes towards AFNs: a clear understanding of consumers' priorities, their interest over intangible features of food products, and the relative influence on consumption behaviors are all mandatory to develop efficient marketing strategies to mainstream AFNs.

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Annex 1 – Sample questionnaire



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Questionario sulle caratteristiche dei consumatori critici

I MERCATI DEI CONTADINI

Il presente questionario è volto ad identificare e studiare alcune caratteristiche ed abitudini dei consumatori "critici". La preghiamo di rispondere a tutte le domande, e le ricordiamo che i dati saranno trattati esclusivamente in forma anonima ed aggregata, per fini di ricerca.

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3402524675





SEZIONE 1 - ABITUDINI PERSONALI E DI CONSUMO

Queste domande servono per identificare alcune caratteristiche dei consumatori

1. Quali di queste realtà locali di filiera conosce?

- Patto della Farina del Friuli Orientale
- Pan e Farine dal Friùl di Mieç
- Gruppi Organizzati Domanda Offerta (GODO) dell'AIAB
- Gruppi di acquisto solidale (GAS)

2. Le sue abitudini - 1

Indicare la frequenza dei seguenti comportamenti, in una scala da 1 (mai) a 5 (sempre)

	mai 1	2	3	4	sempre 5
Presto attenzione al luogo in cui è stato prodotto il cibo che acquisto	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Presto attenzione alla sicurezza del cibo che consumo (es.: ingredienti di qualità, igiene del prodotto, rischio di contaminazioni, etc...)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Presto attenzione alle mie abitudini alimentari (es: dieta bilanciata, consumo di frutta e verdura, prodotti non industriali, etc...)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Faccio acquisti presso produttori locali	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Acquisto prodotti a basso impatto ambientale (es: prodotti privi di imballaggi, confezioni biodegradabili, ridotta distanza tra luogo di produzione e di acquisto, etc...)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Acquisto alimenti biologici	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

3. Le sue abitudini - 2

	SI	NO
Pratico attività fisica regolarmente	<input type="radio"/>	<input type="radio"/>
Sono vegetariano/a	<input type="radio"/>	<input type="radio"/>
Sono vegano/a	<input type="radio"/>	<input type="radio"/>
Faccio la raccolta differenziata	<input type="radio"/>	<input type="radio"/>
Acquisto prodotti equosolidali	<input type="radio"/>	<input type="radio"/>
Faccio parte di un GAS	<input type="radio"/>	<input type="radio"/>
Faccio attività di volontariato	<input type="radio"/>	<input type="radio"/>



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SEZIONE 2 - IL MERCATO DEI CONTADINI

Queste domande servono per comprendere meglio le dinamiche di acquisto e consumo presso i mercati dei contadini e a km zero

4. Presso quale mercato diretto fa abitualmente i suoi acquisti?

5. Come è venuto/a a conoscenza di questo mercato?

- Tramite parenti, amici o conoscenti
- Notizie sul web, sito internet, social network
- Conferenze o incontri
- Altro canale - Specificare: -----

6. Perché ha scelto questo mercato?

Indicare l'importanza di ognuno dei seguenti aspetti nella decisione di compiere i suoi acquisti presso il mercato, in una scala da 1 (per niente importante) a 5 (molto importante)

	per niente	1	2	3	4	molto	5
Qualità del prodotto (es.: sicurezza, igiene, salute)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Gusto del prodotto	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Prodotto biologico	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Prodotto locale	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Prodotto fresco	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ragioni etiche (es.: sostenere piccoli produttori)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Prodotto a ridotto impatto ambientale	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Partecipazione alla vita della comunità	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Convenienza economica	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Altro - Specificare:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



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7. In che misura le sue aspettative sono state soddisfatte?

Indicare il grado di soddisfazione per ognuno dei seguenti aspetti, in una scala da 1 (per niente soddisfatto) a 5 (completamente soddisfatto)

	per niente				
	1	2	3	4	molto 5
Qualità del prodotto (es.: sicurezza, igiene, salute)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Gusto del prodotto	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Prodotto biologico	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Prodotto locale	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Prodotto fresco	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ragioni etiche (es.: sostenere piccoli produttori)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Prodotto a ridotto impatto ambientale	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Partecipazione alla vita della comunità	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Convenienza economica	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Altro - Specificare:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

8. Ha individuato motivi particolari di insoddisfazione?



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9. Intende continuare a fare qui i suoi acquisti anche in futuro?
 SI
 NO
10. Ha parlato di questo mercato a parenti, amici, conoscenti?
 SI
 NO
11. Se SI, quanti poi hanno deciso di provarlo?
_ _ _ _ _
12. Acquista abitualmente farina?
 SI
 NO
13. Se SI (1), potrebbe indicare il prezzo al kg della farina?
_ _ _ _ _
14. Se SI (2), che quantità acquista mediamente in un mese?
_ _ _ _ _
15. Qual è il prezzo massimo al kg che sarebbe disposto/a a pagare, per acquistare la stessa quantità di una farina con le seguenti caratteristiche: farina da frumento biologico, coltivato da un piccolo produttore in Friuli Venezia Giulia e macinato a pietra in un mulino artigianale?
_ _ _ _ _



SEZIONE 3 - ANAGRAFICA

Queste domande sono utili per categorizzare meglio le risposte precedenti

- 16. Comune di residenza

- 17. Fascia di età
 - 18-24
 - 25-34
 - 35-44
 - 45-54
 - 55-64
 - 65 e oltre
- 18. Sesso
 - Maschio
 - Femmina
- 19. Titolo di studio
 - Licenza elementare
 - Licenza media
 - Diploma
 - Laurea
 - Formazione post-laurea
- 20. Numero di componenti del nucleo familiare
 - 1
 - 2
 - 3
 - 4 e oltre



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21. Stato occupazionale

- Studente o casalinga
- Disoccupato/a
- Lavoratore/lavoratrice dipendente
- Lavoratore/lavoratrice autonomo/a e imprenditore/imprenditrice
- Pensionato/a

22. Fascia di reddito del nucleo familiare

- Primo scaglione - 0-15.000 €
- Secondo scaglione - 15.001-28.000 €
- Terzo scaglione - 28.001-55.000 €
- Quarto scaglione - 55.001-75.000 €
- Quinto scaglione - oltre 75.000 €

23. Ha qualcosa da aggiungere?

Inserire, se ritenuto opportuno, commenti sul questionario o altre informazioni sul tema che potrebbero essere utili

FINE DEL QUESTIONARIO
Grazie per la disponibilità

Urban food production and green infrastructures: the case of Ljubljana

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Abstract

Among the different categories of Alternative Food Networks, urban farming has become relevant for researchers and policy-makers, as it offers broad opportunities to enhance sustainability of food production and resilience of cities. This paper presents the case of Ljubljana and provides an analysis of local urban farming initiatives in the city as green infrastructures for the production of ecosystem services, exploring their contribution to the overall sustainability of the Slovene capital city. The analysis follows the framework suggested by Hansen and Pauleit (2014) for an integrated approach to Green Infrastructure and Ecosystem Services in strategic planning for green urban areas.

1. Introduction

According to the UN, by 2045 over nine billion people will live in urban contexts worldwide (UN, 2015). The main drivers of this process are, on the one hand, the global population growth trend, and on the other hand the steady increase in urbanization of rural people who look for better living conditions. This is likely to determine several consequences: first, conventional agriculture in rural areas is losing workforce; secondly, the expansion of urban areas is reducing the availability of agricultural land; third, in particular in developing and underdeveloped countries, rural people who have always based their food security on self-production, once urbanized, will need to find alternative food sources. The broad impacts of these trends, ranging from global food security and food safety to resource use and environmental impacts (Seto & Ramankutty, 2016), is already redefining the relationship between humanity and food worldwide, and raises the necessity of integrated strategic planning for cities, resource management, and food production (Godfray & Garnett, 2014).

In developed countries, the awareness over these issues, coupled with ethical and environmental concerns, has pushed the diffusion of Alternative Food Networks (AFNs), which include organic farming, fair trade, local food movements, and other phenomena which offer alternatives to conventional food systems, in an attempt to overcome inefficiency and lack of sustainability (Som Castellano, 2015). In general, the utility of consumers who participate in AFNs, refers not only to maximization of consumption, as it includes ethical and environmental considerations as well.

Among these, urban gardening and urban farming initiatives, that is food production within or next to urban areas, are drawing the attention of researchers,

policy makers and urban planners, for their potential in terms of overall sustainability of food production and urban areas, as well as the ethical and economic considerations which underpin these initiatives (Erwein, 2014). Indeed, the impacts of urban agriculture, in terms of food production, provision of ecosystems services, and occupation, are widely explored in scientific literature (McClintock, 2010; Colding & Barthel, 2013).

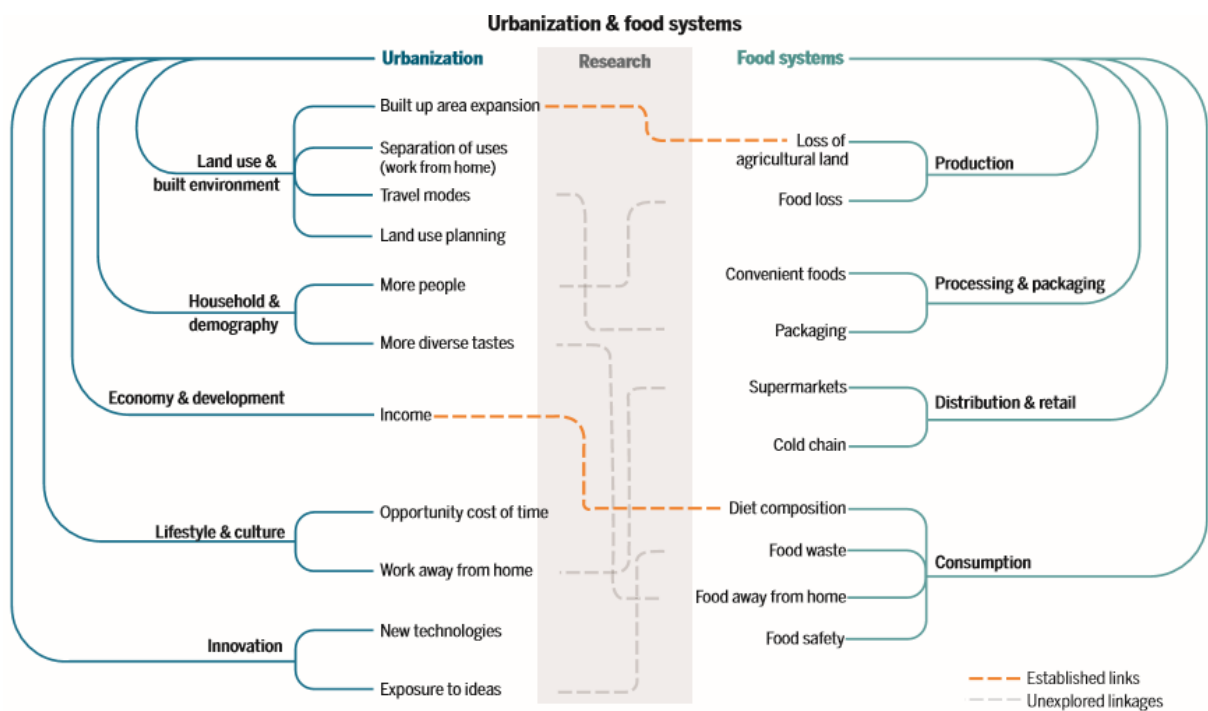


Figure 1: *Established and underexplored linkages between urbanization and food systems.*
Source: Seto & Ramankutty, 2016.

This paper presents the model of urban farming in Ljubljana as a successful example of sustainable food production and multifunctional agriculture. During the last decade, several projects in Ljubljana, and all over Slovenia, have promoted sustainability, transforming the traditional self-production model into green infrastructures for the provision of ecosystem services for urban areas, determining positive spillovers for local communities.

2. Background

Modern urbanization trends in developed countries have determined a clear distinction between urban and rural landscapes, as well as their respective functions and the relationships among them. Traditionally, countryside is associated to the primary sector, hence it is called to produce primary goods and raw materials for the city, which, in turn, provides complex products, services, and governance (Gutman, 2007). The reality, though, is different: the relationships between the city and the countryside are complex, the urban-rural divide is often shaded and based on interdependence, complex networks, and, sometimes, substitution.

The case of agricultural activity is a clear example of this complexity. While we traditionally conceive the countryside as the area which produces food and fibers, rural areas produce a broad range of services for the cities and their inhabitants. Ecosystem services refer to the ensemble of goods and services produced by ecological systems which generate direct or indirect benefits for human beings (Costanza et al., 1997). Ecosystem services are grouped into three categories, i.e. provisioning, regulating, and cultural services.

In spite of urbanization, the demand for ecosystem services has accompanied the history of cities, and is constantly growing (Gómez-Baggethun & Barton, 2013). Indeed, due to the negative effects of urbanization, in terms of health and wellbeing, the demand for green spaces and ecosystem services by urban communities is increasing worldwide, in particular in developed countries, where environmental attitude and care for personal wellbeing are deeply rooted (Tzoulas et al, 2007).

In this sense, urban gardening and urban farming have been widely investigated

by researches. Barthel et al. (2015) discuss the importance of green spaces and urban farming in building resilient cities, both for the cultural role of urban food production and for its importance during crises, as for example the “war gardens” which flourished all over European cities during the two world wars. Similarly, Camps-Calvet et al. (2015) present the urban gardening movements in Barcelona, urban green spaces are interpreted as urban commons which played a major role in promoting the city’s resilience during the last economic crisis.

Barther et al. (2013) analyze the cultural role of urban gardens in storing tradition and knowledge on food production and processing. Other studies reveal the importance of urban green spaces for local biodiversity protection (Lindemann-Mathies & Marty, 2013), as well as improvement of aesthetic quality of cities (Lindemann-Mathies & Brieger, 2016), which in turn increases the attractiveness of urban areas.

However, in spite of the large corpus of literature supporting urban farming, some authors rise critical issues and problems to be addressed. Reynolds (2015) suggests that in some contexts urban farming promotes disparities and hampers social justice. This opinion is supported by other studies which criticize urban agriculture as a neoliberal occupation of urban green spaces to the detriment of lower social classes (McClintock, 2014).

Nevertheless these critical positions, the community of researchers generally agrees on the broad positive impacts of urban greening initiatives, which improve food security, health, quality of life, land and real estate value, and environmental quality (Poulsen et al., 2014; Goldstein et al., 2016).

3. Methodology

Drawing on the literature on AFNs and urban farming, this paper provides an analysis of the urban gardening experience of the city of Ljubljana, Slovenia, to demonstrate its role in promoting sustainability and resilience of the city. In fact, the strategic planning of urban green areas and community vegetable gardens has played a pivotal role in fostering sustainability, and as a matter of fact the Slovene city was awarded European Green Capital in 2016.

The research follows the framework suggested by Hansen and Pauleit (2014) for the analysis of multifunctionality in green infrastructure planning for urban areas. Figure 2 provides a graphical representation of the framework. The aim of the authors is to provide a holistic framework to bring together the Green Infrastructure approach and the Ecosystem Services approach and operationalize them in urban green planning processes. This study will focus on the System Analysis section of Hansens and Pauleit's framework, as the complete valuation step would require expensive and complex gathering of not only socioeconomic data, but also biological and ecological data. The extension and future development of the research should therefore be based on a transdisciplinary approach, in collaboration with experts from other fields.

This research constitutes an exploratory study on the rationale for urban gardening initiatives and the opportunities they can create, therefore it presents a simplified version of the analysis, based on qualitative data. Even though qualitative researches are not prevalent in agricultural economics, their holistic approach provides insights which are otherwise difficult to identify and measure through quantitative data; it is therefore useful to explore new paradigms or alternative contexts, and as an antecedent of empirical studies (Bitsch, 2005).

Information gathering took place in June 2017. Following a qualitative approach, data collection was based on official documents, existing research on urban agriculture in Ljubljana, and semi-structured interviews with stakeholders: local administrators, urban farmers, citizens, representatives of local environmental associations, researchers. The study area is the city of Ljubljana. Figure 3 depicts urban green areas, with vegetable gardens highlighted in brown.

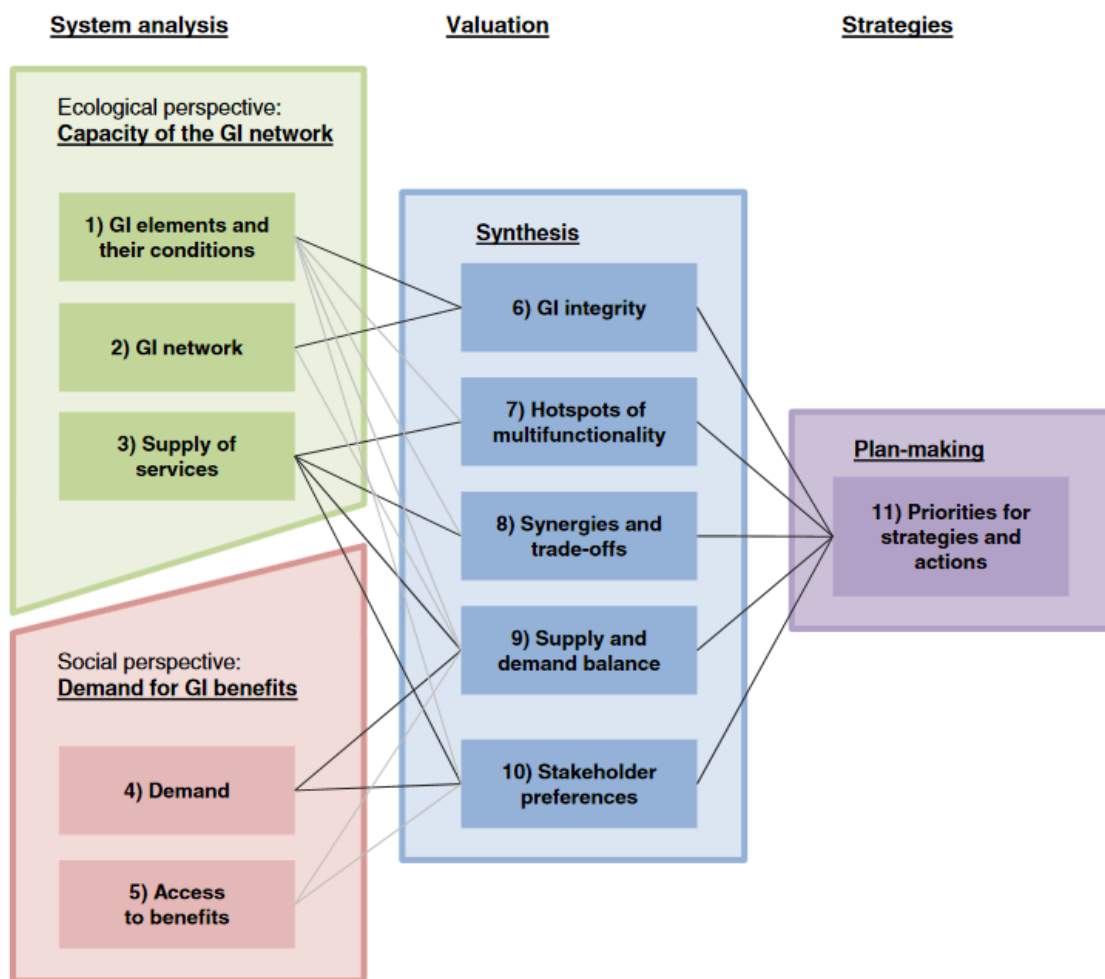


Figure 2: Conceptual framework for assessment of GI multifunctionality. Source: Hansen & Pauleit, 2014.

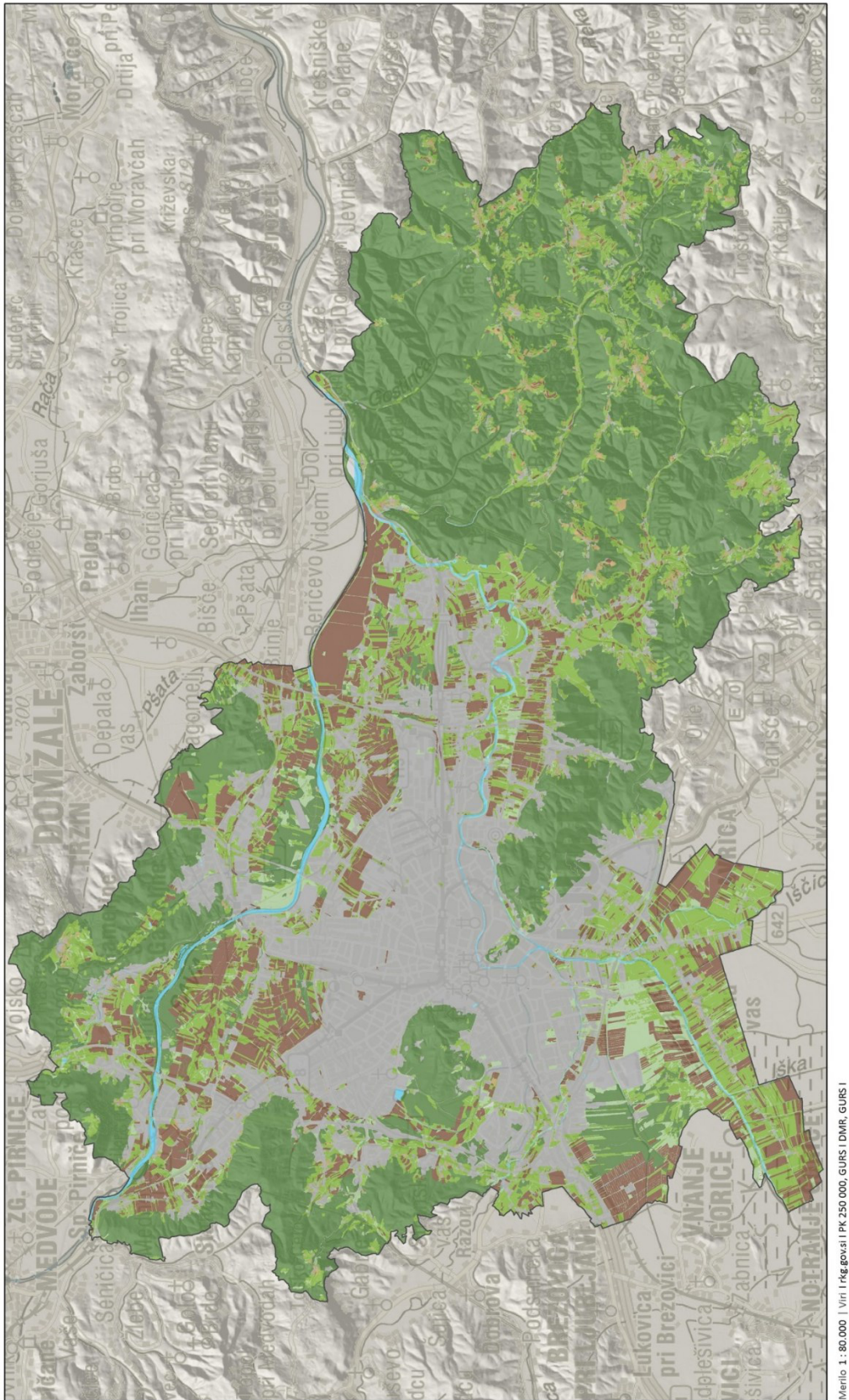


Figure 3: *Ljubljana green areas in 2015*. Source: Municipality of Ljubljana, 2015.

4. Evolution of urban gardening in Ljubljana

The city of Ljubljana has a long-standing tradition of urban and peri-urban food production. Like other European medieval towns, the original nucleus of the town around the castle used to source agricultural products from the surrounding areas, in particular from the small villages of Trnovo and Krakovo, right outside the walls. Over the centuries, the town expanded and incorporated the two villages, though keeping vegetable gardens. Still today, the two neighborhoods next to the city center produce food for the local market, even though farming in these areas is rather traditional and not competitive.

A different story happened in the other districts, which were incorporated during the Yugoslav period. As people from rural Slovenia and other republics of the Federation moved to town, the demand for housing and modern infrastructures pushed the city to incorporate more villages and subtract land from professional agricultural activities, with the exception of limited areas in the northern and eastern ends, where professional farming is still present nowadays. Since the majority of Slovene residents of Ljubljana still held strong family ties with relatives living in the countryside, they referred to them to integrate their food consumption, and did not need to personally grow food in the first place.

The practice of urban gardening spread between 1960-1980's, when poorer households, mainly from rural areas of other Yugoslav republics, reproduced traditional self-production models to overcome economic constraints and improve food security. In this period, people used not only their gardens, but any available piece of land, either with formal or informal permission, or with no right at all. Besides domestic gardens,

in fact, it was common for industrial plants to grant their workers unused land for vegetable growing; moreover, appropriation of public spaces was pretty common, as in the area of Žale. This anarchic attitude, and the lack of a master plan, raised several issues linked to urban gardening: land property and rights of use, environmental problems and pollution, social degradation, food and water contamination.

Between late 80's and mid-90's, the Municipality of Ljubljana decided to regulate urban gardening and promoted a strategic approach, however the process proceeded slowly until early 2000's, with the adoption of the new urban policy. The national context surely influenced this tardiness, as only between 2002 and 2004 the Spatial Planning Act and the Spatial Development Strategy of Slovenia were defined. Within the new national regulations, the Municipality redefined rules and criteria for the practice of urban gardening, as well as the management of public allotment gardens. Currently, the Municipality of Ljubljana manages four community gardens, in Dravlje (51 allotments), Štepanjsko naselje (14 allotments), Ježica (258 allotments), and Park Rakova Jelša (320 allotments); town residents can apply for allotment renting at low prices, which include basic services and infrastructures. At the same time, a growing number of citizens have undertaken autonomous urban gardening initiatives, either individually in their backyards or in different forms of social organization: living block gardens, neighbourhood initiatives, students' dormitories gardens, and also public-private partnerships with the Botanical Garden of Ljubljana.

5. The urban gardening model of Ljubljana

Following the framework presented in the methodology, this paragraph will present the System Analysis of Ljubljana's urban farming initiatives, investigating the capacity of the GI network and the demand for GI benefits.

Urban green infrastructure within the city of Ljubljana, that is the complex of green and blue areas within the city, is complex and varied. Green hotspots, such as the Tivoli Park and the Botanic Garden; the city's watercourses; community gardens and private gardens add up to 560 m² of green surface per capita, according to the Municipality of Ljubljana (Százaz & Nastran, 2015). Hansen and Pauleit (2014) refer to GI network as spatial relations among green areas. In this context, due to the fragmentation of urban green areas – about 75% of the areas are smaller than 200 m², urban gardens constitute individual service providing areas, in the sense that they separately provide localized goods and services for the respective surrounding areas and their users (Syrbe & Walz, 2012).

Urban green spaces are lively, and residents enjoy the ecosystem services they produce. In detail, green areas provide: **provisioning services**, i.e. food production in urban gardens and freshwaters; **regulating services**, as for example carbon sequestration, and air and soil quality – green and agricultural areas present little to no contamination, in any case below danger level (Mestna Občina Ljubljana, 2015); **supporting services** for wildlife and biodiversity; **cultural services**, in terms of leisure and recreation opportunities, aesthetic value, and tourism. In this context, urban gardens constitute a relevant category of green infrastructure. Residents use them to produce food for personal consumption and income integration; appreciate their social

and cultural role as spaces for socialisation, creation of networks, and re-appropriation of urban areas; soil is generally non-contaminated and rich in organic material, efficiently contributing to biological cycles (Mestna Občina Ljubljana, 2015); preserve local traditional vegetable varieties and promote biodiversity.

Due to the broad and different typologies of urban gardening initiatives, there exists no unique or standard profile of the involved citizen. Both middle and lower income families run private gardens, or rent municipal allotments, and even associations rent them to provide free access to poorer households who cannot afford the fares. In general, the demand for ecosystem services by green initiative participants is higher for cultural services rather than for any other category of ecosystem services. Food production is obviously relevant, but it is not the sole nor the primary reason to practice urban farming. The opportunity to enjoy open air; meet new people; build social networks; conquer spaces of freedom, and personal and social initiatives among the city boundaries; the satisfaction originating from learning, experimenting and mistaking, share knowledge, seeds and food; all these elements contribute to motivate participants.

The case of Onkraj Gradbišča - Beyond a construction site is particularly intriguing. It is a garden initiative in Resljeva Street, in a formerly degraded context. The Municipality granted inhabitants the opportunity to turn an abandoned construction site into a vegetable garden. Besides the neighbourhood presenting rather extensive green areas, with gardens and parks, local residents demanded “more green”, intended as appropriation of urban green, a space to be freely managed and organised according to the specific needs and desires of its users and beneficiaries, a proactive space rather than a place for passive experiences.

Similarly, university students who live in the Rožna Dolina and Mestni Log

dorms, and have have been granted by dorms administration the authorization to run vegetable gardens, do not consider food production as a primary objective nor an output measure of their initiative. Indeed, the garden is opened for visitors, and vegetables are free to pick; rather than production, the number of participants and the creation of networks and new projects around the garden gives the measure of the success. The dorm gardens are intended as public spaces to meet, talk, socialise, learn and share knowledge and experiences, not only in the field of gardening and agriculture. This cultural and social attitude also reflects on the definition of the municipal strategy for allotment gardens. In fact, mainly environmental, hedonic, aesthetic and social reasons drive the project, and its success is not measured in terms of food production or income integration opportunities: soil quality and social network creation provide better measures of the impact of the project.

With the obvious exclusion of private gardens, urban gardens are generally open and freely enjoyable, and participating citizens are willing to share their spaces and their opinion on spaces and initiatives. In general, urban gardens configure as local public goods, which produce benefits for the surrounding areas and inhabitants, even when they do not actively participate in urban greening initiatives. In the case of allotment gardens, the Municipality of Ljubljana periodically updates an open tender and ranks demands according to social protection criteria. Renting fares are low (0.7 €/m² for allotments without infrastructures, 1 €/m² with infrastructures, plus cost of water and trash service), and contracts have no deadlines, but urban farmers have to respect organic farming principles and are not allowed to sell their products. Besides these regulations, each urban garden area is autonomously managed by a committee of urban farmers, which also acts as an intermediary between renters and the local administration. Moreover, the Municipality organizes open seminars and meetings

with professionals and experts on topics linked to urban food production. Other urban gardens present different degrees of management structure, ranging from informal to more structured models, including also unique partnerships – the “Along the Railway Track” project, initiated by the Botanic Garden with the support of the National Television.

6. Conclusion

Current trends in urbanization impose alternative approaches to the analysis of food production and food networks, which demand holistic and multidisciplinary perspectives as they combine environmental, economic, social, cultural, and urban planning issues. Among the consequences of urbanization and modernization, the relocation of food production within city boundaries provides inspiration for researchers and demands for strategic planning from administrators.

The research presented in this paper offers a qualitative analysis of the urban gardening model of Ljubljana. Referring to the framework proposed by Hansen and Pauleit (2014) for the analysis of multifunctionality in green infrastructure planning for urban areas. A qualitative approach to the analysis is useful to catch the broad variety of issues linked to food production in urban contexts, ranging from environmental to cultural elements. The panorama provided by the analysis of the interviews and document gathered, present the recent evolution of the urban farming model in Ljubljana, from a self-production strategy to integrate diet and income of poor

households to an environmental and cultural phenomenon which largely contributes to the general improvement of living standards for its inhabitants.

Even though food production is not negligible, in particular during the warm season, this is not the main driver for urban farmers, who consider urban gardening initiatives as cultural, social and environmental actions which improves quality of the urban spaces, produce comprehensive benefits for individuals, create social ties, provides spaces of freedom between concrete and asphalt.

Notwithstanding the contribution of this research in terms of identification and primary interpretation of the dynamics of urban food production, empirical approaches to the topic are desirable to advance knowledge, and measure and value quantifiable impacts of urban food production. Further research should therefore consider broad approaches to measure and quantify individual and social gains derived from urban food production.

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