



Figure 1. Public cultural event organized by "libreria due punti" in the urban gardens "Orto aperto" in Clarina, Trento. Source: Elisa Vettori, 2020.

SOCIO-ECOLOGICAL CONNECTIVITY FOR PRODUCTIVE, CIRCULAR AND RESILIENT TERRITORIES. THE EXPERIENCE OF THE “SATURN” EIT CLIMATE-KIC PAN EUROPEAN PROJECT

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Since the European conference on Sustainable Cities and Towns happened in Aalborg in 1994 the urgency to promote a more balanced relationship and to enhance the reconnection between urban and rural areas became a matter of discussion in research and policy-making. A further important push towards the implementation of reconnection strategies occurred in 1997 with the European Conference on Rural Development. Nowadays, many stakeholders involved in territorial and landscape planning, in order to implement a new relationship between cities and countryside, aim to remove rural areas from margins, to bring citizens closer to the urgent need to safeguard the entire natural ecosystem, and to preserve rural areas and the ecosystem services they provide. The food system can be a key of reconnection between urban and rural areas and has a great impact on materials and energy flows in the metabolism of a city-region. The contribution will explore the spatial transformation of urban and rural landscapes in the city of Trento through a multidisciplinary lens on social dynamics and the governance of food policies.

foodscape / multifunctional landscape / socio-ecological connectivity / rural-urban connectivity

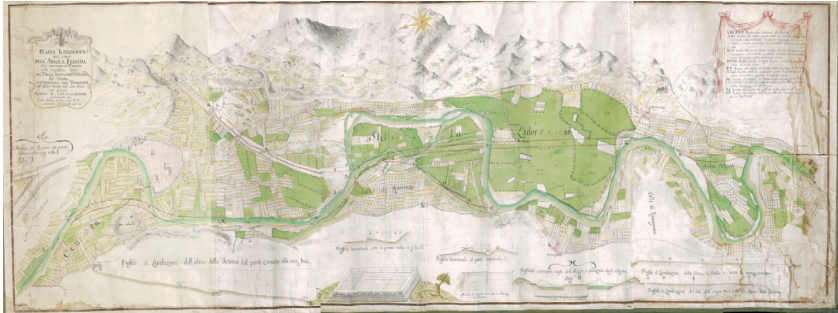


Figure 2. Gian Bartolomeo Scotini, Iconographic map of the Adige river and Fersina stream along the borders of Trento, 1777. Source: Archivio Storico del Comune di Trento, Biblioteca Civica di Trento, Ordinamento austriaco, Esibiti, ACT3.8-XXV.4373.1848

THE DEVELOPMENT OF THE CITY-COUNTRYSIDE RELATIONSHIP OVER THE CENTURIES

For centuries, urban settlements were shaped by the presence of rivers and nearby fertile soils as essential conditions for food production which determined a changing relationship between agriculture and architecture. This close connection between urban form and agricultural practices shaped landscapes. A major shift took place since Industrial Revolution which brought a transformation in agricultural techniques and consequently in city-countryside relations. Mechanisation of crops' growing and food production led to an increasingly strong orientation towards monoculture and larger plots. This caused agricultural activities to move further from fragmented and scattered urban environments in order to adapt more efficiently to the growing industrial and production facilities. The city-countryside relation became therefore weakened because of the increased distance between agricultural and urban areas (Marot 2019). Hybrid, fragmented, and multi-functional territories have emerged, often defined as peri-urban areas.

More recently, after the Second World War, the movement of significant flows of people from rural to urban areas occurred. Such migrations increased the dom-



Figure3. Plan der Stadt Trient mit einem Theil der Umgebung, 1834. Source: Biblioteca Comunale di Trento, TG 1 f 31.

inance-dependence relation between cities and the countryside. (Meloni et al. 2016). The fusion between urban and rural has so far been hindered by the rigid regulatory constraints imposed by urban zoning, according to which each function is located in a specific designated area. The overcoming of this planning model is prevented by an uncertain cultural and social condition, by the industrial crisis, and the need to transform the consolidated urban fabric (Dal Ri et al. 2020). While focusing on the region of Trento it is possible to recognize the territorial development dynamics above mentioned by studying the historical cartography of the city. Some of the paintings in the Buonconsiglio Castle, that date back to fourteenth century, show that agricultural activity was fundamental for society and in close connection with the urban area. This relationship remained unchanged until the nineteenth and twentieth century. As represented in the pictures, the city was a fragment within a rural landscape. One can say that settlements were in the service of the countryside (Fig. 2).

Since peasant activity was central, many people spent most of their time working in the fields. Until 1834, it can be said that Trento was surrounded by countryside with precise and linear boundaries between urban and rural areas. Buildings were rare episodes in rural landscapes and usually, they were functional for carrying out

agricultural activities (Fig. 3). In the Trentino region, there were mixed crops like fruit trees and mulberries grown in association with horticultural plants and cereals (Grandi 1976). Animals grazed in the countryside—to keep them clean and fertilized—and for this reason, some crops were protected by dry stone walls. By studying historical maps, it can be deduced that there were urban gardens also within the city's walls, in fact it is noted that there are the same graphic symbols both within the city walls and in the immediately surrounding areas (Buffoni et al. 2015). From the nineteenth century onwards, Industrial Revolution influenced the evolution of urban and rural landscapes. Productive activities were moved from the city and agricultural systems became always more mechanised and increasingly mono-crop. There was a first major change in historical maps in 1881 when the first walls were demolished and the city expanded into the countryside. But the real change came after the Second World War when the expansion of the city exploded towards the countryside. The disconnection between urban and rural landscapes could be due to two main facts: the localisation of productive-industrial areas in the surroundings of the city and the need to have extended plots of land for agriculture, available far away from the cities. This mechanism has continued throughout twentieth century. Its unsustainability has entered the debate only recently with the emergence of a new awareness, both from an economic-social and environmental point of view, related to issues of production and consumption of food. Today, the increasing interest in food production and preservation of biodiversity is manifested by individual citizens, small-size farmers, and associations setting up vegetable gardens and valorising natural resources, pushing for a change from large-scale to local and micro-scale production. These dynamics are shown by the numbers of public community gardens, initiatives of indoor-agriculture projects, and the recovery of abandoned areas in the city for local agricultural production (Fig. 4). In the city of Trento, the demand for public urban gardens is higher than their availability as has been demonstrated by other research projects (Meyfroidt et al. 2019).

FOOD AS AN ELEMENT OF CONNECTION BETWEEN URBAN AND RURAL AREAS

The whole food system could be a unifying element between urban and rural landscapes, encompassing economic, cultural, social, historical values, and identifying elements for a certain region. These values are reflected both in physical and immaterial aspects of the territory and of people who inhabit it, creating important connections between them. The agricultural landscapes that we see today are inextricably linked to the cultural and social background of people who worked in the

landscape by modifying it (Fig. 1). The repercussions of the food system in rural but also urban areas go beyond the production phase: also the system of distribution, consumption, and waste have important repercussions at the level of the physical space they pass through, influencing the flows of material and energy that cross the territory.

Urbanisation phenomena have caused and exacerbated the physical and mental distances between urban and rural residents. This disconnection of people from food production has led to a certain degree of indifference about the origin of food, the used production methods, and the scale of the phenomenon and its consequences. This is particularly true in most industrialised countries, where well-being is widespread and food is abundant and cheap (Halweil 2002). Indeed, it is important to remember that in these countries less than 5% of the population produces food and that the food supply is relatively secure (Herrendorf et al. 2014).

Even if there is a growing interest in healthy diets, safe food, and even environmental issues, this rarely takes the form of organised and collective actions (Kennedy 2018). Most urban consumer initiatives focus only on a few aspects related to individual critical consumption, such as the quality and price of products at the supermarket. The broader issues of food safety, environmental protection, or the socio-economic conditions of the workers involved in food production are external to most of the purchasing decisions. For this reason, food has become a commodity, an industrial product decontextualized in the market, without any clear understanding about the role of agriculture and livestock farming in ecosystems or the social functions of the production system, a „thing“ without background or ethical aspects to worry about (Francis et al. 2005). However, the contextualisation and positive linkages between urban and rural populations can be recovered through the promotion of local food systems and through establishing and strengthening connections with the rural landscape.

Successful examples of positive linkages are the so called alternative food networks (AFNs),¹ farmers' markets,² the so called community-supported agriculture (CSA),³ solidarity purchasing groups (GAS),⁴ food centres (which aggregate, distribute and trade food from farmers to consumers), eco-belts (which help to link rural and urban areas with activities of common interest), and others, such as food cooperatives and fair trade (Allen et al. 2003; Renting et al. 2003; Goodman 2004; Ilbery, Maye 2005; Venn et al. 2006). Urban populations spatially connected in this way to workers employed in the agri-food sector can become consumers who are better informed about the problems affecting food production and, therefore, also more committed: citizens able to actively support an ecologically, economically, and socially sustainable food production system, as well as to enhance a healthy

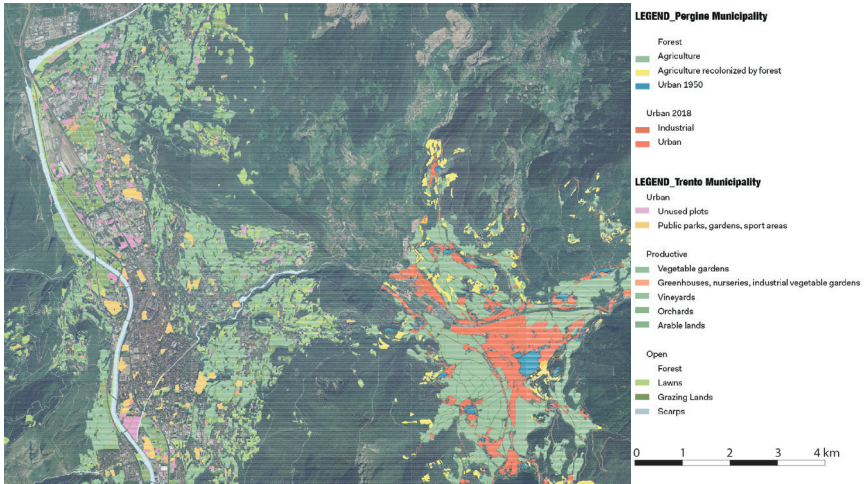


Figure 4. Thematic map based on land use layers of the Municipalities of Pergine Valsugana and Trento. Map elaboration based on Provincia Autonoma di Trento data from Portale Cartografico Trentino and Fabio Frisanco, and Municipality of Trento open source data. Map by Marco Ciolli and Sara Favargiotti, 2019.

and multifunctional rural landscape. In order to promote these changes, it is necessary to work with a multiscale and multilevel approach. The shortening of the supply chain could be a solution to improve the economic, social, and environmental sustainability of the supply chain itself. Unfortunately, this is still perceived by most as an expensive and elitist approach. This idea is sustained by the fact that, in many cases, the longer the supply chain is, the less expensive the food is for consumers. This does not happen thanks to a particular optimisation of the system but since mechanisms are triggered to extremely reduce farmers' margins. Furthermore, agricultural activities have increasingly moved away from cities.

In the scientific and physical context of the SATURN (System and sustainable Approach to virtuous interaction of Urban and Rural Landscapes) project funded by EIT Climate-KIC, these theoretical positions as been addressed on three case study areas: Birmingham (UK), Göteborg (SWE) and Trento (IT). In all three cases, efforts were made to create or start the debate towards creating local food policies.

Birmingham's actors act mainly on a governance level. Here, the goal is to develop a broader vision to connect and integrate initiatives related to the food system within a landscape governance framework. The development of a strong relationship is seen as a support tool for a political re-prioritisation of landscape policies



Figure 5. Public urban gardens in Mesiano hill, Trento. Source: Giuseppe Gorfer, 2019.

and is fundamental to enlarge the common interest about urban agriculture and to spread practical initiatives, and also to change the perception of local land uses. Food-growing traditions are also part of the pilot case; their sustainable improvement is supported with social farms and urban gardens. These actions are then considered for planning initiatives. To address the debate concerning food security issues and the loss of natural resources, it is important to connect cultural with planning initiatives. By doing so, it is also possible to increase the sense of place-belonging and long-term landscape stewardship (Nikologianni et al. 2020). In the context of Göteborg, where the theme of food has been fundamental for the administration for several years, it has been chosen to operate on a small-scale, with the creation of a Model Farm, the implementation of incubators, and the activations of education courses concerning farm management and urban agriculture. Farmers and citizens are empowered to develop their own farming business focusing on sustainable agriculture and the recovery of abandoned plots. Special leasing and financing schemes are dedicated to this kind of activities. Together with four other municipalities, the Municipality of Göteborg is mapping and match-making underutilised and abandoned land and buildings, to give them for use to new entrepreneurs who want to develop their agricultural business in the peri-urban and rural landscape.

TRENTO FOOD R-URBAN METABOLISM

In the Trentino context, it was decided to start from the enhancement of awareness of producers and consumers concerning food issues, activating communication between them, keeping high the interest on these issues, and supporting a debate around these topics at city level. To connect rural and urban landscapes it is possible to work on the beliefs of consumers—by dismantling the imagination of the elitist short-chain—and to reduce the physical and governance pressure on urban and peri-urban areas, giving space to self-production models and giving a new function to urban voids (Fig. 5).

The main levels of action are:

- the governance level, acting on local food policies;
- the analysis level of flows and involvement of the population in sustainable food consumption issues;
- the food production level, introducing innovations and improvements in the system.

The mechanisms by which the food system works today can be changed by acting on the three levels separately but it would be even better to integrate them. The starting point was the creation of the “Nutrire Trento” (literally “Feeding Trento”) project through a collaboration between the Municipality and the University of Trento as part of the Unicittà Protocol in June 2017, preceded by a series of initiatives that involved local stakeholders (Forno et al. 2019). Nutrire Trento is a working table as an open and continuous discussion about experiences and visions concerning food issues and challenges for agriculture. The three main aims of Nutrire Trento are: to promote more conscious consumption patterns, to raise awareness of more sustainable production, and to shorten the distances between producers and consumers, as well as between city and countryside.

Today, Nutrire Trento is a pilot case of the SATURN project. The involved actors in these two projects are now analysing the territorial food dynamics through the study of the flows of matter and energy related to the food system. With the aim of reconnecting the countryside to the city through the production, distribution, and consumption of food, the research is developing a Food R-Urban Metabolism tool. It examines the complex relations between physical and social processes in the Trentino Alpine area aiming to connect and to enhance sustainable relations between urban and rural areas by analysing and mapping the biomass flows re-

lated to food cycles. We refer to Urban Metabolism as the “collection of complex socio-technical and socio-ecological processes by which flows of materials, energy, people, and information shape the city, service the needs of its populace, and impact the surrounding hinterland” (Musango et al. 2016). Following a review of different accounting approaches and methods, we focused on a spatial-oriented analysis merging ‘top-down’ and ‘bottom-up’ activities. They are combined with the Material Flow Analysis (MFA) as standardised accounting method.

We recognised that a ‘top-down’ approach ensures good comparability with other studies at the expense of a precise picture of the local condition and it does not include local stakeholders. For these reasons, the ‘top-down’ work has been combined with ‘bottom-up’ activities to assure a closer relationship with local stakeholders and a more precise picture of local flows. Once data has been collected, they have been used to calculate the ecological footprint of different biomass flows. Results will be compared to regional biocapacity to define which sectors have the highest resource consumption. Combining the two approaches and closing the gap with local stakeholders supports the development of locally-targeted guidelines towards a circular economy perspective.

FINAL REMARKS

Food production has a clear impact on landscape transformation: over the centuries, agricultural landscapes have changed in relation to production technologies and in connection with the relationship that society wants to set up for the production of food. The investigation on the Trento case study clearly highlights the opportunities of reconnecting the countryside to the city through the production, distribution, and consumption of food. The contribution illustrates the ongoing studies and preliminary results of the research, considering the experiences of the three case studies related to food systems and the relationship between cities and rural landscapes, and food growing. The foreseen achievements will be, on the one hand, to achieve a more comprehensive awareness about food system cycles, on the other hand, to guide and support local administrations in the adoption of more sustainable territorial planning policies by using the Food R-Urban Metabolism as decision-making support at the local level.

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FOOTNOTES

- 1 The AFNs are, for example, those food supply initiatives that are alternative to the Large-Scale Retail model, such as direct sales on farms.
- 2 It refers to physical retail markets with foodstuffs sold without intermediaries, directly from farmers to consumers.
- 3 The CSA are networks or associations of individuals who are committed to supporting one or more small or medium sized local farms, with farmers and consumers sharing the risks and benefits of food production.
- 4 The solidarity purchasing groups (GAS) are networks of consumers that link up with farmers to pursue certain fundamental values, such as product quality, dignity of work and respect for the environment.

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