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Application of the TAPE method to some farms of the Basso Isonzo Agri-landscape Park and opportunities for the urban agroecological transition of Padova Municipality

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Abstract

In 2019 FAO issued TAPE (Tool for Agroecology Performance Evaluation), a new method for the agroecological assessment, with a specific aim of measuring the agroecological transition level by comparing contexts and family farms and analysing the evolution of these contexts over time. So, it can include the totality of the aspects characterizing an enterprise choosing agroecological approaches. The aim of this tool is to design an evaluation system that could understand each element of any context being analysed, so that it could be adapted to any situation and level of transition. In Italy, considering the time of preparing this research, TAPE has not yet been used; the first objective of the research is therefore the adoption of the method for the study of two cases – farms – within a context for some years devoted to agroecology and its practices. As extremely efficient tool, TAPE could represent an important turning point in the study of agroecological practice thanks to the adaptability and the need for – relatively few – resources.

Abstract in Italian

Nel 2019 FAO presenta TAPE (Tool for Agroecology Performance Evaluation), un nuovo metodo per la valutazione agroecologica, con l'obiettivo specifico di misurare il livello di transizione agroecologica confrontando contesti e aziende familiari e analizzando l'evoluzione di questi contesti nel tempo. L'intento è quello di includere la totalità degli aspetti che caratterizzano un'impresa che sceglie l'agroecologia come metodo di lavoro (ambiente, società, economia). L'obiettivo di questo strumento è quello di progettare un sistema di valutazione in grado di comprendere ogni elemento nei diversi contesti analizzati, in modo da poter essere adattato ad ogni situazione e livello di transizione. In Italia, al momento della stesura di questa tesi, il TAPE non era ancora stato applicato; il primo obiettivo della ricerca è quindi l'adozione del metodo per lo studio di due aziende agricole – in un contesto da alcuni anni dedicato all'agroecologia e alle sue pratiche. Si tratta di uno strumento estremamente efficiente, per questo motivo TAPE potrebbe rappresentare un importante punto di svolta nello studio delle pratiche agroecologiche, grazie all'adattabilità e alla necessità di – relativamente poche – risorse.

Introduction

In the last four decades the concept of agroecology has gained importance in scientific, agricultural, and political discourse (IAASTD, 2009), during its historical evolution, agroecology has expanded beyond the scales of field, farm, and agroecosystem to include, in the last two decades, the entire food system. To date, agroecological approaches explicitly aim at transforming food and agricultural systems, addressing the root causes of the food problem, and providing long-term solutions considering the complexity of agricultural systems within their economic and ecological contexts (Petersen and Arbenz, 2018). It is for this reason that such approaches are increasingly considered as possible alternatives to the industrial model currently dominant in food production and distribution systems. The agroecological transition presents itself as a solution, but it must be thoroughly analyzed and evaluated in all its aspects. For this purpose, FAO has presented in 2019 TAPE – a Tool for the Agroecological Performance Evaluation, a system for evaluating the agroecological practice applicable to various contexts and realities. In the city of Padua two farms have decided to apply agroecological principles to their work, to produce healthy food and preserve the environment that houses them. This research aims to test the TAPE model by analyzing the effects of the latter's work and hypothesizing on possible applications of their method on a wider territory.

First part: Theoretical context, state of art and objectives of the thesis

1 Cities, food, and agroecology

1.1 Edible cities

The agriculture of the 21st century is very different from that of the previous century, as geographies, economies, and societies, have undergone transformations and evolutions. The most used terms to refer to today's agricultural practice in Europe are new post-industrial agriculture (Basile and Cecchi, 2003) and post-production (Brunori and Pieroni, 2006). This terminology identifies the presence of something new and different, and probably the bigger difference between the existing industrial agriculture and emerging post-industrial agriculture is the attitude of entrusting agriculture with other functions – not always strictly related to food production – such as the conservation of the environment and biodiversity, the maintenance of the territory, the production of alternative energy sources, social and cultural services (Ferrario, 2016). Although the crisis of the first decade of the 21st century has highlighted the growing need for food globally. The gardens and the perimeter areas of the cities dedicated to greenery and agriculture, no longer have the sole purpose of providing oxygen, recreation, and relaxation to the inhabitants of the metropolis, but have regained their primary function: providing nutrition. In a certain sense agriculture is adapting to cities, with their infrastructure and their rhythm. Is the opposite process also possible? Can cities adapt to food production? What could be the consequences of such a change of perspective? Urban food demand today is met by conventional food systems based on industrialized and global supply chains associated with environmental impacts. The implementation of sustainable food systems requires a renewal promoting the production and consumption of food "on site", a mode therefore more environmentally friendly. To achieve this goal, we must consider cities as key spaces to integrate the cultivation of green and edible vegetation (Sanyé-Mengual et al., 2018). The main strategy to solve the food problem in the metropolis seems to create "edible cities", despite the lack of a common definition in the literature, it refers to the use of urban green areas to produce healthy and free food. Such a practice would also bring a wide range of benefits to the inhabitants of cities, such as reducing the transport distance of food, carbon sequestration, the potentially reduced urban heat island effect, improvement of physical and mental health, improvement of aesthetics, community

building, job opportunities, improvement of local land prices, shortened supply chains and hence reduced price differentials between producers and consumers, supply of wildlife habitats and waste recycling (Brown and Jameton 2000; Slater 2001; Twiss et al. 2003; Hynes and Howe 2004; Pearson et al. 2010). In fact, the development of urban agriculture (and urban horticulture) is one of the main strategies adopted spontaneously in developing countries to address urban poverty and improve the well-being of urban inhabitants (Orsini et al., 2013). But what exactly does the term "urban agriculture" mean? One possible answer can arrive from the COST Action Urban Agriculture Europe (2018), scholars have defined urban agriculture in this way: "agricultural activities which take place within and around the city and which, in addition to food production, provide environmental services (soil, water and climate protection; resource efficiency; biodiversity), social services (social inclusion, education, health, leisure, heritage culture), and support local economies through a significant direct orientation to the urban market" (Lohrberg and Timpe, 2012). Specific types of urban gardens have also been identified: family gardens, educational gardens, environmental gardens, hobby gardens and aesthetic gardens (Kortright and Wakefield, 2010). In the 21st century, urban agriculture has aroused increasing interest in research, institutions and individuals; books such as *Omnivore's Dilemma* (Pollan 2006) and *Fast Food Nation* (Schlosser 2001) and documentaries such as *Food, Inc.* (Kenner 2008) not only brought convincing criticisms of the industrial agricultural system to a mainstream audience, but also widespread alternative production methods (Mok et al., 2013). So much so that urban agriculture, understood both as cultivation of their own food and purchase from local producers, has been integrated into an ideological movement of sustainable choices from the environmental and social point of view (Follett 2009; Press and Arnould 2011). This practice has been adopted primarily to counter the spread of "food deserts": areas characterized by poor access to healthy and affordable food through lack of physical capacity, financial means or knowledge (Shaw, 2006). The main causes are lack of access to supermarkets, racial/ethnic and socio-economic disparities in access to food, differences in the chain compared to non-chain stores, the cost of food, the availability of food products and the links with obesity (Franco et al. 2008; Larson et al. 2009; Schafft et al. 2009; Walker et al. 2010; D'Angelo et al. 2011). Understanding of food accessibility and food deserts has been growing over the last two decades; the location and type of food services have long been considered as important factors affecting food accessibility (Bao et al., 2020). However, these are not the only factors that limit access to healthy food; among the main obstacles – distance

to the respondent's usual grocery store, lack of transportation, hours their usual grocery store is open, price, physical disabilities, time available to go shopping, selection of items available at their usual grocery store, and the quality of items available at their usual grocery store – food prices are most common across all income levels (Wolfson, 2019). In addition, there is also a correlation between the frequent meeting of barriers to access to food and the consumption of packaged and/or frozen food. Facilitating access to healthy food is therefore not enough to bring about improvements in dietary behavior and limit the occurrence of diet-related diseases; instead, it is necessary to build appropriate skills, that allow you to know where and buy healthy food and how to prepare it (Wolfson, 2019). The solution, therefore, should be self-sufficiency according to the principle that localities should have the ability to produce or obtain at least the necessities within their physical borders. In this modern era of globalization however, it is impossible to be completely isolated, however, in the edible city, high-quality food can be provided cheap or free of charge to all population groups, which would support environmental justice (Kosack, 2016). In the case of urban agriculture, self-sufficiency corresponds to the ability to produce enough food for people living in a specific area, be it a family, a neighborhood, a city, or a region, without relying on external resources. Such autonomy would bring several economic and social benefits, including job creation in the food sector, increasing property values, reducing economic losses and empowering the community (Malakoff, 2004). To support these theses there is the virtuous example of the German cities of Andernach that in 2010, on the International Year of Biodiversity, planted and reported 101 tomato varieties in the city center to highlight the issue of gene erosion of traditional crop species (Artmann et al., 2020). With this campaign, Andernach experimented with the concept of edible cities – implemented as a top-down approach – and for this he can be considered a leader in promoting such a concept and an inspiration for other cities (Sartison and Artmann, 2020); specifically, the cities of Haar and Munich followed his example in later years. The goal of the edible city of Andernach is to grow aesthetically pleasing vegetables and fruits, such as berries, beets or kitchen herbs in the city center using public spaces; all edible plants grown in urban green spaces are offered at zero cost (Artmann et al., 2020). However, the food factor is not the only one to have suffered the consequences of this project: residents agree that they are aware of the connection between food production and the environmental impact, and that food consumption is part of their lifestyle attitude and thus feel more connected to the city. The edible city offers the opportunity for residents to participate in urban development

and to get in touch with each other and the municipal administration (Saumel et al., 2019) in this way, through the interactions between individuals and natural environments, People can live experiences that form social bonds (Raymond et al., 2010). The example of Andernach, however, must not imply that the project has been a success in its entirety or that it can be replicated without difficulty in other cities or contexts. The results in the cities of Haar and Munich were not as excellent as in Andernach and in the same pilot city not everyone appreciated the project and its effects. Artmann's research (2020) has in fact shown that, although the increase in tourism due to "agricultural interventions" in the city has been generally appreciated, many citizens did not consume products grown on public space. The main reasons were the belief that the supermarket's food was healthier than that grown in the city and the feeling that the city's edible food, as free, was only for the poorest sections of the population. However, these data must not discourage administrations and citizens, the benefits resulting from the construction of an edible city, in fact, remain an important driving force. In this regard, Artmann (2020) describes what should be the key points for an effective spread of urban agriculture:

(i) a bottom-up approach linked with a top-down perspective is necessary for the upscaling success of the concept of edible cities. Bottom-up initiatives are needed above all to create union and solidarity among citizens (Ehnert et al., 2018), but without coordinated management from above there is a risk of not getting results, but only confusion. Then there is a need for a cross-sectional view of the phenomenon that connects people with different interests (for example, technology, aesthetics, social exchange, and food) and different departments of the city (for example, greening and building department or social and health affairs) (Artmann, 2020).

(ii) Andernach is the leader for other cities in the field of edible cities; the choice of other cities to follow his example underlines how education and awareness can be important to support the spread of sustainability interventions (Boyer, 2015).

(iii) Partnerships can help accelerate the idea of an edible city. In general, interviews have shown that networking is an important social driver that is confirmed by other studies dealing with UST (urban sustainability transformation) (Ehnert et al., 2018).

(iv) In terms of instrumentalization, the integration of the unemployed in the edible city of Andernach has opened the door for public funding that

promotes long-term implementation of the edible city. In general, material resources are important factors in ensuring the success of UST initiatives (Feola and Nunes, 2014).

(v) The municipality of Andernach did not choose a conscious strategy to start the project, but preferred experimentation. The courage to experiment by the municipal administration is important for the implementation. This is in line with Bulkeley et al. (2018) who argue that transformation processes are complex and involve uncertain system mechanisms that require a flexible learning-by-doing and doing-by-learning process.

1.2 Agroecology in urban food systems

In 2020, web searches for "urban agriculture" and "community-supported agriculture" increased as the impacts of the COVID-19 pandemic on the food system became more apparent (Google Trends, 2020). In addition, urban agriculture occupies a prominent place in recent discussions on food justice, alternative food networks (AFN) and sustainable food systems. It has also begun to appear in the literature after the initiatives of Via Campesina and the Declaration of Nyéléni (Mali) in 2017, during the first global forum on food sovereignty "*The right of peoples to healthy and culturally appropriate food produced through ecologically sound and culturally appropriate methods, and their right to define their own food and agricultural systems. It puts the aspirations and needs of those who produce, distribute, and consume food at the heart of food systems and policies rather than the demands of markets and corporations*" (Nyeleni, 2007). However, it often happens that cities are considered exclusively as containers for food, rather than a context that determines specific modes of consumption and, consequently, poses challenges to the food system (Tornaghi and Dehaene, 2020). To favor the necessary agroecological transitions, urbanism, must be addressed by analyzing every aspect of life in cities. Agroecological transitions in the cities is necessary not only to create alternatives supporting agroecological farmers and communities, but also to actively dismantle the processes of oppression perpetuated in them (Holt-Giménez and Shattuck, 2011). In urban planning, this means not only creating isolated initiatives, but to systematically break speculative land markets, halt the logics of substitution at the roots of the commodification of food, place urban soil care centrally within land policies, nourish the communing of urban resources in ways allowing communities to exercise control of their social reproduction,

and more generally enable the full politicization of biopolitical relations across the spectrum, moving away from technical and functionalist approaches solely focused on food. (Tornaghi & Dehaene, 2020). Current patterns of food consumption must necessarily transform into agroecological food systems, therefore focus on the consumption of local and seasonal food and on the production of animal products in quantities that can be supported by the agroecological food system. But environmental and agronomic analysis must be accompanied by a thorough study of the processes of social reproduction and lifestyles rooted in the processes of urbanization. Decreasing the reliance on industrial ready meals in favor of fresh local agroecological food can only work if more time becomes available for cooking, if social arrangements are in place to return nutrients to the land, and if collective interdependencies contribute to the reproduction of knowledge across the sharp divide between producers and consumers. On the other side the goals of urban food sovereignty have often not been achieved by current direct consumption patterns often identified and aligned with upper-class elites and gourmets, not involved in any political commitment (Clendenning et al., 2016). Politicizing agroecological practices and acting on the processes governing social reproduction means to imprint a real program of transformation for an agroecological urbanism (Tornaghi & Dehaene, 2020). There are three main mechanisms (Tornaghi & Dehaene, 2020): i) interrupting the logic of substitution; ii) embodying an ecology of care and solidarity; iii) building enterprising communities through the empowerment of infrastructure, as the only infrastructure to be considered fundamental is soil. Agroecology is opposing the central character of actual urbanization, based on the extractive use and exploitation of natural resources, promoting the care and reproduction of the ecological conditions in which lives are lived, including urban ones (Tornaghi & Dehaene, 2020). Nevertheless, it is time to design and implement a sovereign food system that focuses on food for people, values food suppliers, localizes food systems, brings control locally, builds knowledge and skills and works with nature (Anderson, 2018).

2. Tool for Agroecology Performance Evaluation (TAPE) and the challenge of evaluating agroecological transition

The global food system is not providing what is needed to effectively address the issues of hunger and malnutrition, often insufficient agricultural livelihoods, and the environmental impact of agriculture. To address these challenges, it requires a deep and developed transformation on different scales, which allows us to approach the resolution of global issues such as: persistent malnutrition, rural poverty, increased power and concentration of agricultural and food industries, climate change, and biodiversity loss (FAO, 2018). In short, this transformation, concerning the current food system (how food is produced, processed, transported, distributed, consumed) is necessary to meet the Sustainable Development Goal 2 to end hunger and all forms of malnutrition by 2030. Sustainable agriculture is the main key to achieving this objective, but the issue must be analyzed from a variety of points of view, since productivity must be associated with environmental and social issues (Tittonell, 2014). The key to solving these problems has been identified in the so-called agroecological transition. A substantial change can be implemented with relative ease, however, to define it as sustainable it is necessary the change is perpetuated temporally (for a period) and spatially (in a specific geographical location) (Marsden, 2013). Moreover, the term transition must include the political, socio-cultural, economic, environmental, technological, practical, institutional and value spheres, which lead to more sustainable modes of production and consumption (Marsden, 2013).

2.1 Defining agroecological transition

To examine sustainable transitions, a multi-level perspective was used. This shows how dynamic processes and transversal interactions can support a transformative change in the whole system, but also what power relations issues push to change or establish locks. The 2019 HLPE Report (*Agroecological and other innovative approaches: for sustainable agriculture and food systems that improve food security and nutrition*) noted that innovation in sustainable food systems requires (i) inclusive and participatory forms of innovation governance; (ii) co-production and sharing of information and knowledge between communities and networks; and (iii) Responsible innovation that directs innovation towards social issues (HLPE, 2019). In the "*Final Report for the International Symposium on Agroecology for Food Security and Nutrition"* (2014) FAO identifies a set of practices necessary for change:

- move from continuous nutrient management to a nutrient recycling model, with increased dependence on natural processes such as biological nitrogen fixation and mycorrhizal relationships
- use renewable energy sources instead of non-renewable sources
- eliminate the use of non-renewable inputs, off the farm, which could harm the environment or the health of farmers, farm workers or consumers
- when it is necessary to add materials to the system, use naturally occurring materials instead of synthetic and manufactured inputs
- manage unwanted pests, phytopathologies and herbaceous species instead of "controlling them"
- restore the biological relationships that can occur naturally in the farm instead of reducing and simplifying them

However, to start and lead an agroecological transition, in-depth knowledge and a specific working method are required. Today, the method to which every study related to the agroecological transition refers is based on a five-level system (Gliessmann, 2007). The system identifies five levels – the first two incremental, the remaining transformational – that allow to give an objective and recognizable assessment to the analyzed context, from an agroecological point of view. The contexts (or companies or communities) in which there are virtuous examples of agroecological practices effectively implemented will reach the highest levels, while those linked to a traditional production system will stop at the first. This system was presented in the 2014 symposium (*Table 1*). The first level focuses on improving resource efficiency through practices that reduce or eliminate the use of costly, non-renewable, scarce, or environmentally damaging inputs. In the second level, alternatives to chemical inputs are foreseen to rely more on ecological processes, exploiting, for example, the co-existing biota (such as the plant microbiome or natural enemies) or genetic characteristics (as biotic stress resistant/tolerant cultivars) to improve plant nutrient absorption, stress tolerance and defenses against pests and diseases. Level 3 aims to redesign the agricultural system to strengthen its resilience, through diversification, recycling, better land management, self-sufficiency, and the reduction of dependence on purchased inputs. One example is the enhancement of diversity in the structure and management of farms with diversified rotations, multiple crops, agroforestry and (re)integration of animals and crops. Transition levels 4 and 5 expand the scope of the

analysis to include the entire food system. Level 4 aims at reconnecting producers and consumers through alternative food distribution networks such as farmers' markets, community-supported agriculture, or Fair Trade in food, helping to ensure equity/social responsibility. Finally, level 5 involves building a new global food system that is not only sustainable, but also helps restore and protect Earth's life-support systems. The goal is to design food systems that guarantee FSN for everyone, now and in the future, in a sustainable way.

Level	Scale	Role of agroecology		
		Ecological research	**Farmer Practice and Collaboration**	**Social Change**
1 Increase efficiency of industrial practices	Farm	**Primary**	**Important** Lowers costs and lessens environmental impacts	**Minor**
2 Substitute alternative practices and inputs	Farm	**Primary**	**Important** Supports shift to alternative practices	**Minor**
3 Redesign whole agro-ecosystems	Farm, region	**Primary** Develops indicators of sustainability	**Important** Builds true sustainability at the farm scale	**Important** Builds enterprise viability and societal support
4 Re-establish connections between growers and eaters, develop alternative food networks	Local, regional, national	**Supportive** Interdisciplinary research provides evidence of need for change and viability of alternatives	**Important** Forms direct and supportive relationships	**Primary** Economies restructured; values and behaviours changed
5 Rebuild the global food system so that it is sustainable and equitable for al	World	**Supportive** Transdisciplinary research promotes the change process and monitors sustainability	**Important** Offers the practical basis for the paradigm shift	**Primary** World systems fundamentally transformed

Table 1. "5 level of agroecologica transition and actors" (FAO, 2014)

This system highlights the importance not only of the choices of producers but also the role of civil society, social movements, and consumer organizations, as fundamental to ensure transitions. The strong involvement of policymakers and decision-makers at local, regional, national, and supranational levels, as well as farmers' organizations, supply chain operators and agroindustry is necessary to facilitate an agroecological transition (IPES-Food 2018). The interaction and synergies between the specific context, local knowledge, and academic science, as well as social and institutional innovation, play a crucial role in catalyzing and supporting an epistemic transition. This includes the creation of stronger markets for agroecologically grown food, the development of social solidarity economies, the push for agroecological procurement

by institutions, the shift of public awareness and the development of inclusive governance mechanisms that support an agroecological transition.

2.1.1 Elements and principles

The definition of the five levels of agroecological transition comes from the analysis of the results of two initiatives: the definition and collection of a series of constituent elements of agroecology to frame and structure the commitment of FAO member countries in this field of work (FAO, 2018); and the vast literature review on concepts, definitions and principles of agroecology considering the three manifestations of agroecology as science, a set of practices and a social movement. FAO (2018) has identified the ten interrelated and interdependent elements of agroecology with the aim of driving the transition to sustainable agriculture and food systems. The identification process took place through three phases carried out from 2015 to 2019, corresponding to the collection of information, their synthesis, and the approval of the results by FAO. The ten elements are: diversity, synergies, efficiency, resilience, recycling, co-creation and sharing knowledge (for the description of the common characteristics of agroecological systems and fundamental practices and approaches to innovation); human and social values, culture, and food traditions (identified as characteristics of the context); responsible governance, circular economy, and solidarity (to analyze the enabling environment). Specifically, the elements are defined as follows:

ELEMENT	DEFINITION
Diversity	diversification is the key to agroecological transitions to ensure food security and nutrition, preserving, protecting, and enhancing natural resources.
Co-creation and sharing knowledge	Agricultural innovations respond better to local challenges when they are co-created through participatory processes.
Synergies	The creation of synergies improves the key functions of food systems, supporting production and multiple ecosystem services.
Efficiency	Innovative agroecological practices produce more by using fewer external resources.
Ricycling	More recycling means agricultural production with lower economic and environmental costs.
Resilience	Increased resilience of people, communities and ecosystems is key to sustainable food and agricultural systems.
Human and social values	Protecting and improving rural livelihoods, equity and social welfare are essential for sustainable food and agricultural systems.
Culture and food traditions	By supporting healthy, diverse, and culturally appropriate diets, agroecology contributes to food security and nutrition while maintaining the health of ecosystems.
Responsible governance	Sustainable food and agriculture require responsible and effective governance mechanisms at different scales - from local to national to global.
Circular and solidarity economy	reconnects producers and consumers and provides innovative solutions to live within our planetary borders while ensuring the social foundations for inclusive and sustainable development.

Table 2. 10 elements of agroecology (FAO, 2018)

These ten elements are based on the seminal scientific literature on agroecology (in particular: Altieri, 1995; Gliessman, 2007) and on the broad and inclusive dialogue between stakeholders, States, Intergovernmental Organizations, and private actors, held globally, regionally, and nationally since the first FAO International Symposium on Agroecology in 2014. For the identification of the principles instead the process was different: the set of 13 principles was developed through a three-step iterative process – selection, articulation, and combination – during the drafting of the report HLPE (Hight Level Panel of Expert) for Committee on World Food Security (CFS), regarding "Agroecological and other innovative approaches for sustain Able agriculture and food systems that enhance food security and nutrition" (HLPE 2019). The aim of this report was to inform policy discussions and to improve understanding of the ways in which agroecology can be used by civil society, governments, the private sector, and other groups to address global food security and nutrition through the development of sustainable food systems (Wezel et al., 2020). These are organized around the three operational principles for Sustainable Food System, such as improving resource efficiency, strengthening resilience, and ensuring equity/social responsibility. In truth, several examples of agroecological principles have been identified in the literature of the last thirty years. Some of these principles refer more specifically to the promotion of ecological processes and services, including aspects of soil, water, air, and

biodiversity. These include: (i) biomass recycling; (ii) enhancement of functional biodiversity; (iii) provision of soil conditions conducive to plant growth; (iv) minimization of losses; (v) diversification of species and genetic resources in the agroecosystem; and (vi) improvement of beneficial biological interactions and synergies. For agroecological practices involving animals, Dumont et al. (2013) added other more specific animal production principles (*Table 3*), such as (i) adopting management practices to improve animal health, and (ii) improving diversity within animal production systems to enhance their resilience. Peeters and Wezel (2017) have defined specific agroecological principles for grass-based farming systems. Stassart et al. (2012) and Dumont et al. (2016) added further socio-economic principles for agroecology related to social equity, democratic governance, collective knowledge creation, financial independence, market access and autonomy and diversity of knowledge and experience (Wezel et al, 2020). All the principles correspond to one or more elements of the FAO (*Table 2*) and, while they are formulated generically, in practice, they are applied locally, generating a diversity of agroecological practices adapted to local circumstances. For this reason, the principles are relevant both for the transition of agricultural and food systems to the achievement of global food and nutrition security and for the construction of the resilience of agriculture by adapting to climate change.

PRINCIPLE	SCALE OF APPLICATION	CORRESPONDENCE TO FAO ELEMENTS
1. Recycling. Preferentially use local renewable resources and close as far as possible resource cycles of nutrients and biomass.	FI, FA	Recycling
2. *Input reduction*. Reduce or eliminate dependency on purchased inputs and increase self-sufficiency.	FA, FS	Efficiency
3. *Soil health*. Secure and enhance soil health and functioning for improved plant growth, particularly by managing organic matter and enhancing soil biological activity.	FI	Reflected in diversity, synergies, and resilience
4. *Animal health*. Ensure animal health and welfare.	FI, FA	Reflected in resilience
5. *Biodiversity*. Maintain and enhance diversity of species, functional diversity and genetic resources and thereby maintain overall agroecosystem biodiversity in time and space at field, farm, and landscape scales.	FI, FA	Part of diversity
6. *Synergy*. Enhance positive ecological interaction, synergy, integration, and complementarity amongst the elements of agroecosystems (animals, crops, trees, soil and water).	FI, FA	Synergies
7. *Economic diversification*. Diversify on-farm incomes by ensuring that small-scale farmers have greater financial independence and value addition opportunities while enabling them to respond to demand from consumers.	. FA, FS	Parts of diversity as well as circular and solidarity economy
8. *Co-creation of knowledge*. Enhance co-creation and horizontal sharing of knowledge including local and scientific innovation, especially through farmer-to-farmer exchange.	FA, FS	Co-creation and sharing of knowledge
9. *Social values and diets*. Build food systems based on the culture, identity, tradition, social and gender equity of local communities that provide healthy, diversified, seasonally and culturally appropriate diets Human and social values	FA, FS	Culture and food traditions
10. *Fairness*. Support dignified and robust livelihoods for all actors engaged in food systems, especially small-scale food producers, based on fair trade, fair employment, and fair treatment of intellectual property rights.	FA, FS	Part of human and social values
11. *Connectivity*. Ensure proximity and confidence between producers and consumers through promotion of fair and short distribution networks and by re-embedding food systems into local economies.	FA	Part of circular and solidarity economy
12. *Land and natural resource governance*. Strengthen institutional arrangements to improve, including the recognition and support of family farmers, smallholders, and peasant food producers as sustainable managers of natural and genetic resources.	FA, FS	Responsible governance
13. *Participation*. Encourage social organisation and greater participation in decision-making by food producers and consumers to support decentralised governance and local adaptive management of agricultural and food systems.	FS	Part of human and social values

Table 3. 3. Consolidated set of 13 agroecological principles, their scale of application and correspondence to FAO elements of agroecology. FI, field; FA, farm; agroecosystem; FS, food system.

2.2 MESMIS: evaluation of transition before TAPE

The growing political interest in agroecology offers the opportunity to spread and institutionalize this practice. To make this possible, however, it is necessary to have real evidence of the effectiveness of this approach. To obtain such evidence, evaluation is the most appropriate method. An efficient means of evaluation can record concrete data on the results obtained from agroecological work and the possibilities that it can offer. In addition, an accurate assessment makes it possible to plan concrete sustainability objectives, which can be reached by available resources and in the shortest period. Demonstrating what has already been done and what can be done should be the focus of an evaluation system, as it would make the agroecological transition on a small and large scale easier. In 1995 the project MESMIS (Marco para la Evaluación de Sistemas de Manejo de Recursos naturales incorporating Indicadores de Sustentabilidad) was launched in Mexico. The main motivation behind the development of a new approach has been the critical need for new indicators to assess the relative sustainability of conflicting production systems, those of the rural sector in developing countries (Lopez-Ridaura et. Al., 2002) and translate the general principles of sustainability into operational definitions and practices. The approach provides guidance in the selection of specific environmental, social, and economic indicators focusing on the important characteristics that guide the performance of Natural Resource Management Systems (NRMs) in the agricultural sector, which have always been widely underestimated. MESMIS replaces long lists of indicators and fixed models that do not fit into the analysed contexts and the actors that are part of them, with a framework for the derivation, measurement and monitoring of sustainability indicators as part of a system, Participatory, interdisciplinary, and flexible evaluation process, adaptable to different levels of data availability and local technical and financial resources (Lopez-Ridaura et. Al. 2002). The framework is based on certain assumptions, sustainability is defined by seven general attributes: productivity, stability, reliability, resilience, adaptability, equity, self-sufficiency. Sustainability assessments shall only be valid for a specific management system in each geographical location, a previously defined spatial scale, and determined period. Evaluation is a participatory process that requires an evaluation team with an interdisciplinary perspective, involving external evaluators and internal participants. Sustainability cannot be measured alone, it can be seen through the comparison of two or more systems, which can be performed transversely or longitudinally. Attributes (properties) must be accurately identified to define a system

of evaluation and a set of consistent and effective indicators. The set of general sustainability attributes contributes to ensuring a compact and coherent set of indicators. The first step is to choose the Natural Resource Management System to be evaluated, indicating the unit of analysis, the spatial and temporal scales, and the socio-environmental context. Subsequently, specific critical aspects related to the sustainability of the system are identified, which help the general attributes of sustainability. These critical characteristics could be environmental, social and/or economic. Finally, diagnostic criteria and indicators are defined for each evaluation area, which can be easily traced back to the different attributes of sustainability (*Figure 1*). This procedure shall ensure a coherent relationship between the sustainability indicators and the overall attributes of the sustainable NRM.

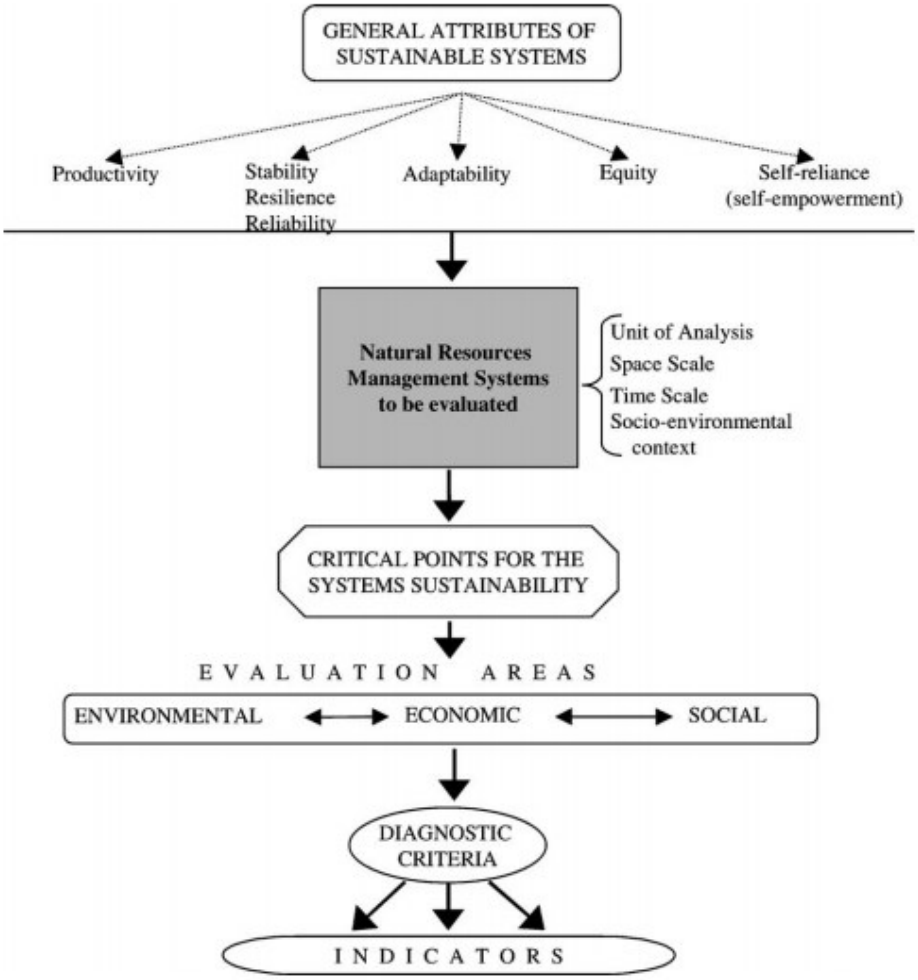

Figure 1. MESMIS evaluation framework (Lopez-Ridaura et. Al. 2002)

The operational structure of MESMIS is designed as a six-phase cycle. The first three phases are dedicated to the characterisation of systems, the identification of critical points and the selection of specific environmental, social and economic indicators. In the last three, the information obtained through the indicators is integrated using quantitative and qualitative analysis techniques, which allows to obtain a value judgement for the evaluated MRI and to suggest ways to improve the environmental profile of those systems. These suggestions and recommendations trigger a new evaluation cycle that begins to re-characterise the system (Lopez-Ridaura et. Al. 2002) (*Figure 2*).

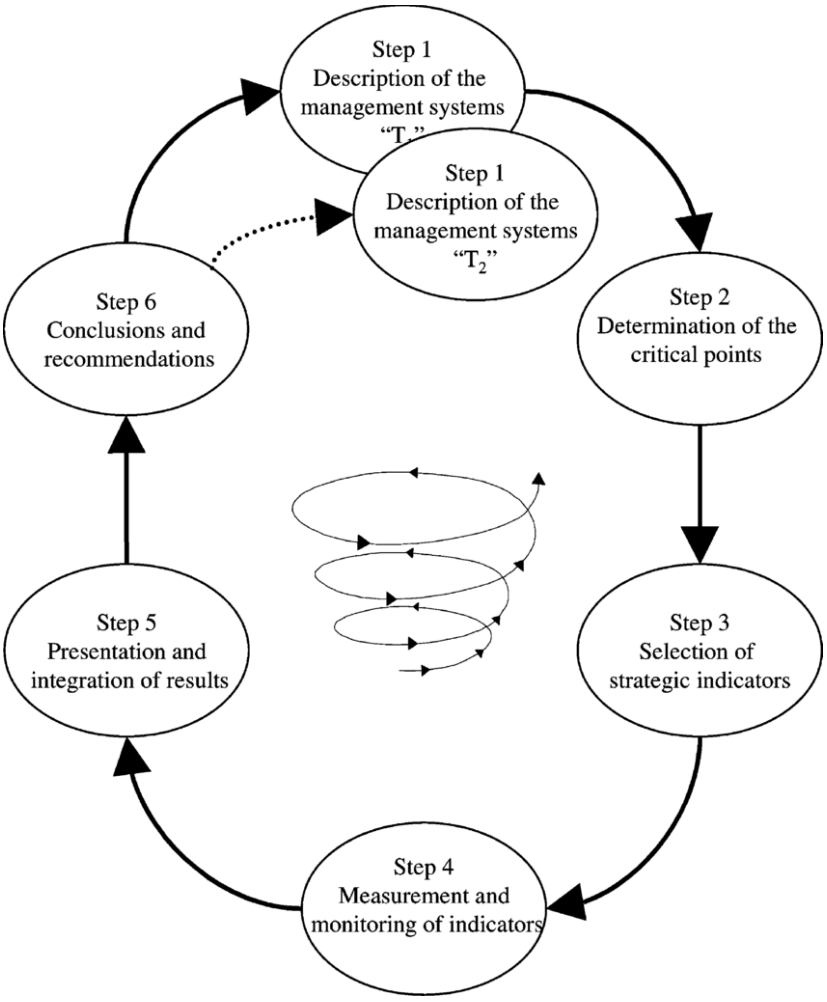

Figure 2. MESMIS process cycle (Lopez-Ridaura et. Al. 2002)

The first step concerns the "Definition of the object of assessment", this phase includes the identification of the management systems under consideration and their socio-environmental context, including the spatial and temporal scope of the assessment, the characterisation of the reference management system in the region and the

alternative systems. The second step is the "Determination of the critical characteristics of the system", that are those aspects that improve or limit the attributes of the system. Some key questions involved in identifying critical points include: What makes NMR vulnerable? What problems does it present? What are the strongest and most important features of NMR? These characteristics, or critical points, exist as environmental, technical, social, or economic factors or processes that, isolated or in combination, have a critical impact on the survival of the management system. Phase three, "Selection of strategic indicators", provides for a two-tier approach. First, a set of diagnostic criteria is defined that serve as the necessary intermediate link between attributes, critical points, and indicators, enabling a more effective and coherent assessment of sustainability. Indicators can then be identified and selected. The set of indicators derived from the assessment of NRMS should cover the seven sustainability attributes as well as the social, economic, and environmental dimensions. The phase ends with a further selection with the aim of generating a set of measurable or estimated strategic indicators. As suggested by De Camino and Muller (1993), the final set of indicators should be solid but not necessarily exhaustive, namely, to include only indicators that reveal critical features of the NRM under consideration. The fourth phase concerns the "Measurement and monitoring of indicators", in this phase the focus is on data collection procedures that allow the monitoring of processes at a given time. Measurement techniques include a wide variety of tools: review of literature on regional environmental characteristics, access to meteorological databases and compilation of historical data on crop yields; direct measurement; development of monitoring devices in the company; construction of a matrix of technical coefficients to obtain the desired technical characteristics for each system; simulation models to determine the expected long-term behaviour of a system’s returns; comprehensive review of the literature on regional socioeconomic characteristics; surveys of institutions and households; open and semi-structured open interviews with farmers, key community members and project staff; field participatory group techniques, workshops and farm visits. Experience with MESMIS case studies shows that a good evaluation process requires at least two cultivation cycles and a combination of techniques. Furthermore, while the MESMIS framework provided sufficient flexibility to adapt to different levels of financial and technical resources available, evaluation projects with sufficient funding and a balanced assessment team often achieve greater precision in the analysis. The next step is the "Synthesis and integration of the results", at this stage the results obtained through the monitoring of the indicators are

summarized and integrated. Quantitative procedures have been used to complement the results, which are well developed and allow a detailed analysis of complex situations, but usually require advanced training in statistics and mathematics; quality, often easier to use even if often their graphic presentations are attractive but of dubious quality; or mixed. One tool that has proved useful to integrate and monitor graphically the different indicators is the AMOEBA diagram (Brink Ten et al., 1991). This diagram shows, in qualitative terms, the extent to which the objective has been achieved for each indicator and allows a simple but complete graphical comparison of the advantages and limits of the evaluated management systems. The final phase concerns "conclusions and recommendations", phase six summarizes the results of the analysis to assess the comparison between different systems in terms of sustainability. With the help of graphic techniques, the evaluation teams discuss and analyse the main limitations and possibilities of reference and alternative systems to strengthen them. This phase is also the phase in which to reflect on the evaluation process itself and to present strategies and recommendations for starting a new evaluation cycle under qualitatively different conditions.

2.3 TAPE (Tool for Agroecology Performance Evaluation) state of art and applications

The literal meaning of the acronym TAPE is "Tool for agroecology performance evaluation" and aims to be a comprehensive analytical framework, as well as a multi-level agroecological performance evaluation approach. The general objective of the framework is the collection and categorization of concrete evidence on the performance of agroecological systems in several sectors – environmental, socio-cultural, economic, food - supporting sustainability policies and programs for agroecological transitions on different scales, places, and times. FAO has set the following objectives with the development of the TAPE methodology: (i) building global knowledge and empowering producers through collective data production processes and evidence of their practices. (ii) Support agroecological transition processes at different scales and locations by proposing performance diagnostics over time and identifying strengths and weaknesses and specific threats or opportunities. (iii) Inform administrations and institutions of development by creating references to the multidimensional performance of agroecology and its potential to contribute to the SDGs. For the development of TAPE, FAO relied on existing frameworks, starting from

MESMIS tool (Marco para la Evaluacíon de Sistemas de Manejo de recursos naturales incorporating Indicadores de Sostenibilidad), which provides principles and guidelines for derivation, the quantification and integration of context-specific indicators through a participatory process involving local actors. The MESMIS assessment cycle - and consequently the TAPE evaluation cycle - is characterized by an inextricable link between system evaluation, system design and system improvement (FAO, 2019). During the development of TAPE, the analyses focused on the indicators already used for the evaluation of agroecological processes and on the practices for the promotion of sustainable agriculture; Subsequently, new indicators have been developed that can be adapted to specific contexts. In October 2018, during an international conference in Rome, a team of experts met to discuss the data emerged from the survey and define a first draft of the indicators. Less than a year later, the method was applied to case studies to assess its potential and efficiency, and then presented in regional workshops (FAO, 2019). During the participatory development process, 20 principles (*Table 4*) for the development of the analytical framework were established, which were validated and completed during the international expert workshop.

1	Build as much as possible on the strengths of existing frameworks, tools, methodologies, initiatives, and data.
2	Be widely applicable, balancing the need to measure the holistic (but not exhaustive) nature of agroecology and its context specificity.
3	Be theoretically robust but operationally flexible to be adaptable to specific contexts across all agricultural production systems and sectors.
4	Measure key data, minimizing the cost of data collection, especially the burden on producers in providing data.
5	Be tested by relevant partners for review, validation, and further adaptation.
6	Be developed and applied in a participatory manner that includes governments, researchers, civil society, producers, and consumers' organizations engaged in agroecology.
7	Generate evidence for agroecology that can be used by stakeholders at local, national, and global levels to advocate for public policies and financial support. By analyzing the impacts of agroecological systems, the results should also be useful at the territorial level (e.g., in developing and monitoring community responses and projects).
8	Collect data that focus on the farm/household and community/territorial levels as a priority but allowing for aggregation at higher level.
9	Build a long-term partnership for data-collection, including investments in capacity development at the local level.
10	Draw on and combine different sources of knowledge, including knowledge from science and practice that includes qualitative and quantitative data at different spatial and temporal scales.
11	Apply a socio-ecological systems approach that can address integrated production systems (crops-livestock-trees-fish).
12	Include a limited number of core criteria with flexible indicators based on agreed dimensions that are universally relevant and that are necessary for a coherent and global assessment of agroecological systems.
13	Use criteria and indicators that allow the characterization of agroecological levels of transition and assess key performance of agroecological systems.
14	Include performance indicators that reflect the contribution of agroecology to the SDGs to engage policymakers.
15	Ensure that the characterization of agroecological systems identifies local reference values to compare agroecological and other systems based on the 10 Elements of Agroecology.
16	Disaggregate data by age, gender and diversity of producers, when possible, as well as location and time.
17	Simplify the indicators as much as possible and involve producers in data collection; 'Citizen Science' can be complemented by other methods.
18	Highlight the contribution of agroecology to global challenges and trends, especially food security and nutrition, climate change adaptation and mitigation, biodiversity, and land degradation.
19	Include key enabling/disabling factors to the agroecological transition.
20	Analyse trade-offs and synergies between the 10 Elements and between SDGs.

Table 4. Founding principles of the analytical framework of TAPE (FAO, 2019)

The TAPE evaluation process is based on two basic steps (1 and 2) supplemented by a preliminary description of the context and systems (phase 0), with the inclusion of an optional typology (phase 1a) and a final analysis and participatory interpretation of the

results (Phase 3) (FAO, 2019). Phase 0 should be conducted at Community or territorial level, as well as at farm or family level, because the processes necessary for the agroecological transition involve generally wide contexts. Once the context and production systems have been described based on primary and secondary information (Step 0), the Characterization of AgroEcological Transitions (CAET, Step 1) provides a description of the current state of the transition level to agroecology of the evaluated systems. This description is based on the 10 Elements of Agroecology proposed by FAO and can be completed as a self-assessment by producers or as a guided exercise with other intermediaries. Depending on the number of systems evaluated in the same relative proximity it is possible to establish a type of transition. The performance of the system is then assessed based on a short list of key performance criteria (phase 2), also based on a farm or household level survey; most of these criteria are directly linked to the SDG indicators. Finally, an analysis of the results of the phases and a participatory interpretation of this analysis is carried out (phase 3). The results of the CAET and the identification of strengths and weaknesses in the evaluated systems may be related to the context of Phase 0. In turn, the performance assessed in Phase 2 shall be analyzed in the light of the results of the CAET: the links between strong (or weak) agroecological elements may be related to good (or poor) performance.

2.3.1 Steps

The approach applied by TAPE can be defined as gradual, articulated in consecutive phases. Step 0 corresponds to the context description. Step 1, also called CAET, (Characterization of AgroEcological Transition) corresponds to the analysis of the agroecological transition level evaluated through the 10 elements of FAO agroecology. In step 1 you can add step 1bis, necessary if you want to achieve a more specific characterization. The evaluation implemented during step 2 is linked to the SDGs (Sustainable Development Goals) (FAO, 2018). Step 3, the last one, focuses on the discussion and sharing of the results of the previous steps, between researchers and stakeholders. All phases, except for phase 3, are developed through a questionnaire mainly closed questions – only in phase 0 is the space for dialogue, for the description of the context. The FAO report indicates a total of four hours required to complete the questionnaire, which can be carried out independently or through an analysis led by the researcher. In this case the interviews were held in presence for most of the cases. The choice of this mode is due to the need to concretely test the usability of the tool by

the participants and to know the context in as much depth as possible. All indications on the use of the TAPE tool are given in the compendium "TAPE Tool for Agroecology Performance Evaluation 2019 - Development process and application guidelines. Trial version" (FAO, 2019)

Step 0 – Description of systems and context

This phase can be considered as a preamble to the evaluation of the agroecological transition. This is a description of the context in which agricultural holdings are included from an economic, environmental, and social point of view. Among the issues investigated at this stage are the physical characteristics of the area, legislation concerning land ownership, production systems in the region, etc. Attention is paid to the threats and opportunities that could affect the progress of the transition. This first phase of the survey works on different scales (farm, but also community) and for this reason phase 0 can be completed with the participation of a multitude of different actors (NGOs, community groups, government agents). The semi-structured consultation is the recommended way to conduct this part of the research; this allows to obtain a wide range of information from the different stakeholders, and then to know precise data from each sector.

Step 1 – Characterization of AgroEcological Transition (CAET)

Phase 1 is to characterize the level of transition to agroecology of agricultural systems based on the 10 Elements of Agroecology proposed by FAO and supported by its governing bodies (FAO, 2018). The 10 elements are used as criteria to define semi-quantitative indices that take the form of descriptive scales with scores from 0 to 4 (a modified Likert scale) (FAO,2019). For each element some questions are asked (3-4), all closed, with the possibility to choose as answer only one of the five options proposed. Each option is associated with a rising score (0 to 4 points). Once the CAET has been completed, the scores for each element are calculated. Index scores are summed (for example 2+3+3+4=12) and totals are standardized on a scale from 0 to 100 percent (12/16=75 percent) to get the overall score for the element. The same procedure is repeated for each element. When the calculation is completed for each element, the overall results of each element are represented through a radar-type diagram. Scores can be used for quick comparisons to reveal differences between systems in terms of degree of transition to agroecology; but they can be useful in supporting reflection and fostering the exchange of knowledge and practice between

peers - for example, the deficiencies of a company can be filled thanks to the exchange with another company that in that field has obtained a higher score. Generally, systems with a high score in each of the ten elements are broadly embedded in an agroecological process, thus at a good transition level. Nevertheless, it is possible to assign each element a "specific weight", which can vary from one element to another. This would provide an opportunity to reflect on the shortcomings or specificity of the elements in that context. In any case, this weight differentiation should be applied once it reaches stage 3, not before. The CAET can be completed by a meeting with the farm or by consulting databases if there have been previous characterizations.

Step 1Bis (optional) – Transition typology

Phase 1bis is necessary if many units present in the same territory collection very similar scores, forming a relatively homogeneous group. For this reason, before proceeding with step 2, it is decided to simplify the sample by further characterization. The aim of this operation is (i) to identify common models that can help to better guide development policies or actions, and (ii) to reduce the wide diversity of situations that can be found on the ground in certain manageable types or categories, from which case studies and performance criteria can be carried out using the next step of the evaluation (FAO, 2019).

Step 2 – Core performance criteria

This phase consists of evaluating the performance of systems (e.g., farms, households, territories) on key dimensions considered relevant to sustainable food and agriculture and to achieve the Sustainable Development Goals (SDGs). Key dimensions were identified during the International Expert Workshop on the Multidimensional Assessment of Agroecology (FAO, 8-9 October 2018, Rome). They have been described as priority areas of work for policy makers to make food and agriculture more sustainable (FAO, 2019). These key dimensions are strategic for framing the evaluation results and communicating them in order to inform policy processes: environment and climate change, health and nutrition, society and culture, economy, governance. This phase must be intuitive enough to be completed independently and without too much difficulty by farmers. To simplify the completion of this phase, a generalist approach has been adopted: ten criteria have been identified, which were considered essential to obtain a clear analysis of agroecological performance. The criteria are secure land tenure (or mobility for pastoralists);

productivity (and stability over time); income (and stability over time); added value; exposure to Pesticides; dietary diversity; women's empowerment; youth employment; agricultural biodiversity; soil health (FAO, 2018). This short list of key criteria is not intended to be exhaustive in the assessment of sustainability. Overall, however, the 10 basic criteria represent an innovative multidimensional framework of qualitative and quantitative criteria for agriculture that goes beyond performance measurement based on one or a few indicators (e.g., yield, income). It is essential, however, that systems are evaluated using all 10 fundamental criteria to create reliable data on the multidimensional performance of agroecology and to explain the performance related to the results of the CAET. Results are intended to populate a global public database developed by FAO that will allow further analysis and identification of priorities for countries and regions, but also for producers and communities. To meet the potential need for additional criteria, the shortlist shall be supplemented by a set of additional criteria, if time and resources permit. These additional criteria, called "advanced criteria", can, for example, respond to specific local priorities or the needs of a particular project. They may also require more advanced methodologies and thus not be easily implemented within families and/or communities. Several advanced criteria have already been identified in the development process of this analytical framework: resilience, food security and nutrition, decent work, water, climate change mitigation. These additional criteria are summarized in the compendium "TAPE Tool for Agroecology Performance Evaluation 2019 - Development process and guidelines for the application. Trial version" (FAO, 2019). Once all the data of the phase is collected, a semaphore approach is adopted to evaluate the level at which the company is positioned:

Green: desirable

Yellow: acceptable

Red: unsustainable.

This approach allows the identification, for each theme, of conditions of critical unsustainability (red), conditions that can be considered desirable (green) and, in the middle, intermediate conditions that are considered acceptable but should improve (yellow).

Step 3 – Joint analysis of Step 1 and 2 and participatory interpretation

Once Steps 0, 1 and 2 are completed and data collected, unified but diversified data will be available for a given unit that will include context and enabling environment data, the current state of the system about the 10 elements of agroecology and its performance compared to the 10 basic criteria. The analysis of the results to highlight the strengths and weaknesses of the system can lead to the identification of compromises or synergies between the elements of agroecology and between the dimensions of sustainability. This last phase should be conducted in a participatory manner with the community to (1) verify the adequacy and performance of the framework; (2) confirm/review the analysis (including sampling and up-scaling from farm to land and thresholds used in phase 2) and identifying synergies and compromises; and (3) designing possible roads forward in time, potentially using the tool to monitor progress. This step should include:

- The review of the CAET results (Phase 1) and how the context and enabling environment collected in Phase 0 can help explain these results, as well as a discussion on the possible weighting of indices within each element to highlight critical aspects in the analysis to ensure contextualized relevance.
- The review of the results of the performance criteria and how the data collected in stages 1 and 0 can help explain these results, as well as a discussion of the thresholds applied to each of the criteria for the "traffic light" approach.
- The review of the aggregation of the results at farm level for a territorial analysis and the sampling method chosen.
- Analysis of how the results of the performance criteria can help inform the SDG indicators at a more territorial and national level: are the results in line with the country reporting or are they different? show synergies (similar performance for different criteria that can be explained with the same scores in the CAET) or compromises (high performance within one criterion seem to be linked to poor performance within another and driven by the same CAET scores).
- Identifying ways to improve performance by increasing scores in the CAET and moving towards a more advanced stage in the agroecological transition.

3 Objectives of the thesis

The objective of the thesis concerns the application of TAPE in the territory of Basso Isonzo, a district of the municipality of Padua and the consequent reflections on urban agroecological transition. This research, when planned, was the first application of TAPE in an Italian context. For this reason, it can be considered a test, necessary to understand the possibilities of TAPE and its possible limits. The most important issue in the application is the adaptability of the methodology to the physical territory and to the socio-economic context; the ease of use for the researcher and stakeholders; the expected results. TAPE will also be used to know the context of the Basso Isonzo area and plan for its future. TAPE will investigate the agroecological work carried out by two farms of the Basso Isonzo area and identify the level of agroecological transition achieved by them. This research will allow reflection on future strategies for the adoption of the agroecological approach the municipality of Padua and address issues related to the relationship between cities and sustainable food production.

Second part: Methodology and case study

4. Methodology, data collection and management

4.1 Applying TAPE (Tool for Agroecology Performance Evaluation)

The first three phases of the TAPE methodology – namely steps 0, 1, and 2 – are structured in the form of a questionnaire. Although FAO has provided a comprehensive and exhaustive list of questions and answers, it was necessary to make some changes. In most cases, these changes were necessary to make the questionnaire more suitable for the research context and thus to obtain more effective answers. The changes made do not affect the original structure nor the issues addressed by the original one. In step 0, dedicated to context analysis, I chose to replace some of the questions using a specific terminology more suited to the Western and Italian context. These questions have been chosen from those presented in the “Documento di indagine sulla struttura e produzioni delle aziende agricole – questionario di azienda agricola” prepared by Istat in 2016. More appropriate sector terminology was needed to analyze land ownership and land management issues. Step 1 (CAET) remained unchanged. The questions of this phase are divided into ten sections, one for each element of agroecology, and for this reason large variations are not possible. Anyway, I found no difficulty in addressing this part and therefore I did not need to make any changes. In step 2 I made the most important changes, because the original questions would not have been appropriate to the context analyzed and would also have been not easy for farmers to deal with. The sections on which I had to intervene most are the sections "Youth employment and emigration", and "Women’s emancipation". In the model prepared by FAO, the issue of youth is understood as the removal/emigration from villages/regions of people under the age of 18; an analysis in this sense would have been impossible to conclude in this case. For this reason, these questions have been replaced with some related to the theme but focused more on: young people’s desire to work the land, relationship with the land worked by young people, agricultural systems chosen by the younger generations in comparison with those chosen by the preceding generations. In the FAO Compendium (2019) it is reported, among the indications for the application of the method, that the phases of the questionnaire then 0, 1, and 2 can be carried out within 4 hours online or in presence through a compilation session guided by the researcher; in this case I chose to fill in the questionnaire together with the farmers for two main reasons. The first is linked to the place where the farms are located, being present on site has allowed me to know more deeply the

environmental and social context and to understand the motivations that push farmers to perpetuate this kind of work. The second reason is directly linked to the questionnaire. This being a trial never adopted in such a context I preferred to be present at the filling, to dispel any doubts or concerns. The choice resulted appropriate because in part the questionnaire proved to be complex or misleading. Some applications took longer to complete: the precise figures of annual or seasonal production were not easy for producers to summaries. I met the farmers twice to fill out the questionnaire, all the farmers were available to solve my doubts or to help me in managing the data at any time of writing the thesis, maintaining a constant and profitable contact. During the first meeting (9th of Semptember 2021) we discussed the TAPE method and the main aspects of the agroecological method applied in the agricultural production of the Basso Isonzo. On this occasion I was able to know in depth the territory and the context in general. The compilation, however, was not complete enough, so I decided that I would come back a second time (27th of January 2022) to talk to them. In this second session of meetings only the one at "Le terre del fiume" was held in presence; nevertheless, I obtained the necessary information to complete the three phases also through a series of online meetings (4th of August 2021; 22nd of February 2022) with Matteo Sandon, representative of "Terre prossime". For the analysis of the data obtained I followed the instructions provided by the FAO Symposium (2019). Thanks to the "report" of Step 0 I got a general but accurate description of the context. In phase 1, the 10 elements of agroecology are used as criteria to define semi-quantitative indices that take the form of descriptive scales with scores from 0 to 4 (FAO, 2019). The general scores for each element are then inserted within a radar diagram. The questions of phase 2 are those that have mostly undergone the changes mentioned above, despite this, the aspects investigated have not been changed; the key dimensions of step 2 have remained: environment and climate change, health and nutrition, society and culture, economy, and governance. At this stage, the "traffic light" approach suggested by FAO (2019) has proved to be adaptable to the questions I modified or inserted. However, the analysis of phase 2 highlighted the main problem which made the analysis so difficult: the data made available by the farms proved insufficient to complete the survey. In most cases the problem was the same: the answers obtained were incomplete, so the cause of the impossibility of giving an assessment was the partial or total lack of data required. In addition, the questions are related to each other, so the gaps in one question had to affect the analysis of another. Step 3 of TAPE is the conclusion: it is a moment of meeting and

comparison on the data obtained through the questionnaire. FAO, again, provides detailed guidelines for the management of this phase, indicating who should participate and what issues should be addressed. For the third phase I met Moreno and Valentina (22nd of March 2022), and Matteo (30th of March 2022) at different times; the cause of this distinction is to be found in the restrictions due to the pandemic of Covid-19 and the work commitments of the participants. Despite this variation I am satisfied with the considerations that have emerged: to dialogue separately with them has allowed to investigate different issues, and to better understand what the focus of the different actors are operating in the Basso Isonzo. The topics addressed with the owners of "Le terre del fiume" mainly concerned the structure of the questionnaire, that is the difficulties encountered during the compilation, and some issues related to their activity of selling products. Although TAPE was designed as an "easy" methodology for use and time spent, it was not easy for them to find the time to devote to filling out the questionnaire. In addition, some of the questions took some time because they were very specific and rich in data to be provided, to the point of making them even complex to compile. The same problem also arose with Matteo Sandon of “Terrre prossime", who could not provide part of the data required. The other fundamental theme was that of the profession: embracing the principles of agroecology even in the workplace is not always easy and they are witnesses every day. We discussed the difficulties they encounter constantly – environmental conditions, laws, and market changes, etc – and how they deal with them. One example is the question of the price of their products, higher than those on supermarket shelves. However much a community has been created around their fields, they often encounter complaints and objections in this regard. Analysis works like this thesis must also serve this, to spread the motivation – and knowledge – that push those who practice agroecology to act even among those who are not directly involved. During the comparison Valentina said: "I often hear those vegetables here cost too much, but nobody ever reflects on how little the supermarket costs. When they tell me so, I always say that what you don’t pay for buying a product at a low price, someone else is paying for it". As for the farm "Terre prossime", phase 3 was held at a distance, despite this, the comparison with Matteo Sandon was extremely interesting. With him I had the opportunity to discuss the project of the Basso Isonzo Park, the management of the area, the relationship with the administrations and the possibilities that could be gained by the inhabitants of the area and the entire city of Padua. The moment in which I carried out these interviews is peculiar for the area of the Basso Isonzo, in fact the conditions have been created for the institutionalization

of an agricultural park (cut of the equalization, interest of the communal administration), through which new projects linked to different forms of agriculture, healthy food and urban planning would be launched. Matteo stressed that the Basso Isonzo Agricultural Park has become, in recent years, a real need, the current situation in fact requires specific safeguards that only an institution can offer. Specifically, a standardization of treatments to all crops, even those managed by conventional methods: "If you own one hectare of land in the city it is not healthy to treat it several times a year with harmful chemicals." These interventions, therefore, would not only have the value of protecting those who practice agroecology, but would also become a means of training, to spread the idea that there are other ways of doing agriculture.

4.2 Available statistical data of agriculture in the municipality of Padova

To know in depth the context in which the farms that participated in the evaluation using TAPE methodology are inserted, it was necessary to analyze the general panorama in which the agricultural production sector is inserted in the Municipality of Padua. The main source of information regarding the identification of the characteristics of farms in Padua was the "6 General Census of Agriculture" drawn up in 2010 by Istat (Istituto Nazionale di Ststistica) and SISTAN (Sistema Statistico Nazionale). Thanks to this document I learned about the types of farms in the territory of Padua, what are the main productions, what characteristics define these companies. The census is not an extremely recent document, unfortunately the "7 General Census of Agriculture" is being published and the first results will be available from June 2022. Another fundamental source was the "Green Plan for the City of Padua" (2022), a strategic tool with the aim of directing the policies of local urban transformation and the consequent choices of the Municipal Administration in the public green sector, defining principles, and setting criteria for the implementation of public green areas. In the first lines, the document is defined as a sort of green zoning plan aimed at defining the future structure of the green and blue infrastructure of the city of Padua to respond to the social and environmental demand of man-made territories. The plan prefers to give value to all possible spatial areas in coordination with the entire green infrastructure, providing guidelines and specific action strategies for each area and type of green. The action plan was implemented after the collection and analysis of a large amount of data, also present in the document. The result of the study is a series of tables that highlight the peculiar elements of the agro-urban context of the city of Padua. The

elements reported are linked to every possible aspect of the relationship with the rural environment; in fact, the analysis is not limited to identifying elements such as vegetable gardens, vineyards, farms, hedges, but, for example, also includes areas dedicated to leisure (leisure, sports). Within the Plan there is also a dossier dedicated to the area of Basso Isonzo, identified as the location of a pilot project that can be replicated in other future urban parks of the city. Fortunately, all the information concerning the agricultural sector can be consulted and downloaded online on the website of the Municipality of Padua (https://www.padovanet.it/).

4.3 Delimitations, limitations, assumptions

During the entire course of the thesis, difficulties of different nature arose, but they can also be considered as ideas for future research. The pioneering nature of the analysis carried out was the cause of most of the difficulties encountered. TAPE had never been tested in an Italian environment, and the similar contexts – so strongly westernized – in which the method was used are very few. For this reason, "adaptive interventions" were necessary from the early stages of the research, that is, the structuring of the questionnaire. Some of the issues addressed during the phases proved to be difficult to manage and the constant presence of the researcher during the compilation was necessary. In addition, some questions took a longer time to be fully answered, those concerning production data. It is likely that a teamwork would have been much more effective, in this case the researcher's skills were limited to the knowledge of TAPE and did not include agronomy or natural science expertise; the absence of an agronomist with technical knowledge has made the comparison more complicated. In conclusion, there were two further limits that I would call "practical": the first is the organization of meetings and interviews, although all farmers have proved to be widely available, their busy days made it almost impossible to meet. The second, however, concerns a particular issue addressed during the interviews: the economic question. Discussing the economy of companies has not been easy, this is because the field is considered strictly personal and, even in the field of research, it is still hard to talk about it openly. The Covid-19 pandemic has also influenced the progress of research in several aspects. From the point of view of the data collected, some of them have undergone significant changes that have distanced them from what was the average of the years preceding the pandemic. For this reason, it has not always been easy to interpret them. On the other hand, first the spread of the virus and then the legislation

have very limited the "field work", as it has not always been possible to meet live and, in cases where it has been possible, the management of the meetings has been slightly complicated by the limitations (safe distance, travel by public transport).

5. The Farms, the district the City: a nested case study to evaluate agroecological transition in Padova

5.1 The city of Padova and the agriculture

Despite the significant urban expansion that has affected the Paduan landscape in the last fifty years, the soils destined for agriculture have not significantly decreased and have also maintained an economically not marginal role (Ferrario, 2016). Urbanization clashes with the agricultural character of the territory and society, leading to the creation of a sort of "agro-urban continuum", characterized by a widespread mixture of urbanized and cultivated spaces; this "hybrid" character makes these spaces subject to harsh criticism, but also a source of inspiration for design scenarios able to respond to the multiple needs of contemporary society (Ferrario, 2016). Agricultural land is almost entirely dedicated to the intensive production of arable land and the cultivation of poplars for timber. Specifically, in The VI General Census of Agriculture (Istat, 2010) states that, out of 5609 hectares of agricultural land, 89% is dedicated to arable crops, in particular cereals (corn, wheat, durum wheat), 7% to woodland crops, 4% to meadows and pastures, and 0.26% to family gardens. Orchards and vineyards are present in peri-urban areas and mostly included in family production. In 2010 there were 656 farms (17% less than in 2000); of these 84% have land owned or for free use, while only 10% of the surface used (SAU, from the Italian acronym Superficie Agricola Utilizzata) is rented. There is a significant number of large farms: 15 farms have a UAA of over 100 hectares, covering half of the total municipal area. Of the 656 actives in 2010, only 9 cultivated according to the protocols of organic farming, for a total area of 218 hectares, 4% of the UAA. Some areas have maintained - or have been restored - green infrastructure and areas characterized by a strong biodiversity (ditches, hedges) (Piano degli Interventi del comune di Padova, 2022). Despite their environmental importance, these areas remain only in the northernmost part of agricultural land and to a very small extent. A large part of Padua’s agricultural territory is also characterized by a rich hydrographic system which, from an ecological point of view, is a very important element of environmental value that determines processes of diversification of vegetation, influencing ecosystems and landscape. The complex of agricultural land represents a system of open spaces of fundamental importance for the community, bearers of well-being, quality of life and urban sustainability; for this reason, it was decided to include them in the Green Plan, where necessary to develop a vision of long-term governance. The development of agricultural activities in the

territory of the city will achieve multiple objectives: producing healthy and safe food, preserving the environment and biodiversity, mitigating environmental problems, meet the demand for leisure spaces and other services needed by urban communities (Piano del Verde del Comune di Padova, 2022). In this context, urban and peri-urban agricultural areas are proving to be a prime terrain for actions that intercept a variety of issues crucial to the territory (food, social cohesion, landscape, environment, work, food production and consumption) and a place of convergence of interests at different territorial and administrative levels (Piano del Verde del Comune di Padova, 2022). For at least ten years, in fact, there has been an increase in attention to urban and peri-urban agriculture (AUP) in public policies relating to the territory, but also in those relating to food and social agriculture. In line with the objective of zero consumption of new land expected by the Veneto Region by 2050 and, more generally, with the objectives of "climate neutrality" provided for by the European Plan for the Environment 2019 (Green New Deal for Europe) The Padua Plan defines the rules and guidelines for implementing a long-term urban and environmental regeneration process of the existing city. The Plan plans to operate on different levels and has proposed a series of interventions aimed at preserving and regenerating the territory, with the aim of not consuming the existing land. The first project is called "Città dei Rioni" and involves an urban design and management that allows anyone to live independently the urban space (all less than 15 min.). The Plan also provides for the strengthening of green and blue infrastructure, with the aim of increasing urban forestation, reducing waterproof soils, increasing green coverage, and improving river parks. In addition, the preservation of the historical value of the city is among the objectives of the Plan, there is in fact the intent to enhance and expand the Park of the Walls and Waters, of ecological value, landscape, historical and identity, enhance and safeguard the sites protected by UNESCO as Cultural Heritage of Humanity and protect the urban planning of the so-called "Garden City". These and other interventions are part of a single project, composed of five macro-strategies: Arboreal Heritage, Sponge City, Biodiversity, Parks and Cultural and Accessibility Routes, Urban Agriculture. The latter is relevant to the research carried out; the agricultural environment takes on a new value: from a place of food production is transformed into a multifunctional space for teaching, gastronomic experimentation, leisure, the protection of biodiversity, etc. The following table illustrates the strategies for urban agriculture (*Table 5*).

landscape features	Measure	Description
Areas cultivated with simple monoculture intensive arable land.	Agroforestry	Encouragement of the cultivation of perennial tree and/or shrub species, associated with arable land and/or pastures, in the same unit of surface, in view of a climate smart agriculture.
Areas cultivated intensively or extensively, with no or discontinuous sideline system.	Implementation of the system sideline.	Planting of new country hedges and creation of buffer strips with grassy surface.
Extensively cultivated areas that present abandoned elements of the agricultural landscape.	Extraordinary maintenance of the elements of the agricultural landscape.	Care and maintenance of hedges, dams, ditches. Improvement of the agroecosystem and hydraulic safety.
Cultivated spaces close to the urban fabric.	Creation of agrourban parks.	Design of agrourban parks where to develop organic farming, social gardens, structures for direct sale, connections with GAS (solidarity purchase group) and GAC (collective purchase group), paths for slow mobility, educational farms/ agrinido. Areas excluded from building expansion. It is allowed to build only structures to direct service of the parks.
Cultivated areas with the presence of old rural buildings in disuse.	Development of historic rural buildings.	Mapping of the existing; creation of connections through a gentle mobility; design of tourist paths of proximity.
Residential districts characterized by a high density of family gardens.	Development of family gardens.	Design of forms of incentives to cultivation; creation of a food bank; training courses; barter.
Soft and fragmented mobility network.	Concession of soft mobility networks.	Interventions to connect the networks of soft mobility using the roads, even with conventions with private individuals.

Table 5. Strategies for the Urban agricolture in Padua (Piano del Verde del Comune di Padova, 2022)

A special position within the Piano del Verde is occupied by the area of the Basso Isonzo: the area is in fact identified as "masterplan", a pilot project to be implemented in the Basso Isonzo, laying down general principles applicable in the other agro-urban parks envisaged. The Basso Isonzo Agrourban Park is the ideal context to test a governance strategy of coexistence between the needs of the urban world and the agricultural world – the most typical of the problems of the agro-urban world –, in view of a mutual benefit. The Basso Isonzo then becomes a test laboratory for the project of the Metropolitan Agrolandscape Park of Padua (Parco Agropaesaggistico Metropolitano di Padova). Specifically, the strategy for the enhancement of urban agriculture includes: the development of a strategic network between agricultural

enterprises, associations and owners of land to improve the competitiveness of small primary producers who take care of urban and peri-urban agricultural areas, integrating them better in the agro-food chains of the city; the birth of new forms of promotion and marketing of local products (for example, the creation of a brand for products from the Basso Isonzo area, highlighting the relationship between products and the peri-urban agricultural landscape, also in connection with the future Ecomuseum of the Basso Isonzo); the dissemination of information and knowledge to all stakeholders through a series of actions (events, multimedia products, meetings and workshops) with regard to the primary role of agriculture in the conservation of natural resources and in the provision of services to the population in the peri-urban areas and specifically on the importance of the cultivated space of the Basso Isonzo for the city of Padua (Piano del Verde del Comune di Padova, 2022).

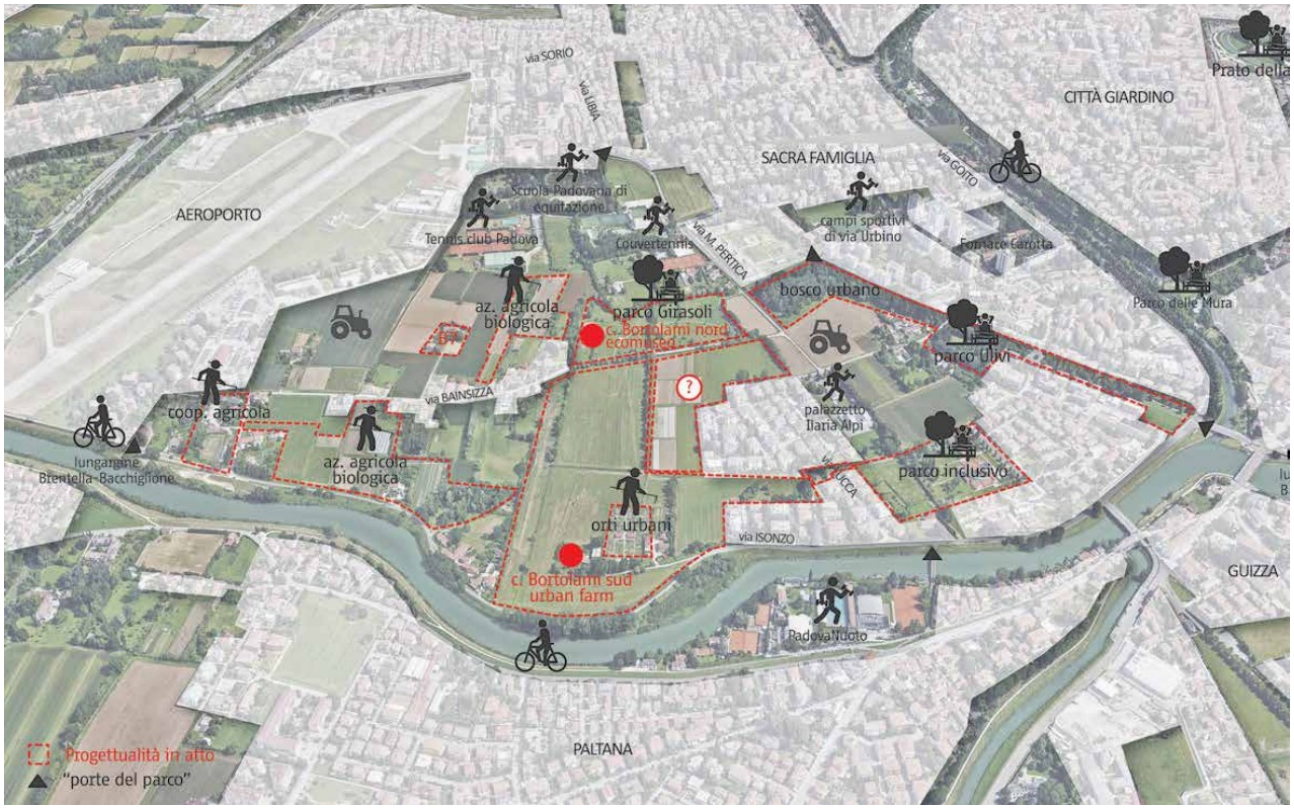

Figure 3. Area of Basso Isonzo Park (Fabrizio D'Angelo in Piano del verde del Comune di Padova, p. 390)

5.2 The Basso Isonzo District

We are in the south-west quadrant of the city of Padua, near the 16th century walls. The so-called Basso Isonzo is a cultivated area of about 100 hectares, cut between the city and the Padua-Bologna railway, the ring road and the airport and lapped by the Bacchiglione river to the south. The post-World War II General Development Plan,

signed by Luigi Piccinato, approved in 1957, provides in this area, in the westernmost part facing the walls, one of the nuclei of expansion of the city, marked by a center with public spaces and intensive construction, surrounded by extensive building. The plan will be completed in the early 1980s. In 1990 the Committee for the Parco del Basso Isonzo was established, the first to propose an alternative idea to sports facilities and to try with various initiatives to raise public awareness of the importance of creating the urban park. The Municipality will entrust the Castelnovi-Thommaset studio with the drafting of a rough draft, which, however, will never be approved. Despite this, the area is bordered (until 2003) and in 1998 was inaugurated the first green equipped area: il Parco degli Ulivi (Ferrario, 2016). In the following years the land will be divided between the two largest owners and the municipality, which gets 25% and in 2011 another part of public park is inaugurated. The following year, the creation of the PaAM (Parco agro-paesaggistico metropolitano di Padova) is proposed, for the management of the multifunctionality of open space. The project focuses on the relationship between the design of the city and the government of agricultural spaces and practices (Ferrario, 2016). In 2014 the Municipality of Padua, through the project agenda 21 of the environment, activates a path of participation that leads to the drafting of an action plan divided into 8 themes and with 30 strategic objectives that can be reached through the participation of public and private entities. In 2018 the “Dossier per il Parco Agro-paesaggistico della Comunità metropolitana di Padova” is published. It also contains a series of operational proposals such as: (i) the resumption of Agenda 21 activities; (ii) the identification, by the participants, of the actions they intend to take directly; (iii) the start of the census of abandoned and uncultivated land to establish the "Bank of land"; (iv) the implementation of interventions aimed at the construction of the main green infrastructure planned in the vast area of Padua (development of green spaces connected to the Parco delle Mura e delle Acque di Padova, formation of ecological corridors, creation of cycle and river routes); (v) a meeting between the representatives of the municipalities concerned and the Province to create a stable coordination that promotes studies and planning tools essential to make operational the proposal of the Park; (vi) the request to the Veneto Region to proceed with the elaboration of the Landscape Plan of Area and to prepare and approve a specific strategic Project concerning the territory of the “Pianura agropolitana centrale” (2018). The Association for the Parco agro-paesaggistico was created to promote cultural initiatives carrying out studies develop projects and start actions that can encourage the establishment and construction. The first project concerns an urban area of considerable extent partly

publicly owned and partly privately owned where there are already many vegetable gardens and where the City of Padua is renovating a rural building to be used as an eco-museum of agriculture. The association wants to collaborate in this initiative and support a spontaneous coordination between the owners of private land that would like to market their products under the aegis of PaAM. If the project were realized, it would become an example of multifunctional management and development of urban agriculture.

5.3 Terre del Fiume and Terre Prossime: the lighthouse farms

Moreno Feltrin and Valentina Chiesura, owners, and farmers of the farm "Le terre del fiume", bought the first portion of land in 2016 with the main aim of preserving the territory near their home. Both came from a job far from agriculture, but after a first course at the “Scuola esperienziale Itinerante di Agricoltura biologica” ("Experiential Itinerant School of Organic Farming") they realized that the most incisive way to make environmentalism is the cultivation of land intended as environmental protection. Similar are the reasons given by Matteo Sandon, who in 2017 – after an experience in organic catering – decides with 3 partners to buy land, with the intent to preserve that territory from indiscriminate urbanization and thus founding the farm "Terre prossime". Protecting their own living environment is the motivation for them to act, even if it meant making difficult and sometimes shared decisions. The food market is today a complex sector in which the lack of incentives or financial subsidies, the lack of support for niche markets or sales mechanisms, the lack of funding for research and extension, as well as political controleconomic of genetics, technological resources and information hinder the agroecological upscaling (Holt-Giménez, 2006; Duru et al., 2015; IPES-Food, 2016; Giraldo and Rosset, 2017; Holt-Giménez et al., 2021; Muñoz et al., 2021). Although conventional and highly specialized agriculture is encouraged, interest in various forms of small-scale sustainable agriculture is also growing (McGreevy et al., 2021). And it is precisely on this interest that Matteo, Moreno, and Valentina have decided to aim. Their agricultural production is in fact associated with a series of interventions aimed at improving the agroecological aspects of their work; soil conservation and continuous research aimed at enriching its biodiversity join the events created to spread the philosophy behind their companies and the good production practices for food consumption. The farm "Le terre del fiume" was responsible for arranging the ditches and banks, planting a grove, and spreading good

environmental protection practices through a close collaboration with elementary schools in Padua and through the Facebook page, as well as by their direct example. Around "Terre prossime" instead arose an archipelago of businesses, such as “Fattoria Lilliput” – small educational farm –, an apiary, “Campo dei girasoli” – meeting place – and from March 2022 was also added “Arakè”, an agricultural enterprise that will work the land of "Terre prossime". The birth of all these realities demonstrates the real desire for change that involves not only producers, but also consumers. The role of "Le terre del fiume" and "Terre prossime" then changes, expands. It is no longer just a matter of providing healthy food, but of becoming carriers of a message, of a philosophy. For this reason, these farms can be defined as lighthouses of agroecological practice in Padua and in the region, to be considered models for "designing and managing farms based on agroecological principles" (Nicholls and Altieri, 2018). In 2021 McGreevy et al. addressed the issue of the spread of agroecological practice by analyzing the cases of Japanese companies producing fruit and vegetables and dairy products, developing a ten-indicator agroecological scaling up system based on the concepts of amplification and territorialization. The first targets person-to-person interaction as amplifiers, such as lighthouses and traditional farming, and how agroecological knowledge and practices move through individual and community networks and enable the creation of supportive policies and markets (Nicholls and Altieri, 2018). In particular, the focus is on how knowledge and resources are used and how this type of activity affects territorial societies and policies. Territorialization has a geographical character and describes how different symbolic and material characteristics come to dominate or contest a territory (Guzmán Luna et al., 2019). These processes take place constantly within the area of the Basso Isonzo: the agroecological practice is in fact applied to different sectors; food production is the main, but not the only one. The collaborations between actors of the territory are by now consolidated and although there are still many hectares of land cultivated through conventional methodologies the network of people and companies that want to oppose this practice is strong. And it is precisely on these networks that the agroecological diffusion process is based: There is an expanding literature on transformative learning (Anderson et al., 2019), farmer’s knowledge networks (Laforge and Levkoe, 2018), peasant-to-peasant processes of horizontal learning (Val et al., 2019), “wisdom dialogues” (dialogo de saberes) (Anderson et al., 2019), and communities of practice (Dolinska and d’Aquino, 2016) that detail the different ways agroecological knowledge is passed from farmer-to-farmer. The importance of their work, however, is not measured solely by the

dissemination of knowledge; in fact, the "agroecological lighthouses" create social capital in rural communities (McGreevy et al., 2021) and not. Lighthouse farmers are effective leaders and use different types of social capital to build trust and leverage cooperation, connect disparate networks to engage in collaboration, and create links between sections of society in which formal or institutionalized power plays a role (Cofré-Bravo et al., 2019). Economic sustainability is in fact a fundamental element for any project of an environmental nature, as it provides the possibility of perpetuating its intentions for a long time. For this reason, Moreno and Valentina have worked to sell their products from the beginning, building a steady clientele. The same happened to Matteo, who also wanted to involve consumers in the production process of some products; in fact, two days were organized dedicated to the planting of tomato seedlings, the raw material of the tomato sauce they produce. The constant involvement through the sale, the example, the organization of events and the comparison allow to explore the threefold definition of agroecology, making what was a method (science) and a set of practices also a real social movement. In the article by McGreevy et al. other concepts are described, applicable to the context of the Basso Isonzo of Padua. The first one is that of agroecological territory, “where (a) a transition toward sustainable agriculture based on agroecological practices exists, (b) biodiversity and resource conservation is taken into account, (c) territory-linked embedded food systems exist, and (d) stakeholders support the transition toward sustainable agricultural and food systems.” (Wetzel et al., 2016). This definition can be considered valid even if in the same territory there are areas or actors that deviate from the agroecological practice and operate through conventional practices (McGreevy et al., 2021) even more so if you are in an urban context or with a strong agricultural tradition. It can be said that the agroecological territories link individual farm-scale activities with the surrounding ecological and socio-cultural landscape, and the local food system to amplify agroecology and further territorialize and the re-territorialize in the face of pressures from contemporary food systems (McGreevy et al., 2021). A further concept is that of territorial resilience, or the collective capacity of the actors to continue to facilitate the development of territorial responses to external disturbances” (Gilly et al., 2014); this value is computed through six variables: agrobiodiversity maintenance, food sovereignty, learning and innovation, resistance to depeasantization, and social, economic, and political aspects of territoriality (Guzmán Luna et al., 2019). Finally, there are the territorial mediators: politically, socially, and culturally significant elements that “facilitate the rooting of agroecological social

processes in a given territory.” (McCune et al., 2017). Such territorial mediators can be identified in the figures of lighthouse farms/farmers or in formal associations or institutions. Obviously, if the role of mediator were to be held by a social organization, the agroecological transition would acquire strength, and would even be able to institutionalize agroecological principles in a community (Magrin et al., 2019). In Basso Isonzo, work is also being carried out in this direction, working for the creation of an urban agricultural park in which to produce food for the city of Padua. Matteo, Moreno, and Valentina perfectly represent the definition of "agroecological lighthouses" and "agroecological mediators": theirs is a work project for environmental protection, but also social, which they have chosen to pursue by creating a community of consumers and producers aware of the impact that the industrialist is bringing to the environment.

Third part: Results, Reflections, Perspectives

6. Le terre del Fiume and Terre Prossime: the first application of TAPE in Italy

In recent years, the area of Basso Isonzo in Padua has been distinguished by constant research in the field of environmental sustainability. The agricultural practices of some farms located in this place have allowed the creation of an extremely fertile environment, not only from the point of view of food production but also from that of innovation. For this reason, a first evaluation test of the agroecological transition seemed the best way to know deeply the dynamics and the environmental, social, cultural characteristics of the area. Although the results obtained are not those expected, it has been extremely interesting to work in this environment. A food production system that respects the environment and workers is possible, and this is what the farmers of the Basso Isonzo want to demonstrate. In general, the data obtained – when complete and measurable – have allowed to know in depth the methodologies and philosophy of those who work and live here. Step 0 provided a description of the context and the work system of the companies. Within the farm "Le terre del fiume" four male and female employees from programs of protection and reintegration are hired. Valentina and Moreno made this choice to embrace every aspect of the agroecological philosophy, combining food production with a project of inclusion. From the point of view of the natural environment, the main problem they have faced since the beginning of the project has been the soil management, heavily depleted by years of intensive agriculture, now fertile thanks to the interventions of the farmers. A further issue related to the soil has been water stagnation, but through the recovery of ditches and flower beds the situation has improved, although the problem cannot be solved completely. The land is very close to those of "Terre prossime " in fact Matteo Sandon reported the same difficulties. But he also added a comment: "We grow food in one of the areas with the most polluted air in Europe, as far as we can intervene on the natural environment, it is the city that must take note of the necessary changes". Fortunately, these adversities have also proved to be a stumbling block: with the growth of the two farms, the interest of the community of Basso Isonzo has also grown, which increasingly feels to act to find solutions to the environmental issues. Within the context, in fact, there are several public and private actors participating in the network of collaboration and training. Among these we must mention the guest

apiary in the grounds of "Terre prossime", the educational farm "Lilliput", the "Campo dei girasoli", cultural center that organizes and offers events, workshops and sells products of Basso Isonzo, the Municipality of Padua, the social cooperative "Coislha", and some schools of now Padua showing a solid collaboration. Phase 1 of TAPE, or CAET, focuses on the evaluation on the relationship with the 10 elements of agroecology. The scores obtained in this Step (*Table 6*) are on average high, in three elements ("Diversity", "Circular and solidarity economy", "Responsible governance") the maximum score has been reached. On the contrary, the element "Recycling" shows the lowest score; in fact, for two out of four questions the score reaches only one point. One refers to the management of seeds considering "80% of the seeds of animal genetic resources are purchased on the market"; the other is related to the use of renewable energy production as "most of the energy is bought from the market and a small amount is self-produced". A probable justification for this low score can be found from one side in the general context of doing farming in a urban area, from the other side on the scarce economic viability of choosing other paths. The elements then of "Resilience", "Culture and food tradition", and "Co-creating and sharing of knowledge" get a slightly higher position than the latter but still without reaching the highest scores. Although these are high scores, there are space for improvement, especially about some elements. For example, in the case of "Culture and food tradition" the most difficult work is being done now, in these years, building a new culture of food production within a territory that almost no longer hosts peasant families. A similar speech can also be made for the element "Co-creating and sharing of knowledge" because the work done by Moreno, Valentina, and Matteo is not limited to the cultivation of land but to sharing and training related to agroecological processes. It is important to highlight how these scores are very high considering the two farms are very young and spent the first years of activities in building ecological infrastructure and improving soil quality.

Element	Score	
	Le terre del fiume	Terre prossime
Diversity	100	56
Synergies	80	62
Efficiency	93	83
Recycling	55	56
Resilience	75	75
Culture and food tradition	75	75
Co-creating and sharing of knowledge	75	90
Homan and social values	83	75
Circular and solidarity economy	100	90
Responsible governance	100	75

Table 6. CAET scores of "Le terre del fiume" and "Terre prossime" (2021)

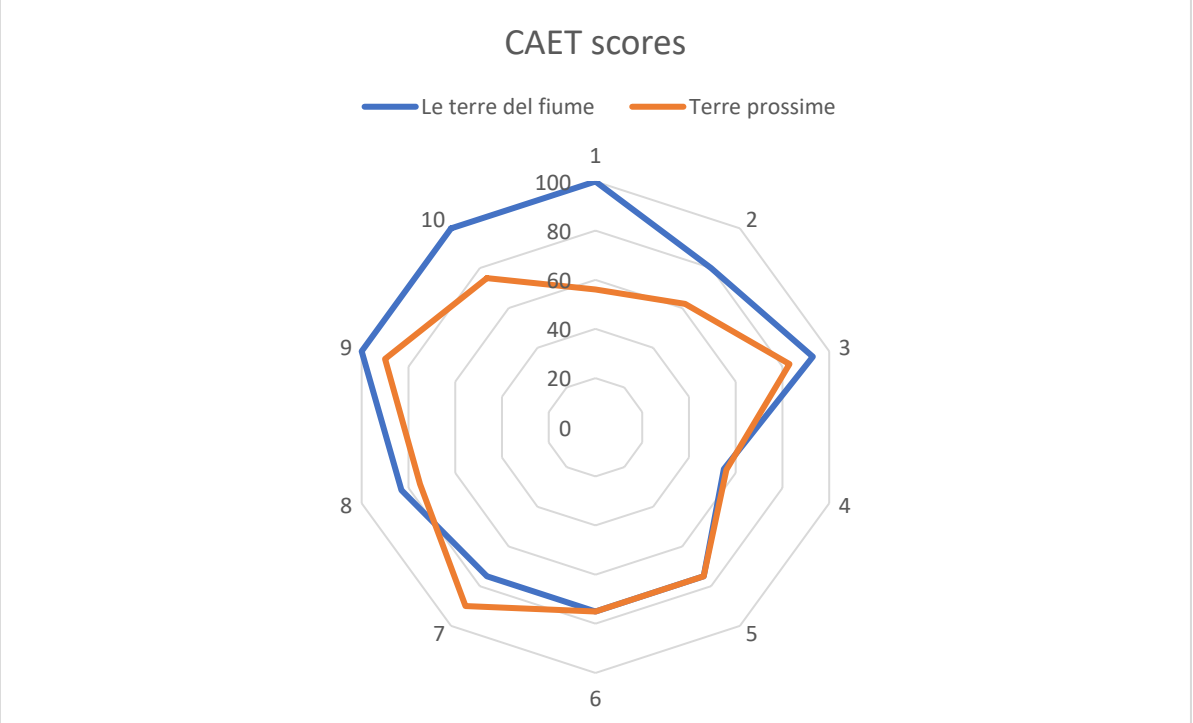

Figure 4. CAET scores (2021)

During Step 2, the main difficulties arose: as mentioned in the previous chapters, some fundamental data were not made available and for this reason the evaluation cannot be defined as complete, moreover, since the sample of companies was so small, it was

not possible to disclose sensitive economic data for privacy reasons. In general, however, it is possible to make some important evaluations regarding the production method and the working environment. Referring to the "traffic light" system proposed by FAO for the evaluation of the results of this Step have reached the maximum score for some aspects as: "Women's empowerment", "Soil health", "Exposure to Pesticides". Among the not answered questions, some would probably deserve a different analysis; for example, the question "Youth employment opportunity" has proved unsuitable as all employees of one of the two companies ("Le terre del fiume") they are all foreigners. Another case is the question of ownership: property laws in the Italian context are quite precise, and the issue could be addressed differently. As for the productions, the data obtained are fragmentary: only one of the farms has provided some information related to crops. The Covid-19 pandemic also influenced the trend of production, which in the years 2020/21 have undergone variations that have removed them from the average of previous years. A comment is also necessary about the space occupied by the crops. The farm uses systems of alternation of crops and sharing of space, so on the same land grow different crops and/or alternate different productions throughout the year. For these reasons, it is not possible to relate the cultivated area to the area occupied by the individual crops mentioned above – especially if the data concerning the totality of the crops are not available.

7. Conclusion

7.1 Reflections on agroecolocical transition in Padova

The projects implemented in recent years in the territory of Basso Isonzo and especially the intentions of the community living in that place show how much the way of living the rurality in this area has changed. Doing agroecology here not only means producing food, but also creating services for the community, designing a new management of spaces, and giving them value. Despite these initiatives, however, the path is only at the beginning: the work of recent years and of the next will form a solid foundation on which to build the new face of Basso Isonzo and other neighborhoods of the city of Padua made of sustainability and multifunctionality of spaces, of whatever type they are. The administration of Padua has shown to be interested and willing to work towards a greener future: the elimination of equalization in Bainsizza Street and in the rest of the Basso Isonzo have marked a turning point for farmers of "Le terre del fiume" and "Terre prossime", and for all the other actors who contribute every day to the creation of a multifunctional and sustainable environment. Although the municipality, through the Piano del Verde, has demonstrated its intention to take the example of the Basso Isonzo to transform the face of the city, it will not be easy to promote and implement such important interventions. With this statement I am not only referring to the practical phase of intervention in infrastructure, but also to the changes that citizens and associations will have to make in their daily choices. Difficult, however, does not mean impossible: necessity is urgent, and the time has come; for this reason, I feel I can say that this is the time to act to finally realize a project of transition agroecology that involves every aspect of life in the suburbs and in the city center of Padua.

7.2 Discussion on results lighthouses for amplifying agroecological transition

Unfortunately, the results are not those expected, there are many obstacles that have adversely affected the application of TAPE in the Basso Isonzo. This does not mean, however, that important considerations cannot be drawn from this. From the economic point of view, what is needed is a general large-scale change in the market, aimed at including within it all those who practice agriculture far from conventional methods. The current market in fact partially excludes the farms of Basso Isonzo, which are not entitled to aids and subsidies, and the opportunities related to cooperation, usually

provided by consortia. This makes the process of selling farm products very difficult, which is fundamental. Such an intervention would not only provide concrete support to companies such as "Le terre del fiume" and "Terre prossime" but would also encourage other producers to abandon conventional farming processes and instead choose the path of agroecology. The farmers' opinion I have spoken with is that the main method of preserving the work done so far and extending it is to institutionalize the Basso Isonzo Agricultural Park. The establishment and protection of an area to be dedicated to multifunctional park would offer the opportunity to work on new projects that, at different levels and in different areas, would allow to spread the agroecological practice. Another sector in which the agroecological farmers of the Basso Isonzo wanted to be involved is that of training, and in this case, it would really be a valuable intervention to amplify the scope of their interventions. If this were to happen, the dissemination of agroecological knowledge and practices would lead to the creation of other oasis of sustainability, such as the one that is being born in the Basso Isonzo. This type of intervention would give the agroecological philosophy the strength to spread even to bands of "users", previously not involved in this type of project as students and tourists.

7.3 Conclusion and further research

In conclusion, there are some considerations to be made. The TAPE method, applied for the first time in Italy in Basso Isonzo (Padua) has not given the expected results, but this does not mean that it is completely unsuitable for further investigation in this context or in similar contexts. The analyses carried out have shown that an agroecological project is already well underway, moreover it can be said that there are all the necessary conditions to realize these projects in the short and long term. TAPE is a very specific and comprehensive method of analysis and for this reason it would be a mistake to exclude this tool from any future research in the Basso Isonzo. What is missing during the writing of this thesis is a team of professionals with complementary skills and knowledge, who could structure an efficient questionnaire and appropriate to the context. In addition, I believe that we need to involve all the actors who in different ways influence the process of agroecological transition of the Basso Isonzo and the city of Padua. In the case of this thesis, the only actors – protagonists – were the two farms that agreed to collaborate; any future research must also involve the community that has allowed these realities to grow and take root in

that territory. This greater involvement is not only necessary to obtain more data and to be able to complete every question of the questionnaire, but above all to better understand the possibilities and desires of those who live and work on the soil of the Basso Isonzo. Spreading the agroecological philosophy also in other sectors of work, whether related to food, within the city of Padua would allow to conduct a more thorough investigation. In addition, shifting research to a wider territory and to a greater number of public and private actors could be the solution to some of the difficulties encountered during this research. Anyway, the data collected can become the first piece for the construction of a database of data on the practice and agroecological transition of companies in Padua, but also in Veneto and Italy.

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10 Annexes

The questionary used during the research in Basso Isonzo (2021):

TAPE

Tool for Agroecology Performance Evaluation

Questionario sviluppato nell'ambito della ricerca per la tesi di laurea magistralein Local Development

Martina Veneri - Anno accademico 2020-21

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STEP 0 – DESCRIZIONE DEL SISTEMA E DEL CONTESTO

Informazioni anagrafiche

0.1 Stato _____

0.2 Località (comune/provincia) _____

0.3 Sede legale (indirizzo) _____

0.4 Tipologia di sistema _____

0.5 Nome azienda _____

0.6 Forma giuridica:

- ☐ Imprenditore o azienda individuale/familiare
- ☐ Società di persone
- ☐ Società di capitali
- ☐ Società cooperativa
- ☐ Amministrazione dello Stato o Ente pubblico
- ☐ Altri Enti privati
- ☐ Proprietà collettiva
- ☐ Consorzio
- ☐ Altra forma giuridica (specificare)

0.7 Titolo di possesso. Per ciascuna tipologia di titolo di possesso si deve indicare la Superficie Totale
dell'Azienda e la Superficie Agricola Utilizzata, espresse in ettari e are.

Titolo di possesso dei terreni	**SUPERFICIE TOTALE** (SAT)		**SUPERFICIE AGRICOLA UTILIZZATA** (SAU)	
	Ettari	Are	Ettari	Are
Di proprietà o in usufrutto				
In affitto				
Ad uso gratuito				
TOTALE				

0.8 Quanti sono i componenti della famiglia?

- Uomini _____
- Donne _____
- Giovani _____
- Bambini _____

0.9 Manodopera familiare. La società è costituita, esclusivamente o in parte, da familiari o parenti del conduttore che svolgono lavoro in azienda? Si – No

	Genere	Anno di nascita (1)	Cittadinanza (2)	Posizione INPS (3)	Lavoro svolto in azienda			Attività remunerative extra aziendali	
					Giorni a settimana	Ore al giorno	%	Tempo dedicato (4)	Settore (agricolo o extra agricolo)
Conduttore									
Coniuge del conduttore									
Altro membro della famiglia									
Altro parente del conduttore									

(1) ANNO DI NASCITA: Se non sa, dire età approssimativa.

(2) CITTADINANZA: 1. Italiana; 2. Altro paese UE; 3. Paese extra UE.

(3) POSIZIONE INPS: 1. Non versa contributi; 2. Versa contributi come coltivatore diretto (CI) o imprenditore agricolo (IAP); 3. Versa contributi nella gestione dipendente dell'INPS (tramite modello DMAG o EMENS).

(4) TEMPO PER ATTIVITA' REMUNERATIVE EXTRA AZIENDALI: 1. Un tempo maggiore di quello dedicato all'azienda; 2. Un tempo minore di quello dedicato all'azienda; 3. Non si dedica a nessuna attività extra-aziendale.

0.10 Altra manodopera aziendale in forma continuativa. Lavoratori di almeno 16 anni che nell'annata agraria 2019-2020 hanno lavorato con contratti caratterizzati da stabilità e/o ciclicità della prestazione lavorativa, anche se a termine. Si includano anche quelli che non hanno lavorato per parte dell'annata agraria per condizioni particolari di produzione dell'azienda, servizio militare, malattia, infortunio, ecc. ISTAT 2020

	Numero di persone				**Lavoro svolto in azienda**		
	Cittadinanza italiana	Altro paese UE	Extra UE	Totale	Giornate (8 ore lavorative)	% tempo dedicato	Numero di persone dedicate ad attività connesse
Maschi							

Femmine							
TOTALE							

Attività produttive

0.11 Quali sono le produzioni? È possibile selezionare più di un'opzione TAPE 2019

- ☐ Colture
- ☐ Animali (compresi pesci)
- ☐ Alberi
- ☐ Altro (specificare)

0.12 Qual è la destinazione principale dei prodotti?

- ☐ Vendita
- ☐ Per lo più vendita e in piccola parte autoconsumo
- ☐ Metà vendita e metà autoconsumo
- ☐ Per lo più autoconsumo e in piccola parte vendita
- ☐ Autoconsumo

Ambiente

disponibile

0.13 Descrivere brevemente il contesto naturale in cui si trova il sistema (ad es. tipo di agroecosistema, clima, altitudine...) e le sfide ambientali (ad es. siccità, inondazioni, inquinamento...)

_____
_____
_____
_____

0.14 Descrivere brevemente le politiche pubbliche e il contesto di mercato, che possono sostenere o limitare la transizione agroecologica del sistema (ad es. normative nazionali o locali in materia di agricoltura, produzione e commercio, zone di conservazione, esistenza di un'etichetta o di meccanismi di riconoscimento/protezione dell'origine del prodotto, mercati locali/fiere, sistemi di garanzia partecipativa,bagricoltura sostenuta dalla comunità...)

_____
_____
_____
_____

0.15 Descrivere brevemente i vari attori che interagiscono con il sistema e i gruppi potenziali o reti in grado di sostenere la transizione agroecologica (ad es. servizi di estensione, cooperative, piattaforme di conoscenza, organizzazioni di produttori, governance partecipativa, meccanismi quali i consigli alimentari...)

_____
_____
_____
_____

STEP 1 – CARATERIZZAZIONE DELLA TRANSIZIONE AGROECOLOGICA

1 Diversità

1.1 Coltivazioni

- 0 – Monocoltura (o nessuna coltura)
- 1 – Una coltura che copre più dell'80% della superficie coltivata
- 2 – Due o tre colture con una superficie coltivata significativa
- 3 – Più di 3 colture con una superficie coltivata significativa adattata ai cambiamenti climatici e allecondizioni locali
- 4 – Più di 3 colture di diverse varietà adattate alle condizioni locali e diversificate nell'area dell'azienda con multi-, poli- o inter-colture

1.2 Animali (inclusi pesci e insetti)

- 0 – Nessun allevamento di animali
- 1 – Una sola specie allevata
- 2 – Due o tre specie allevate con pochi animali
- 3 – Più di tre specie allevate con un numero significativo di animali
- 4 – Più di tre specie allevate con razze diverse ben adattate alle condizioni climatiche locali

1.3 Alberi (e altre piante perenni)

- 0 – Niente alberi (né altre piante perenni)
- 1 – Pochi alberi (e/o altre piante perenni) di una sola specie
- 2 – Alcuni alberi (e/o altre piante perenni) di più di una specie
- 3 – Numero significativo di alberi (e/o altre piante perenni) di specie diverse
- 4 – Elevato numero di alberi (e/o di altre piante perenni) di diverse specie nei terreni agricoli

1.4 Diversificazione di attività, prodotti e servizi

- 0 – Una sola attività produttiva (ad es. vendita di una sola coltura)
- 1 – Due o tre attività produttive (ad es. vendita di 2 colture o di una coltura e di un tipo di animali).
- 2 – Più di 3 attività produttive
- 3 – Più di 3 attività produttive e un servizio (ad es. trasformazione di prodotti in azienda, ecoturismo, trasporto di beni agricoli, formazione, ecc.)
- 4 – Più di 3 attività produttive e diversi servizi.

2 Sinergie

2.1 Integrazione di colture-allevamento-acquacoltura

L'enumeratore deve considerare le risorse condivise a livello comunitario. Nel caso dei pascoli, ad esempio,i corrispondenti input di mangimi per gli animali non sono considerati esterni. Sono considerati esterni soloi mangimi acquistati dal mercato.

- 0 – Nessuna integrazione: gli animali, compresi i pesci, sono alimentati con mangimi acquistati e il loro letame non è utilizzato per la fertilità del suolo; o nessun animale nell'agroecosistema.

- 1 – Scarsa integrazione: gli animali sono alimentati principalmente con mangimi acquistati, il loro letame è utilizzato come fertilizzante.
- 2 – Integrazione media: gli animali sono per lo più alimentati con mangimi prodotti nell'azienda e/oal pascolo, il letame viene utilizzato come fertilizzante.
- 3 – Elevata integrazione: gli animali sono alimentati prevalentemente con mangimi prodotti in azienda, residui di colture, sottoprodotti e/o il pascolo, il loro letame è utilizzato come fertilizzantee forniscono trazione.
- 4 – Integrazione completa: gli animali sono alimentati esclusivamente con mangimi prodotti in azienda, residui di colture, sottoprodotti e/o pascolo, tutto il loro letame è riciclato come fertilizzante e fornisce più di un servizio

2.2 Gestione del sistema suolo-piante

- 0 – Il suolo è vuoto dopo il raccolto. Nessuna consociazione. Nessuna rotazione delle colture (o sistemi di pascolo rotazionale). Forte disturbo del suolo (biologico, chimico o meccanico).
- 1 – Meno del 20% del terreno coltivabile è coperto da residui o colture di copertura. Più dell'80% delle colture viene prodotto in mono e colture continue (o senza pascolo rotazionale).
- 2 – Il 50%o del suolo è coperto da residui o colture di copertura. Alcune colture vengono ruotate o consociate (o viene eseguito un pascolo rotazionale).
- 3 – Oltre l'80% del suolo è coperto da residui o colture di copertura. Le colture vengono ruotate regolarmente o consociate (o il pascolo a rotazione è sistematico). Il disturbo del suolo è ridotto al minimo.
- 4 – Tutto il terreno è ricoperto da residui o colture di copertura. Le colture vengono ruotate regolarmente e la consociazione è comune (o il pascolo rotazionale è sistematico). Poco o nessun disturbo del suolo.

2.3 Integrazione con gli alberi (agroforeste, silvopastoralismo, agrosilvopastoralismo)

Siano prese in considerazione anche le aree forestali comuni

- 0 – Nessuna integrazione: gli alberi (e altre piante perenni) non hanno un ruolo per gli esseri umanio per il raccolto o nella produzione animale.
- 1 – Bassa integrazione: un numero limitato di alberi (e altre piante perenni) fornisce un solo prodotto (es. frutta, legname, foraggio, sostanze medicinali o biopesticidi ...) o servizi (es. ombra per gli animali, aumento della fertilità del suolo, ritenzione idrica, barriera all'erosione del suolo ...)per le colture umane e/o animali.
- 2 – Integrazione media: un numero significativo di alberi (e altre piante perenni) fornisce almeno un prodotto o un servizio.
- 3 – Alta integrazione: un numero significativo di alberi (e altre piante perenni) fornisce diversi prodotti e servizi.
- 4 – Integrazione completa: molti alberi (e altre piante perenni) forniscono diversi prodotti e servizi.

2.4 Connessione tra gli elementi dell’agroecosistema e il paesaggio

Siano prese in considerazione le aree circostanti, gli ambienti seminaturali e le potenziali zone di compensazione ecologica.

- 0 – Nessuna connessione: elevata uniformità all'interno e all'esterno dell'agroecosistema, nessun ambiente semi-naturale, nessuna zona di compensazione ecologica.
- 1 – Bassa connessione: alcuni elementi isolati possono essere trovati nell'agroecosistema, come alberi, arbusti, recinzioni naturali, uno stagno o una piccola zona di compensazione ecologica.
- 2 – Connessione media: diversi elementi sono adiacenti a colture e/o pascoli o ad una vasta zona di compensazione ecologica.
- 3 – Connessione significativa: diversi elementi possono essere trovati tra appezzamenti di colturee/o pascoli o più zone di compensazione ecologica (alberi, arbusti, vegetazione naturale, pascoli, siepi, canali, ecc.).
- 4 – Alta connessione: l'agroecosistema presenta un panorama a mosaico e diversificato, tanti elementi come alberi, arbusti, recinzioni o stagni possono essere trovati tra ogni appezzamento di terreno coltivato o pascolo, o più zone di compensazione ecologica.

3 Efficienza

3.1 Uso di input esterni

Tenere conto di tutti gli input necessari per la produzione, compresi energia, carburante, fertilizzanti, sementi, animali giovani, paglia per l'inseminazione artificiale, manodopera, sostanze fitosanitarie, ecc.

- 0 – Tutti gli input sono acquistati dal mercato.
- 1 – La maggior parte degli input viene acquistata dal mercato.
- 2 – Alcuni input sono prodotti in azienda/nell'agroecosistema o scambiati con altri membri della comunità.
- 3 – La maggior parte degli input è prodotta in azienda/nell'agroecosistema o scambiata con altri membri della comunità.
- 4 – Tutti gli input sono prodotti in azienda/nell'agroecosistema o scambiati con altri membri della comunità.

3.2 Gestione della fertilità del suolo

- 0 – I fertilizzanti sintetici sono utilizzati regolarmente su tutte le colture e/o su tutti i prati (o non vengono utilizzati fertilizzanti per mancanza di accesso, ma non viene utilizzato alcun altro sistemadi gestione).
- 1 – I fertilizzanti sintetici sono utilizzati regolarmente nella maggior parte delle colture e alcune pratiche biologiche (ad es. letame o compost) sono applicate ad alcune colture e/o prati.
- 2 – I fertilizzanti sintetici sono utilizzati solo per alcune colture specifiche. Le pratiche biologiche sono applicate alle altre colture e/o ai prati.
- 3 – I fertilizzanti sintetici sono utilizzati solo in via eccezionale. Una varietà di pratiche biologiche èla norma.
- 4 – Non sono utilizzati fertilizzanti sintetici, la fertilità del suolo è gestita solo attraverso una varietàdi pratiche biologiche.

3.3 Gestione dei parassiti e delle malattie

- 0 – Pesticidi chimici e farmaci sono utilizzati regolarmente per la gestione dei parassiti e delle malattie. Nessun altro metodo di gestione viene utilizzato.

- 1 – Pesticidi chimici e farmaci sono utilizzati solo per una specifica coltura/animale. Alcune sostanzee pratiche biologiche sono applicate sporadicamente.
- 2 – I parassiti e le malattie sono gestiti attraverso pratiche biologiche, i pesticidi chimici sono utilizzati solo in casi specifici e molto limitati.
- 3 – Non vengono utilizzati pesticidi chimici e farmaci. Le sostanze biologiche sono la norma.
- 4 - Nessun pesticida chimico e farmaco viene utilizzato. I parassiti e le malattie sono gestiti attraverso una varietà di sostanze biologiche e misure di prevenzione.

3.4 Produttività e bisogni delle famiglie

Siano presi in considerazione tutti i tipi di beni, inclusi animali, piante perenni, etc.

- 0 – I bisogni delle famiglie non sono soddisfatti né per il cibo né per altri elementi essenziali.
- 1 – La produzione copre solo il fabbisogno alimentare delle famiglie. Nessuna eccedenza per generare reddito.
- 2 – La produzione copre il fabbisogno alimentare delle famiglie e le eccedenze generano liquiditàper l'acquisto di beni di prima necessità ma non permette risparmi.
- 3 – La produzione copre il fabbisogno alimentare delle famiglie e le eccedenze generano liquiditàper l'acquisto di beni di prima necessità e permettono di avere risparmi sporadici.
- 4 – Tutte le esigenze della famiglia sono soddisfatte sia per il cibo che per il denaro contante, che permette di acquistare tutti gli elementi essenziali necessari e di avere risparmi regolari.

4 Riciclo

4.1 Riciclo della biomassa e dei nutrienti

- 0 – I residui e i sottoprodotti non sono riciclati (ad es. lasciati in decomposizione o bruciati). Grandi quantità di rifiuti vengono buttati o bruciati.
- 1 – Una piccola parte dei residui e dei sottoprodotti viene riciclata (ad es. residui di colture come alimenti per animali, utilizzo di letame come fertilizzante, produzione di compost da letame e rifiuti domestici, concime verde). I rifiuti sono buttati o bruciati.
- 2 – Più della metà dei residui e dei sottoprodotti viene riciclata. Alcuni rifiuti sono buttati o bruciati.
- 3 – La maggior parte dei residui e dei sottoprodotti viene riciclata. Solo una piccola quantità di rifiuti viene buttata o bruciata.
- 4 – Tutti i residui e sottoprodotti sono riciclati. Non vengono buttati o bruciati rifiuti.

4.2 Risparmio idrico

- 0 – Nessuna attrezzatura o tecnica per la raccolta o il risparmio dell'acqua.
- 1 – Un solo tipo di apparecchiatura per la raccolta o il risparmio di acqua (ad es. irrigazione a goccia, serbatoio).
- 2 – Un solo tipo di apparecchiatura per la raccolta o il risparmio di acqua e l'adozione di una sola pratica per limitare l’uso di acqua (ad es. irrigazione temporizzata, colture di copertura).
- 3 – Un solo tipo di attrezzature per la raccolta o il risparmio di acqua e varie pratiche per limitare l'uso di acqua.
- 4 – Diversi tipi di attrezzature per la raccolta o il risparmio di acqua e varie pratiche per limitare l'uso di acqua.

4.3 Gestione delle sementi e delle razze

- 0 – Tutte le sementi e/o le risorse genetiche animali (ad es. pulcini, giovani animali, sperma) sono acquistate dal mercato.
- 1 – Più dell'80% delle sementi/risorse genetiche animali sono acquistate dal mercato.
- 2 – Circa la metà dei semi viene autoprodotta o scambiata, l'altra metà viene acquistata dal mercato. Circa la metà dell'allevamento viene effettuato con aziende agricole vicine.
- 3 – La maggior parte delle sementi/risorse genetiche animali sono autoprodotte o scambiate. Alcune sementi specifiche sono acquistate dal mercato.
- 4 – Tutte le sementi/risorse genetiche animali sono autoprodotte, scambiate con altri agricoltori o gestite collettivamente, garantendo un sufficiente rinnovamento e diversità.

4.4 Uso e produzione di energie rinnovabile

- 0 – Non viene utilizzata né prodotta energia rinnovabile.
- 1 – La maggior parte dell'energia viene acquistata dal mercato. Una piccola quantità è autoprodotta (trazione animale, vento, turbina, idraulica, biogas, legno...).
- 2 – Metà dell'energia utilizzata viene autoprodotta, l'altra metà viene acquistata.
- 3 – Produzione significativa di energia rinnovabile, uso trascurabile di combustibili e altre fonti non rinnovabili.
- 4 – Tutta l'energia utilizzata è rinnovabile e/o autoprodotta. La famiglia è autosufficiente per l'approvvigionamento energetico, garantito in ogni momento. L'uso di combustibili fossili è trascurabile.

5 Resilienza

5.1 Stabilità del reddito/produzione e capacità di ripresa dopo una perturbazione

- 0 – Il reddito diminuisce anno dopo anno, la produzione è molto variabile nonostante il livello costante di input e non vi è alcuna capacità di recupero dopo shock/perturbazioni.
- 1 – Il reddito tende a diminuire, la produzione varia di anno in anno (con input costanti) e le capacità di recupero dopo shock/perturbazioni sono scarse.
- 2 – Il reddito è globalmente stabile, ma la produzione varia di anno in anno (con input costanti). La maggior parte di reddito e produzione si riprende soprattutto dopo shock/perturbazioni.
- 3 – Il reddito è stabile e la produzione varia poco da un anno al l'altro (con input costanti). La maggior parte di reddito e produzione si riprende dopo shock/perturbazioni.
- 4 – Il reddito e la produzione sono stabili e aumentano nel tempo. Si riprendono completamente e rapidamente dopo shock/perturbazioni.

5.2 Meccanismi per ridurre la vulnerabilità

- 0 – Nessun accesso al credito, nessuna assicurazione, nessun meccanismo di sostegno comunitario.
- 1 – La Comunità non è molto di sostegno e la sua capacità di aiutare dopo gli shock è molto limitata. E/o l'accesso al credito e alle assicurazioni è limitato.
- 2 – La Comunità è di sostegno, ma la sua capacità di aiutare dopo gli shock è limitata. E/o l'accessoal credito è disponibile, ma è difficile da ottenere nella pratica. L'assicurazione è rara e non consente una copertura completa dai rischi.

- 3 – La Comunità è di sostegno sia agli uomini che alle donne, ma la sua capacità di aiutare dopo gli shock è limitato. E/o l'accesso al credito è disponibile e l'assicurazione copre solo prodotti/rischi specifici.
- 4 – La Comunità è molto solidale sia per gli uomini che per le donne e può aiutare in modo significativo dopo uno shock. E/o l'accesso al credito è quasi sistematico e l'assicurazione copre la maggior parte della produzione.

5.3 Indebitamento

- 0 – Il debito è superiore al reddito.
- 1 – Il debito rappresenta più della metà del reddito. La capacità di rimborso è limitata.
- 2 – Il debito rappresenta circa la metà del reddito.
- 3 – Il debito è limitato e la capacità di rimborso è totale.
- 4 – Nessun debito.

5.4 Diversificazione tra le attività, i prodotti e i servizi

Questo indice è il punteggio medio per l'elemento di diversità già valutato.

6 Cultura e tradizione alimentare

6.1 Dieta appropriata e alimentazione consapevole

- 0 – Carenza sistematica di cibo, che non soddisfa le esigenze nutrizionali e mancanza di consapevolezza delle buone pratiche alimentari.
- 1 – Alimenti stagionali insufficienti a soddisfare le esigenze nutrizionali e/o dieta basata su un numero limitato di alimenti di specifici gruppi alimentari. Mancanza di consapevolezza delle buonepratiche alimentari.
- 2 – Sicurezza alimentare globale nel tempo, ma insufficiente diversità nei gruppi alimentari. Buona alimentazione, le pratiche sono note ma non sempre applicate.
- 3 – Gli alimenti sono sufficienti e diversificati. Le buone pratiche alimentari sono note ma non sempre applicate.
- 4 – Alimentazione sana, nutriente e diversificata. Le buone pratiche nutrizionali sono ben note e applicate.

6.2 Identità e consapevolezza locali o tradizionali (contadine/indigene)

- 0 – Nessuna identità locale o tradizionale (contadina/indigena).
- 1 – Scarsa consapevolezza dell'identità locale o tradizionale.
- 2 – Identità locale o tradizionale percepita in parte, o solo da una parte della famiglia.
- 3 – Consapevolezza dell'identità locale o tradizionale e rispetto generale delle tradizioni o dei riti.
- 4 – Identità locale o tradizionale fortemente sentita e protetta, elevato rispetto delle tradizioni e/odei riti.

6.3 Uso di varietà/razze locali e conoscenza tradizionali (contadine/indigene) per la preparazione degli alimenti

- 0 – Nessun uso di varietà/razze locali né di conoscenze tradizionali per la preparazione degli alimenti.
- 1 – Si consuma la maggior parte delle varietà/razze esotiche/introdotte, oppure si fa poco uso delle conoscenze e delle pratiche tradizionali per la preparazione degli alimenti.
- 2 – Si producono e si consumano varietà/razze locali ed esotiche/introdotte. Le conoscenze e le pratiche locali o tradizionali per la preparazione degli alimenti sono identificate ma non sempre applicate.
- 3 – La maggior parte degli alimenti consumati proviene da varietà/razze locali e vengono attuate conoscenze e pratiche tradizionali per la preparazione degli alimenti.
- 4 – Vengono prodotte e consumate varie varietà/razze locali. Le conoscenze e le pratiche tradizionali per la preparazione degli alimenti sono identificate, applicate e riconosciute in contestiufficiali e/o in eventi specifici.

7 Cooperazione e condivisione delle conoscenze

7.1 Piattaforme per la creazione orizzontale e il trasferimento di conoscenza e buone pratiche

Le piattaforme possono essere organizzazioni formali o informali, scuole sul campo per agricoltori, incontri regolari, corsi di formazione, ecc.

- 0 – Ai produttori non sono disponibili piattaforme per la co-creazione e il trasferimento di conoscenze.
- 1 – Almeno una piattaforma per la co-creazione e il trasferimento di conoscenze esiste, ma non funziona bene e/o non è utilizzata.
- 2 – Almeno una piattaforma per la co-creazione e il trasferimento di conoscenze esiste e funziona,ma non è utilizzata per condividere specificatamente conoscenze in materia di agroecologia.
- 3 – Esistono una o più piattaforme per la co-creazione e il trasferimento di conoscenze, sono funzionanti e vengono utilizzate per condividere conoscenze in agroecologia, anche dalle donne.
- 4 – Diverse piattaforme ben consolidate e funzionanti per la co-creazione e il trasferimento di conoscenze sono disponibili e diffuse nella comunità, sono utilizzate anche dalle donne.

7.2 Accesso alle conoscenze agroecologiche e interesse dei produttori verso l’agroecologia.

Le conoscenze e le pratiche agroecologiche possono anche essere chiamate in altri modi, e i produttori possono conoscerle e applicarle senza conoscere la parola "agroecologia". Concentrarsi sulle pratiche e le conoscenze reali per la valutazione, e non sulla conoscenza formale di "agroecologia" come una scienza.

- 0 – Mancanza di accesso alle conoscenze agroecologiche: i principi dell'agroecologia sono sconosciuti ai produttori.
- 1 – I principi dell'agroecologia sono per lo più sconosciuti ai produttori e/o vi è poca fiducia in essi.
- 2 – Alcuni principi agroecologici sono noti ai produttori e vi è interesse a diffondere l'innovazione, facilitando la condivisione delle conoscenze all'interno e tra le comunità e coinvolgendo le giovani generazioni.
- 3 – L'agroecologia è ben nota e i produttori sono disposti ad attuare innovazioni, facilitando la condivisione delle conoscenze al l'interno e tra le comunità e coinvolgendo le giovani generazioni, comprese le donne.
- 4 – Ampio accesso alle conoscenze agroecologiche sia da partedegli uomini che delle donne: i produttori sono ben consapevoli dei principi dell'agroecologia e desiderosi di applicarli, facilitando la condivisione delle conoscenze all'interno delle comunità e tra di esse e coinvolgendo le giovani generazioni.

7.3 Partecipazione dei produttori alle reti e alle organizzazioni di base

- 0 – I produttori sono isolati, non hanno quasi alcun rapporto con la loro comunità locale e non partecipano a riunioni e organizzazioni di base.
- 1 – I produttori hanno relazioni sporadiche con la loro comunità locale e raramente partecipano a riunioni e organizzazioni di base.
- 2 – I produttori intrattengono relazioni regolari con la loro comunità locale e talvolta partecipanoagli eventi delle loro organizzazioni di base, ma nella maggior parte dei casi le donne vengono escluse.
- 3 – I produttori sono ben interconnessi con la loro comunità locale e spesso partecipano agli eventi delle loro organizzazioni di base, comprese le donne.
- 4 – I produttori (con una partecipazione paritaria di uomini e donne) sono altamente interconnessie solidali e mostrano un impegno e una partecipazione molto elevati a tutte le manifestazioni dellaloro comunità locale e delle loro organizzazioni di base.

8 Valori umani e sociali

8.1 Emancipazione femminile

- 0 – Le donne di norma non hanno voce in capitolo nel processo decisionale, né nella famiglia né nella comunità. Non esiste un'organizzazione per l'emancipazione femminile.
- 1 – Le donne possono avere voce in capitolo nella loro famiglia, ma non nella comunità. Può esistere una forma di associazione femminile, ma non è pienamente funzionante.
- 2 – Le donne possono influenzare il processo decisionale, sia a livello di famiglia che di comunità, ma non sono responsabili delle decisioni. Non hanno accesso alle risorse. Possono esistere alcuneforme di associazioni femminili, ma non sono pienamente funzionali.
- 3 – Le donne partecipano pienamente ai processi decisionali, ma non hanno ancora pieno accesso
- risorse. Esistono e sono utilizzate organizzazioni femminili.
- 4 – Le donne hanno pieno potere decisionale e accesso alle risorse. Se esistono organizzazioni femminili sono funzionali e operative.

8.2 Lavoro (condizioni di produzione, disuguaglianze sociali)

- 0 – Le catene di approvvigionamento agricolo sono integrate e gestite dall'agroindustria. Distanza sociale ed economica tra proprietari terrieri e lavoratori. Assenza di condizioni di lavoro decenti, salari bassi, i lavoratori sono altamente esposti ai rischi.
- 1 – Condizioni di lavoro difficili, i lavoratori hanno salari medi per il contesto locale e possono essere esposti a rischi.
- 2 – Il settore agricolo prevalentemente da agricoltura familiare, ma i produttori hanno un accesso limitato al capitale e ai processi decisionali. Sono presenti le condizioni minime per definire un lavoro “dignitoso”.
- 3 – Il settore agricolo e formato prevalentemente da agricoltura familiare e i produttori (uomini e donne) hanno accesso al capitale e ai processi decisionali. I lavoratori hanno condizioni di lavoro dignitose.

- 4 – Il settore agricolo si basa su aziende a conduzione familiare che hanno pieno accesso al capitalee ai processi decisionali in materia di parità di genere. Prossimità sociale ed economica tra agricoltori e lavoratori.

8.3 Emancipazione ed emigrazione giovanile

- 0 – I giovani non vedono un futuro nell'agricoltura e sono desiderosi di emigrare.
- 1 – La maggior parte dei giovani ritiene che l'agricoltura sia un settore “difficile” e molti desiderano emigrare.
- 2 – La maggior parte dei giovani non vuole emigrare, nonostante le dure condizioni di lavoro, e desidera migliorare le proprie condizioni di vita all'interno della propria comunità.
- 3 – La maggior parte dei giovani (maschi e femmine) è soddisfatta delle condizioni di lavoro e non vuole emigrare.
- 4 – I giovani (maschi e femmine) vedono il loro futuro nel settore agricolo e sono desiderosi di continuare e migliorare l'attività dei loro genitori.

8.4 Benessere degli animali (se applicabile)

- 0 – Gli animali soffrono tutto l'anno di fame e sete, lo stress e per le malattie e vengono macellati senza evitare inutili dolori.
- 1 – Gli animali soffrono periodicamente/stagionalmente la fame e la sete, lo stress o per le malattiee vengono macellati senza evitare inutili dolori.
- 2 – Gli animali non soffrono la fame o la sete, ma soffrono lo stress, possono essere soggetti a malattie e possono soffrire al momento della macellazione.
- 3 – Gli animali non soffrono la fame, la sete o le malattie, ma possono essere sottoposti a stress, in particolare durante la macellazione.
- 4 – Gli animali non soffrono lo stress, la fame, la sete o per malattie e vengono macellati in mododa evitare inutili dolori.

9 Economia circolare e solidale

9.1 Prodotti e servizi commercializzati localmente

- 0 – Nessun prodotto/servizio viene commercializzato localmente (o non ne viene prodotto a sufficienza), o non esiste un mercato locale.
- 1 – Esistono mercati locali, ma quasi nessuno dei prodotti/servizi è commercializzato localmente.
- 2 – Esistono mercati locali. Alcuni prodotti/servizi sono commercializzati localmente.
- 3 – La maggior parte dei prodotti/servizi viene commercializzata localmente.
- 4 – Tutti i prodotti e servizi vengono commercializzati localmente.

9.2 Reti di produttori, relazione con i consumatori e presenza di intermediari

- 0 – Non esistono reti di produttori per la commercializzazione della produzione agricola. Nessuna relazione con i consumatori. Gli intermediari gestiscono l'intero processo di marketing.
- 1 – Le reti esistono ma non funzionano correttamente. Scarse relazioni con i consumatori. Gli intermediari gestiscono la maggior parte del processo di commercializzazione.
- 2 – Le reti esistono e sono operative, ma non comprendono le donne. Esistono relazioni dirette coni consumatori. Gli intermediari gestiscono parte del processo di marketing.

- 3 – Le reti esistono e sono operative, e comprendono le donne. Esistono relazioni dirette con i consumatori. Gli intermediari gestiscono parte del processo di marketing.
- 4 – Esistono reti consolidate e operative con pari partecipazione delle donne. Relazioni forti e stabilicon i consumatori. Nessun intermediario.

9.3 Sistema alimentare locale

- 0 – La Comunità è totalmente dipendente dall'esterno per l'acquisto di prodotti alimentari e di elementi per la produzione agricola, nonché per la commercializzazione e la trasformazione dei prodotti.
- 1 – La maggior parte dell'approvvigionamento alimentare e degli elementi per la produzione agricola viene acquistata all'esterno e i prodotti sono trasformati e commercializzati al di fuori dellacomunità locale. Pochissimi beni e servizi vengono scambiati/venduti tra produttori locali.
- 2 – L'approvvigionamento alimentare e gli input sono acquistati al di fuori della comunità e/o i prodotti sono trasformati localmente. Alcuni beni e servizi sono scambiati/venduti tra produttori locali.
- 3 – Quote uguali dell'approvvigionamento alimentare e degli elementi per la produzione sono disponibili a livello locale ed acquistati all'esterno della Comunità e i prodotti sono trasformati localmente. Gli scambi/scambi tra produttori sono regolari.
- 4 – La Comunità è quasi completamente autosufficiente per la produzione agricola e alimentare. Elevato livello di scambio/commercio di prodotti e servizi tra produttori.

10 Governance responsabile

10.1 Responsabilizzazione dei produttori

- 0 – I diritti dei produttori non sono rispettati. Non hanno alcun potere negoziale e non hanno strumenti per migliorare i loro mezzi di sussistenza e sviluppare le loro capacità.
- 1 – I diritti dei produttori sono riconosciuti ma non sempre rispettati. Hanno un piccolo potere di contrattazione e pochi strumenti per migliorare i loro mezzi di sussistenza e/o per sviluppare le loro capacità.
- 2 – I diritti dei produttori sono riconosciuti e rispettati sia per gli uomini che per le donne. Hanno un piccolo potere di contrattazione, ma non sono stimolati a migliorare i loro mezzi di sussistenza e/o a sviluppare le loro capacità.
- 3 – I diritti dei produttori sono riconosciuti e rispettati sia per gli uomini che per le donne. Essi hanno la capacità e i mezzi per migliorare la loro vita e sono talvolta stimolati a sviluppare le lorocapacità.
- 4 – I diritti dei produttori sono riconosciuti e rispettati sia per gli uomini che per le donne. Essi hanno capacità e strumenti per migliorare i mezzi di sussistenza e le loro competenze.

10.2 Organizzazioni e associazioni di produttori

- 0 – La cooperazione tra produttori non è trasparente, è corrotta o inesistente. Non esistono organizzazioni di produttori o, se esistono, la distribuzione dei profitti non avviene in modo trasparente e/o uguale e non forniscono sostengono ai produttori.
- 1 – Esiste un'organizzazione di produttori, ma il suo ruolo è marginale e il sostegno ai produttori è limitato all'accesso al mercato.

- 2 – Esiste un'organizzazione che fornisce sostegno ai produttori per l'accesso al mercato e ad altri servizi (ad es. informazione, sviluppo delle capacità, incentivi...), ma le donne sono escluse.
- 3 – Esiste un'organizzazione che fornisce sostegno ai produttori per l'accesso al mercato e ad altri servizi con pari accesso a uomini e donne.
- 4 – Esistono più organizzazioni. Esse forniscono l'accesso al mercato e altri servizi, con pari accessoper uomini e donne.

10.3 Partecipazione dei produttori alla gestione dei terreni e delle risorse naturali

- 0 – I produttori sono completamente esclusi dalla gestione della terra e delle risorse naturali. Non esiste parità di genere nella governance del territorio e delle risorse naturali.
- 1 – I produttori partecipano alla gestione della terra e delle risorse naturali, ma la loro influenza sulle decisioni è limitata. L'uguaglianza di genere non è sempre rispettata.
- 2 – Esistono meccanismi che consentono ai produttori di partecipare alla gestione della terra e delle risorse naturali, ma non sono pienamente operativi. La loro influenza sulle decisioni è limitata. L'uguaglianza di genere non è sempre rispettata.
- 3 – Esistono e sono pienamente operativi meccanismi che consentono ai produttori di partecipare alla governance della terra e delle risorse naturali. Possono influenzare le decisioni. L'uguaglianza digenere non è sempre rispettata.
- 4 – Esistono e sono pienamente operativi meccanismi che consentono ai produttori di parteciparealla governance della terra e delle risorse naturali. Sia le donne che gli uomini possono influenzarele decisioni.

STEP 2 – CORE CRITERIA OF PERFORMANCE

Alcune sezioni di questo passaggio chiederanno informazioni su spese, ricavi o prezzi. Specificare la valuta in cui tali valori saranno espressi: _____

Si prenda come riferimento l'ultimo anno di attività produttiva (la pandemia di Covid-19 ha influito?)

1 Colture

1.1 Entrate totali provenienti dalle colture: _____

1.2 Elenca le 10 colture più importanti:

Nome della specie o del tipo di coltura	Produzione totale (Kg)	Quantità venduta (Kg)	Prezzo (valuta/Kg)	Superficie di produzione (Ha)	Numero di varietà/specie prodotte

2 Vegetazione naturale, alberi e impollinatori

2.1 Quanto la zona di produzione è coperta da vegetazione naturale o diversificata? (pascoli naturali, prati, fiori selvatici, cumuli di pietre o di legno, alberi o siepi, stagni naturali o zone umide, ecc.). Segnare solo una risposta

- ☐ Abbondante: più del 25% del sistema è coperto da vegetazione naturale o diversificata
- ☐ Significativo: almeno il 20% del sistema è coperto da vegetazione naturale o diversificata
- ☐ Scarso: meno del 10% del sistema è coperto da vegetazione naturale o diversificata
- ☐ Assente: l'area coperta da vegetazione naturale o varia è trascurabile

2.2 L'apicoltura è presente? Segnare solo una risposta

- ☐ Sì, le api sono allevate all'interno dell'agroecosistema
- ☐ No, le api non sono allevate ma sono diffuse nell'agroecosistema
- ☐ No, le api non sono allevate e sono rare nell'agroecosistema

2.3 In che quantità sono presenti impollinatori e altri animali benefici all'interno dell'agroecosistema? Segnare solo una risposta

- ☐ Abbondante
- ☐ Significativo
- ☐ Scarso
- ☐ Assente

3 Animali

3.1 Entrate totali provenienti dalla vendita di animali: _____

3.2 Elenca le 10 specie di animali più importanti:

Nome della specie animale	Numero totale degli animali allevati	Numero di razze diverse all'interno della specie	Quantità venduta	Prezzo (Valuta/animale)

4 Prodotti di origine animale

4.1 Entrate totali derivanti da prodotti di origine animale: _____

4.2 Elenca i 10 prodotti di origine animale più importanti:

Nome del prodotto di origine animale	Quantità totale prodotta	Quantità venduta	Prezzo (Valuta/unità)

5 Altre attività/servizi

5.1 Totale delle entrate provenienti da altre attività/servizi (ad es. affitto, piccola industria, turismo, ecc.): _____

5.2 Elenca i 10 servizi/attività più importanti:

Nome dell'attività/servizio prodotto o fornito	Ore a settimana impiegate	Quantità venduta	Ricavi totali

6 Spese per input

6.1 Spese totali per il cibo per autoconsumo: _____

6.2 Spese totali per le sementi: _____

6.3 Spese totali per i fertilizzanti: _____

6.4 Spese totali per i mangimi: _____

6.5 Spese totali per servizi veterinari: _____

6.6 Spese totali per acquisto di bestiame: _____

7 Energia, macchinari e manutenzione

7.1 Spese totali per la manutenzione: _____

7.2 Spese totali per il carburante: _____

7.3 Spese totali per l'energia: _____

7.4 Spese totali per i trasporti (vita familiare?): _____

8 Informazioni finanziarie

Si prenda come riferimento l'ultimo anno di attività produttiva.

8.1 Totale delle tasse pagate (anno solare): _____

8.2 Totale delle sovvenzioni ricevute: _____

8.3 Interessi sui prestiti versati: _____

8.4 Reddito totale derivante dall'affitto dei terreni: _____

8.5 Costo totale dell'affitto dei terreni: _____

9 Esposizione ai pesticidi

(Per la selezione del livello di tossicità di ciascun pesticida si rimanda alla tabella seguente)

	Categorie	Segnaletica	ORAL LD50 (mg/kg)	DERMAL LC50 (mg/kg)	INHALATION LD50 (mg/L)
I	Estremo/alta tossicità	Velenoso/ pericoloso	0 – 50	0 – 200	0 – 0.2
II	Tossicità moderata	Attenzione	50 – 500	200 – 2000	0.2 – 2.0
III	Tossicità leggera	Cautela	500 – 5000	2000 – 20000	2.0 – 20
	Non tossicità	Cautela (opzione)	5000 +	20000 +	20 +

9.1 Elencare i 10 pesticidi chimici più utilizzati

Nome del pesticida	Livello di tossicità	Quantità di principio attivo (%)	Quantità di prodotto utilizzato (l o g)	Superficie su cui è stato utilizzato (ha)	Su quale coltura?	Contro quale parassita?

9.2 Spese totali per pesticidi chimici: _____

9.3 Vengono applicate strategie di mitigazione? Quali?

- ☐ Maschera 1
- ☐ Dispositivi per la protezione del corpo (occhiali, guanti, ecc.)
- ☐ Protezione speciale per donne e bambini
- ☐ Segnaletica di pericolo visibile dopo l'irrorazione
- ☐ La Comunità è informata del pericolo
- ☐ Smaltimento sicuro dei contenitori vuoti dopo l'uso
- ☐ Altro:

9.4 Elencare i 10 pesticidi biologici più utilizzati:

Nome del pesticida biologico	Origine: autoprodotto o acquistato?	Quantità di prodotto utilizzata (l o g)	Superficie su cui è stato utilizzato (ha)

9.5 Spese totali per pesticida biologici: _____

9.6 Gestione ecologica dei parassiti. Selezionare le tecniche applicate sistematicamente all'interno del sistema valutato.

- ☐ Controllo culturale (Le varietà più resistenti sono scelte per la produzione; le piante e i frutti che presentano segni di malattia sono rimossi manualmente; ecc.)
- ☐ Piantagione di piante naturali repellenti
- ☐ Uso di colture di copertura per aumentare le interazioni biologiche
- ☐ Favorire la riproduzione di organismi benefici per il controllo biologico
- ☐ Favorire la biodiversità e la diversità spaziale all'interno dell'agroecosistema
- ☐ Altro:

9.7 Che tipo di pesticida è più importante per la vostra produzione?

- ☐ I pesticidi chimici sono più importanti
- ☐ I pesticidi biologici sono più importanti
- ☐ L'uso di pesticidi in una gestione ecologica trascurabile (né chimica né organica) è più importante
- ☐ Altro:

9.8 Usate antibiotici sul bestiame?

- ☐ Solo per il trattamento di malattie
- ☐ Solo per la prevenzione delle malattie
- ☐ Per la promozione della crescita
- ☐ Non uso affatto gli antibiotici

10 Occupazione giovanile ed emigrazione

10.1 Ci sono membri giovani (15-24 anni) nel sistema valutato? (compresi quelli emigrati e che attualmente vivono al di fuori di esso). Se "Sì", fornire le seguenti informazioni:

	Uomini	Donne
Numero di giovani occupati (principalmente) nella produzione agricola del sistema valutato		
Numero di giovani (principalmente) impegnati in attività di istruzione/formazione		
Numero di giovani che non seguono corsi di istruzione/ formazione né lavorano nel settore agricolo, né svolgono altre attività		
Numero di giovani che lavorano (principalmente) all'esterno ma attualmente risiedono nel sistema valutato		
Numero di giovani che hanno lasciato la comunità/villaggio per mancanza di opportunità		
Numero di giovani che desiderano continuare l'attività agricola dei genitori		
Numero di giovani che non vogliono lavorare nell'agricoltura e che emigrerebbero se ne avessero la possibilità		

11 Emancipazione femminile

11.1 Le donne prendono decisioni su cosa produrre e su cosa fare con i prodotti (controllo sul reddito, autoconsumo)?

	Io (donna)	Mio marito (uomo)	Insieme	Altre persone
Chi è il proprietario delle colture e delle sementi?				
Circa la produzione vegetale, chi normalmente prende le decisioni?				
Chi è il proprietario degli animali?				
Cerca la produzione animale, chi normalmente prende le decisioni?				
Chi è il proprietario del patrimonio per le altre attività economiche all'interno della famiglia?				
Chi è il proprietario dei beni principali della famiglia? (casa, macchinari, etc)				
Circa i beni principali della famiglia, chi normalmente prende le decisioni?				
Chi è il proprietario dei beni domestici minori? (piccoli attrezzi, giardino, etc)				
Circa i beni di consumo minori, chi normalmente prende le decisioni?				

11.2 Decision making in rapporto alle entrate

	Non ha contribuito o ha contribuito poco	Ha contribuito in alcune decisioni	Ha contribuito in molte decisioni
Quanto ha contribuito alle decisioni sull'utilizzo dei ricavi generati dalla produzione vegetale?			
Quanto ha contribuito alle decisioni sull'utilizzo dei ricavi generati dalla produzione animale?			
Quanto ha contribuito alle decisioni sull'utilizzo delle entrate generate attraverso altre attività economiche?			

12 Salute del suolo

12.1 Per la valutazione del suolo, scegliere una superficie della zona produttiva che più riflette lo statomedio dei suoi terreni.

Indicatori	Valore	Caratteristiche	Punteggio (da 1 a 10)
Struttura	1	Suolo polveroso e sciolto senza aggregati visibili	
	3	Pochi aggregati che si rompono con poca pressione	
	5	Aggregati ben formati e difficili da rompere	
Compattezza	1	Terreno compattato, bandiera si piega facilmente	
	3	Sottile strato compattato, alcune restrizioni ad un filo penetrante	
	5	Nessuna compattazione, bandiera può penetrare fino in fondo nel terreno	
Profondità del suolo	1	Sottosuolo esposto	
	3	Sottile strato superficiale	
	5	Suolo superficiale (>10cm)	
Stato dei residui	1	Residui organici in lenta decomposizione	
	3	Presenza di residui di decomposizione dello scorso anno	
	5	Residui in varie fasi di decomposizione, maggior parte dei residui ben decomposti	
Colore, odore e materia organica	1	Odore pallido, chimico e nessuna presenza di humus	
	3	Marrone chiaro, inodore, e qualche presenza di humus	
	5	Marrone scuro, odore fresco e abbondante humus	

Ritenzione idrica (livello di umidità dopo irrigazione o pioggia)	1	Suolo asciutto, non contenente acqua	
	3	Limitato livello di umidità disponibile per breve tempo	
	5	Livello di umidità ragionevole per un periodo di tempo ragionevole	
Copertura del suolo	1	Terra nuda	
	3	Meno del 50% di terriccio coperto o di copertura viva	
	5	Più del 50% di suolo coperto da residui o da copertura viva	
Erosione	1	Grave erosione, presenza di piccoli calanchi	
	3	Segni evidenti, ma bassi di erosione	
	5	Nessun segno visibile di erosione	
Presenza di invertebrati	1	Nessun segno di presenza o attività di invertebrati	
	3	Alcuni lombrichi e artropodi presenti	
	5	Abbondante presenza di organismi invertebrati	
attività microbiologica	1	Poca effervescenza dopo l'applicazione del perossido d'acqua	
	3	Effervescenza da leggera a media	
	5	Abbondante effervescenza	