

MAPPING AGROECOLOGY IN HUNGARY





AUTHORS:

Lili Balogh, Védegylet
 Katalin Réthy, Védegylet
 Bálint Balázs, ESSRG
 contributor: Péter Kajner
 revision: Virginia Pignata
 graphic design: Dorottya Poór
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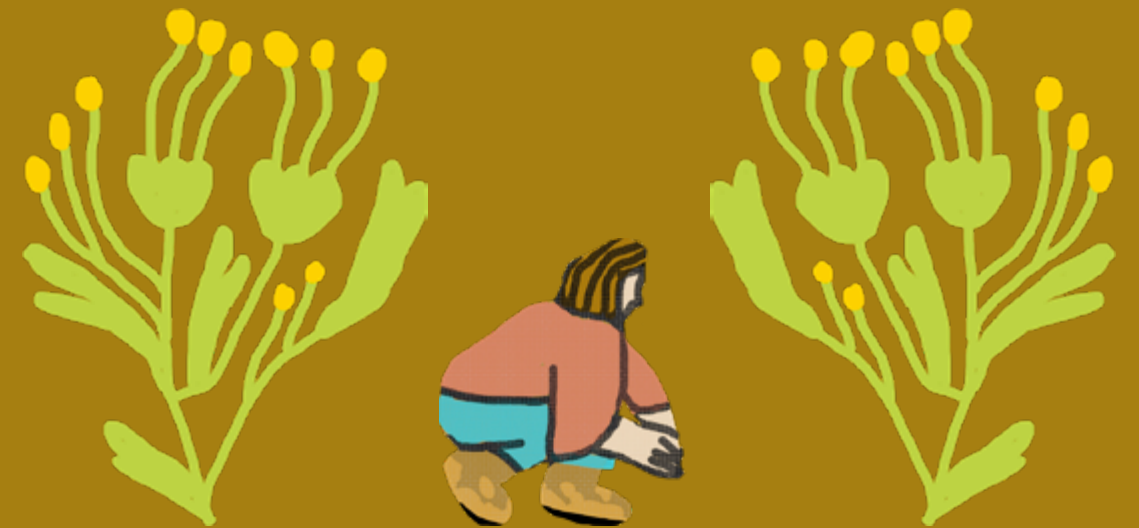
EXECUTIVE SUMMARY

The report “Mapping Agroecology in Hungary” is the result of a 10-month-long mapping project in 2019-2020, commissioned by Agroecology Europe, carried out by Védegylet Egyesület with the help of the Environmental Social Science Research Group (ESSRG), Hungary. The goal of this research was to gain a general overview of the present state of agroecology in Hungary, through attaining an understanding of the historical and political contexts in which these developed and currently function, but also to map agroecology related initiatives, research and their networks. Our goal was also to interpret agroecological principles in the Hungarian context, providing a theoretical background for future research and cooperation. Since the mapping would serve as a basis for advancing agroecology in Hungary, the research was also aimed at apprehending in detail the main drivers and challenges that the different actors and networks are facing.

The report finds that Hungary, considering a transformation towards agroecology, is well situated with its history and present richness of actors all over the country. Still, any transformation will only happen if the actors cooperate formally, and therefore can advocate for agroecological transition in a coordinated manner. Agroecology provides a desirable policy objective with the potential to mobilise farmers and other people working in agriculture, researchers, activists and consumers for a common goal: to create a regenerative, socially just, healthy food system in Hungary. As agroecology advances in Europe and the world, Hungarian initiatives could benefit from projects that connect them to similar international partners.



1. INTRODUCTION



1.1. Research background and participants

Hungary has a rich institutional history of agricultural production, research and higher education; and there is a wide variety of alternative, sustainable agriculture and food-related initiatives. These initiatives are often fragmented in their activities while also facing institutional barriers related to funding and an enabling policy environment. Agroecology is a term not yet widely used in Hungary, and if used, it is often leading to confusion among agricultural professionals, civil society organisations and policymakers alike. Agroecology as an umbrella term also has the potential to hook in farmers, researchers, activists and consumers for a common goal: to create a regenerative, socially just, healthy food system in Hungary. As agroecology advances in Europe and the world, Hungarian initiatives could benefit from projects that connect them to similar international partners.

The following report is the result of a 10-month-long mapping project in 2019-2020, commissioned by Agroecology Europe, carried out by Védegylet Egyesület with the help of the Environmental Social Science Research Group (ESSRG), Hungary. The results from the Hungarian mapping and 6 additional case studies were also added to the Europe-wide mapping of agroecology, coordinated by Agroecology Europe Youth Network, presented in a separate report.

Védegylet and ESSRG have been contributing actively to research, education and capacity development of agroecology related initiatives in recent years; catering to the needs of grassroots organizations, citizens and farmers for advocacy and network organization as well. The project partners hope that this mapping project and related activities in 2019 - such as the first Hungarian Agroecology Conference - will help identify possible allies and advance the case of agroecology in Hungary and Europe.

1.2. Theoretical framework

The need for an agroecological transition

Since the Green Revolution during the 20th century, global agricultural outputs have doubled due to advances in plant breeding, technologies and the expansion of agricultural areas (Grassini et al., 2013). The practices of industrial agriculture have become “conventional”, ruling the current paradigm of food production. Characterized by a heavy reliance on non-renewable resources, intensification, specialisation on a continuously growing scale; while succeeding at increasing outputs and making food a global commodity, the industrial food system also causes major problems for the environment and the whole society (Wibbelman et al., 2013). Biodiversity loss, soil, water and ecosystem degradation cause major challenges for the environment; while the depopulation of rural areas, human health issues related to nutrition, and obstacles faced by many for accessing quality and nutritious food prove that drastic change is needed both in food production, distribution and consumption (IPES-Food, 2016; Wezel et al., 2018). Agroecology calls for a paradigm shift in how we approach food production and consumption in its environmental, social and economic context; ideally resulting in a state of food production where the needs of communities and the integrity of the ecosystem are well balanced. An agroecological transition would entail a long-term, fundamental change in the whole food system; enhancing farm and landscape diversity, securing farm livelihoods and access to healthy, quality and nutritious food for all consumers (IPES-Food, 2016).

Definitions, principles and practices of agroecology

Agroecology is generally defined as the integration of scientific research approaches, a collection of practices and a socio-political movement. In the definition of Gliessman, agroecology is characterized by valuing different forms of knowledge (transdisciplinarity); requiring the participation of a wide array of stakeholders (participatory) and offering alternatives to the current industrial food system (action-oriented). As it is based on a wide array of knowledge systems and actors, agroecology results in a holistic, system-level approach to food systems (Gliessman, 2016).

As a scientific discipline, agroecology developed first as a combination of agronomy and ecology, studying the interactions between agricultural systems, their components and their natural-physical environment (Wezel & Soldat, 2009). As agroecology developed in scale from the field and farm to the food system level, its scientific inquiries now also emphasize the interrelatedness of all of its elements: not only in natural systems but also within human society. Being aimed at finding locally adapted solutions, agroecological research approaches are action-oriented and participation-based, including various stakeholders in the research process (Gliessman, 2016). Methods in research are multi-scale and transdisciplinary with a system approach, including knowledge and advances from various disciplines, as well as local and traditional knowledge (AEEU, 2019).

Agroecological farming practices are aimed at reducing reliance on external inputs while working with ecological processes for crop and animal protection and nutrition, also contributing to protecting and regenerating the soil food web and surrounding landscapes and ecosystems. Examples of agroecological practices include organic agriculture, regenerative agriculture, permaculture, agroforestry, integrated pest management, closing resource cycles, use of crop rotations and cover crops, biological pest management - if they are applied in a holistic way. Farming in an agroecological way does not follow a strict set of rules, and it is rather based on adapting to local circumstances, for which agroecology provides a toolkit (Silici, 2014). Agroecology also extends to the whole food system and rural development, and advocates for reducing food miles and waste, strengthening local markets, supporting local food cultures and rural livelihoods. Agroecological marketing practices include, for example, community-supported agriculture (CSA) and participatory guarantee systems (PGS) (Hatt et al., 2016).

Agroecology is rooted in grassroots movements formed by small-scale producers and consumers that fight for food and seed sovereignty, food and social justice, access to land and other resources. Prioritizing local communities over large corporations in the whole food system means that agroecology is also a means to food sovereignty. Initiatives are characterized by social equity between actors, democratic governance, shared organization, geographic proximity of producers and consumers and fair distribution of financial profits (Dumont et al., 2016). A summary of the principles of agroecology and the tools to realize them are presented in Table 1.



PRINCIPLES		TOOLS AND PRACTICES
SCIENCE	Holistic approach	-Participatory research -Action research -Agronomy,ecology,sociology, economics
	Transdisciplinarity	
	Locally adapted solutions	
PRACTICE	Sustainable use of local renewable resources	-Organic agriculture, permaculture, biodynamic agriculture, agroforestry -Recycling of biomass, composting, cover crops and mulching -Minimize energy, water and nutrient loss -Minimize dependence on external resources -Crop rotation and fallowing -Local crop varieties and livestock breeds -Enhance biological interactions -Conservation tillage -Intercropping, polycultures -Holistic landscape management -Local and short food supply chains, CSA, PGS -Locally adapted design of farming and food systems -Traditional or innovative products
	Regenerating biodiversity	
	Providing resilience	
	Applying ecological principles	
	Climate change mitigation and adaptation	
	Geographic proximity between producers and consumers	
MOVEMENT	Defending smallholder and family farming	-Financial independence, market access -Farmers groups, advocacy -Sharing of knowledge -Cross-sectoral dialogue -Shared organization -Participatory governance -Fostering food culture
	Food, seed and land sovereignty	
	Sustainable and fair food system	
	Autonomy of farmers	
	Social equity between actors	

Table 1.: Key principles and tools of agroecology

Mapping agroecology: examples from Europe

Three examples from Europe served as an inspiration for the methodology in this paper. Wezel et al. (2018) mapped research, education and collective action networks of agroecology in Europe. They identified research institutes, education programs, research topics and social movements based on keywords related to the specific sector. Sources of information included literature and internet research, workshop summaries and a World Café from the Agroecology Forum in 2017. Migliorini et al. (2018) provided a detailed analysis of agroecology in the Mediterranean countries of

Italy, Spain and Greece; highlighting specific strengths and weaknesses for agroecology in the region. Data was collected from experts and through a keyword-based literature review, including grey literature. A mapping guide was published in 2019 through the AgroecologyNow! initiative, highlighting issues and challenges related to mapping agroecology. According to the guide, mapping can be performed to inspire with good practices, build an evidence base for projects and advocacy, facilitate networking or help market products. The authors also highlight the importance of participation of the mapped actors and a conscious application of control over who and what gets on the map (Milgroom et al., 2019).

1.3. Research aims

The mapping aimed to gain a general overview of the present state of agroecology in Hungary, through attaining an understanding of the historical and political contexts in which these developed and currently function, but also to map agroecology related initiatives, research and their networks. The goal was also to interpret agroecological principles in the Hungarian context, providing a theoretical background for future research and cooperation. Since the mapping would serve as a basis for advancing agroecology in Hungary, the research was also aimed at apprehending in detail the main drivers and challenges that the different actors and networks are facing.

In more detail, the following research questions were posed:

- What is the historical, social and political context for agroecology in Hungary? What key-terms can be used to define it, and how do these relate to international definitions?
- Who are the main actors connected to the case of agroecology in the three pillars (science, movement, practice)?
- What agroecological practices are present in small and medium-scale food production, processing and distribution?
- How are agroecological principles expressed in education, research and policies?
- Which agroecological themes can be identified in social movements?
- What is the connection between initiatives, how can their networks be characterized?
- What are the barriers and opportunities for developing agroecology in Hungary?

1.4. Methodology

Research steps in mapping agroecology in Hungary

A mixed method approach was used within a cooperative research framework in the following phases:

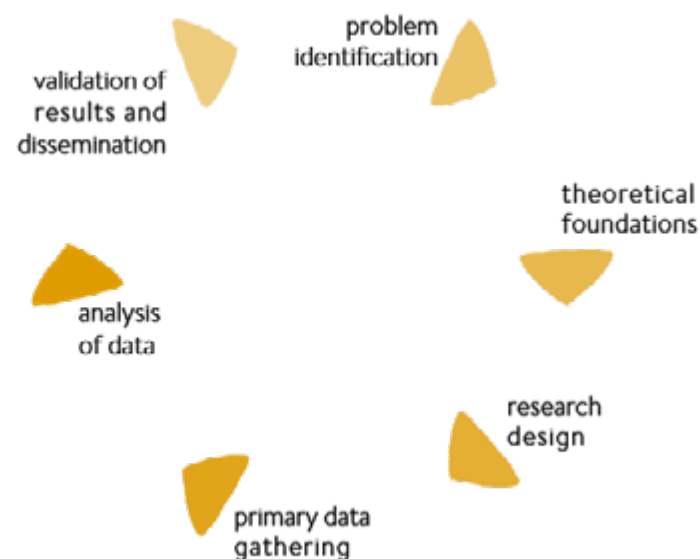


Figure 1.: Research steps. Based on Creswell 2003

Problem identification and framing

Relying solely on self-definition of agroecology poses problems for mapping agroecology in Hungary, as the term itself holds different or confusing meanings compared to those currently accepted by the global stakeholders of agroecology (see in detail chapter 2.2.) Mapping actors solely on the keyword “agroecology” would not have been sufficient; therefore, principles and practices related to agroecology presented in Table 1. were used during data collection.

Literature and online search were performed based on these keywords to collect actors, soft and hard literature for historical, social and policy context. A bibliography was compiled of journal articles and soft literature (publications, conference reports, books, educational materials, etc.) using the software Zotero.

Sources of literature and online search included:

- Google and Google Scholar;
- Arcanum (online digitized library of newspapers and journals);
- Online archives of national level journals;
- Hungarian National Agricultural Library database and library services.

See Appendix 1. for the curated bibliography.

See Appendix 2. for keywords used in search and analysis of initiatives.

Research keywords are presented in Table 6.

Based on the stakeholder mapping, the extensive literature review and insights of previous studies, we carried out explorative interviews and a vision-to-action workshop with the main stakeholders and representatives of agroecology in Hungary. This helped to understand the differences in problem identification and framing by various key informants. Stakeholders’ understanding of the problems around agroecology also instructed our framework for analysis.

Theoretical basis

Explorative interviews and informal discussions with various disciplinary and stakeholder representatives were particularly helpful in identifying the relevant theoretical approaches in the literature and reflect on the local context-specific aspects of the research. The conceptualisation of agroecology in Hungary is building on the theoretical understanding of the field (Wezel et al., 2018). A list of relevant stakeholders was compiled, extending to Hungarian-language literature and thematic bibliography by Hungarian authors.

Research design

The research aimed at the exploration of differences in interest and attitudes towards agroecology between various stakeholders. The qualitative interviewing have been combined quantitative data gathering within a cooperative research setting created by Védegylet and ESSRG (see above the figure based on Creswell 2003).

Data gathering and analysis

The research is based on stakeholder mapping and key informant interviewing. The cases of agroecology in Hungary were identified in their original contexts (Yin 2003), and we worked with stakeholders to create the use case descriptions. The cases illustrate the most desirable forms and types of agroecological practice in Hungary (See in Appendix).

Methods

During the data gathering and analysis, the following methods were used:

- Desk research: document analysis and stakeholder mapping;
- Formal and informal qualitative interviewing;
- Vision to action workshop.

All these methods were embedded in a participatory and cooperative research process.

Desk research

As a first step, we carried out a web search of the publicly available internet sources and archives, searching for previous studies and policy documents.

We initiated email exchange with the representatives of the use cases and gathered information through personal emails.

Qualitative interviews

A semi-structured interview approach was used, relying on a template with the most relevant analytical points. The deepening of the questions followed the actual context of the interviews to explore the principal attitudes towards agroecology in Hungary.

The anonymized list of selected interviewees is shown in Table 2., as well as their nearly equal distribution according to the three pillars of agroecology: Science (3); Practice (5); Movement (4). Note that some interviewees and/organizations have activities that can be part of two pillars. The selection of interviewees aimed at reflecting the reality of the situation by presenting representatives balanced between the different constituencies (NGO, State Institutions, SME, Farmers, Advocacy Groups, Researchers, Academia, etc.). In addition to the 10 interviews conducted face-to-face in Hungary, the Hungarian Ministry of Agriculture has been as well requested to give an interview; they chose to give a written answer, including their related activities.

The qualitative interviews consisted of two parts: first a list of words taken from various definitions of Agroecology (from Agroecology Europe, the Nyéléni Movement, Lexicon of Natural Conservation, FAO, Assessment of the Agroecological Potential of Hungary) was presented to the interviewees to point out 5-10 words that is the most relevant to their activities, and what agroecology means to them. The keywords used in the interviews are presented in Chapter 4. Following this introduction, the semi-structured, qualitative, explorative interviews were conducted using a pre-established frame between May and July 2019 in person by co-workers of Védegylet, lasting between 60 and 180 minutes. The interviews were tape-recorded and transcribed verbatim before data analysis.

See Appendix 4. Semi-structured interview guideline

NR. OF INTERVIEWEE	ORGANIZATION	PROFESSION OF THE INTERVIEWEE	SCIENCE, MOVEMENT, PRACTICE
1.	Hungarian Organic Association	Managing professional	P/M
2.	MTVSZ- Hungarian Association for Nature Conservation	Program coordinator	M
3.	NAK - Hungarian Agricultural Chamber	Innovation expert	P
4.	Talajmegújító Mezőgazdaság	Farmer, no-till activist	P/M
5.	Hungarian Academy of Sciences, Traditional Ecological Knowledge Research Group	Research group leader, researcher, scientific advisor	S
6.	Private individual	Agricultural economist	P
7.	NAIK- Agricultural Research and Innovation Center	Agro-Environmental Research Institute, Scientific Advisor	S
8.	Agrofutura	Company owner, advisor, nutrient management specialist	P
9.	Szent István University, Faculty of Agricultural and Environmental Sciences	Associate professor	S
10.	AGRYA- National Association of Young Farmers	Copresident, farmer, lecturer at University	MA

Table 2.: List of selected interviewees

Vision to action workshop

On the 5th of December 2019, Védegylet co-organized with ESSRG and the Research Institute of Organic Agriculture and with the support of FAO a workshop entitled “Agroecology: Vision to Action” with the aim to connect actors from agroecological initiatives in Hungary and form

a basis for future cooperation of the stakeholders (farmers, researchers, members of civil society organisations, consumer associations and NGOs, decision makers, etc.). The event was useful on many levels: different stakeholders got to know each other and collaborations have been born; a common, agreed context for agroecology in Hungary was discussed (with its

constraints, realities and opportunities); and last but not least, the participants created long-term visions, which were then translated into short term goals and actions. The main outcome of the workshop was an agreement on the creation of a Hungarian Agroecology Network.

Data analysis

Interviews were anonymised and then analyzed to show common threads and general patterns of thinking about the actual practice of agroecology in Hungary. The analysis used meaning condensation and interpretation (Kvale, 2005). In this way, the principal attitudes, concepts could be identified, and give an interpretation of the underlying meanings and interlinkages within the conceptualisation of agroecology. The insights show how the current understandings of agroecology reflect the broader societal position of agroecology in Hungary. Also, the interviews reveal that stakeholders actively create this field by shaping the current context of agroecology. Transcripts, personal notes and video recordings from specific events during 2018-2019 related to agroecology organized by Védegylet were used in the qualitative analysis as well. These events have included expert opinions and statements from a wide array of stakeholders from all three pillars. These sources are:

- Transcripts of roundtable discussions during the Agroecology Nights event series co-organized with the Central European University between the dates November 2018 -March 2019. The four events aimed at showing the different dimensions of agroecology (environmental, social, economic and political) through concrete examples presented by practitioners, generating lively discussions with the public;
- Video recordings of the roundtable discussions from the Agroecology conference organized in Budapest on 27-28.11.2019 by Védegylet, ESSRG and the French Institute of Hungary;
- Personal notes from the workshop ‘Creating a Common Vision: laying the foundations of the Hungarian Agroecology Network’ on agroecology organized by Védegylet on 5.12.2019,

bringing together different key-figures from all pillars of agroecology.

As part of the Europe-wide mapping project organized by Agroecology Youth Network, 6 case studies were commissioned by Védegylet, and also featured in this analysis.

Quality assurance

Validity and reliability of the research results require complete transparency and replicability of the entire research process, including data gathering and analysis. The main external validity claim is that by replicating this study, other researchers draw similar conclusions. In this case, this was strengthened by using mutually agreed protocols, guidelines and templates for the research. The data sources were shared with the stakeholders, and the main aims and methods of the research were negotiated. The construct validity of the research required to use various (primary and secondary) data sources and provide our interviewees with a safe space to interpret the results. The generalisability of the research is illustrated by the actual insights gained throughout the process as defined by the given socioeconomic context of agroecology in Hungary. The validity of the research is dependent on the reality check (clarity and wholeness) of these insights. The validity of the research is further increased through several consecutive public presentations of the results in conferences and workshops, which in practice pressed for substantial modifications of our results based on stakeholders’ and experts’ feedback.



2. CONTEXT OF AGROECOLOGY IN HUNGARY



2.1. From landscape research to agroecology and agri-environmental management

It is beyond the scope of this report to analyze in detail the history of important figures, scientific institutions, policies and social movements forming the perception of agroecology today in Hungary. However, some key topics and events are important to summarize for the sake of understanding the current state of it.

Landscape research started to establish in Hungary at the end of the 19th century, when the history archaeology, climate, habitats, plant and animal species of certain regions were described in detail. Being multidisciplinary in nature - some of the most memorable landscape researchers were themselves experts in several different disciplines. For example, Ottó Hermann, who wrote studies in the fields of the natural history of certain regions, ethnography, linguistics of peasants and fishers, was the founder of both the Hungarian Ornithological Society and the Hungarian Ethnographic Society. During the first half of the 20th century, a movement of village research started, with a strong focus on rural sociology and anthropology (Herédi, 1976; J. Kiss, 2020). After the Second World War, landscape ecology was defined by Marosi and Szilárd as an interdisciplinary field combining geography, landscape descriptions and landscape ecology practices. Marosi was also the one who established a national level landscape evaluation system-defining large, medium and small landscapes and categorizing them by natural factors and agricultural economic potential. Along with more specific national mapping, for example, genetic soil categorization of habitats by Pál Stefanovits, the work of these scientists inspired large-scale national projects during the 1980s- 2000s (Géczi, 2014).

In the government issued project “Mapping of the agroecological potential in Hungary” Láng et al.. (1983) undertook a large-scale analysis of Hungarian territories for potential biomass yields. The mapping aimed at analyzing ecological

conditions until the new millennium and gave a prognosis on which plant production levels could be reached, what political and economic consequences were to be expected. By adapting the production systems to the agroecological potential of different regions, hope was to make better use of natural resources, increase productivity and reduce food prices (Láng, 1981; Láng et al., 1983). In 2004, professor Láng, the agrochemist behind mapping the agroecological potential undertook another large-scale project. The VA-HA-VA research project (“Változás-Hatás-Válaszadás”/meaning Change-Effect-Response) included over 100 scientists from a wide range of disciplines to analyze the challenges posed by climate change and develop adaptation strategies (Láng, 2005). The research “Agroecology - Environmental implications of agroecosystems and methods for regulation” is associated with the agronomist and soil scientist György Várallyay, undertaken in 2004 (Várallyay, 2004, 2005). The research program was multidisciplinary, realized with scientists from the fields of soil science, water management, meteorology, plant ecology, plant pathology, agronomy, mathematics and physics.

“The main objective of the „Agroecology” Program was to identify, describe, quantify and evaluate the main physio-geographical factors (climate, weather, soil, water resources, biota) and land-use practices from the viewpoint of agro-ecosystems; to clarify their relationships and the mechanism of the existing processes in the soil-water-plant-air continuum for their efficient control.”

Ángyán et al. developed a land-use zonation system combining the agroecological potential and environmental sensitivity, based on 28 soil, climatic and environmental factors. Additionally, several land-use scenarios were developed, and changes in land-use patterns were proposed (Ángyán & Podmaniczky, 1997). The adaptation of land use to the local conditions forms the basis of

the wide-spread discipline and policy of agro-environmental management (for example as indicated by the number of university programs described in Chapter 3.). In a coursebook for university students, Ángyán emphasizes the important aspects of agro-environmental management:

- Understanding landscape ecology and local cultural heritage;
- Developing land use patterns based on ecological vulnerability;
- Recycling biomass, managing natural resources responsibly;
- Mapping and analyzing the environmental effects of agriculture, ecotoxicology;
- Extending organic, environmentally friendly and integrated management practices.

Ángyán also points out the importance of maintaining traditional and extensive land-use practices, especially in environmentally vulnerable areas, such as:

- Extensive grassland management in sandy and saline pastures to avoid desertification;
- Silvopastoral systems - agroforestry to maintain environmental and cultural landscape value;

- Extensive cropland production in mosaic landscapes with small parcels;
- Traditional plantations of fruits and vines, management of flood basin orchards;
- “Tanya system”-homesteads developed during the 19th century for small-scale market farming and family level self-sufficiency, the “tanya” buildings and related small-scale farms are still an existing form of farming (Ángyán et al., 2010).

Combining multidisciplinary analysis for land zonation and locally adapted, often traditional methods of land use, while keeping in mind cultural heritage and advocating for system-level change; Ángyán’s interpretation of agro-environmental management is very similar to the definitions of agroecology presented in Chapter 1.2.. Unfortunately, at the policy level, agro-environmental management was reduced to CAP payments (see Chapter 3.), while land access to practice traditional agriculture has been hindered by land-grabbing (Gonda, 2019). However, along with long traditions of multidisciplinary landscape research, the concept of agro-environmental management has been forming the mindsets of scientists, farmers and activists working today in agroecology-related research, production and movements.

2.2. Environmental and agricultural movements in Hungary in light of agroecology

Grassroots green and peasant movements in the second half of the 20th century were not present due to the restrictions imposed in the communist era, during which large-scale collectivization and the ending of private land ownership was carried out. The forced collectivization resulted in large-scale, industrial, state-controlled cooperatives, active in production and marketing of agricultural products. “Háztáji” – meaning small-scale, subsistence agriculture – however, was allowed for fruits, vegetables and meat; some of these products were also marketed on local markets (Bognár, 2008). The communist political system steered away from the international environmental movements of the 1960s and 1970s, the driving opinion being that a socialist system does not need environmental protection, as all economic actors automatically take care of the environment (Borsos, 1995).

The environmental movement started to evolve in the 1980s, as groups formed around demonstrations against large-scale nature forming investments, such as the Bős-nagymarosi dam. The green movement became a strong political force during the system change of 1989 and continued to evolve during the 1990s. Among the notable organizations were Ökotárs Alapítvány, formed in 1991, or the National Society of Conservations, both large-scale national umbrella organizations. The green movements yearly meeting (the “Zöld Civil Szervezetek Országos Találkozója -Zöld OT”) was initiated in 1989 and still carries on today (Papp, 2017). In the new democratic system in the 1990s, environmental questions were marginalized, green issues were not a central theme in politics, but there was a growing number of civil organizations around environmental questions, focusing mostly on local issues. During the 2000s, there was a noticeable expansion, during this time also global organizations, such as Greenpeace or WWF became active in Hungary, but also national anti-globalisation NGOs were born, such as Védegylet. In 2008, the first

green party, “Lehet Más a Politika” (LMP) was formed (Glieb, 2013), comprising many members of the before-mentioned green NGOs.

Organic farming started with local gardening and bioculture clubs in Hungary in the early 1980s. As grassroots associations were mostly prohibited, the movement was informal until the regime change in 1989. During the early years, the organic movement organized meetings and international study tours, published a magazine and developed an organic certification system, Biokontroll Hungária, that was launched in 1996. Only in the second half of the 1990s did market production start with oilseeds and cereals that left the country without further processing (Czellér, 2015; Szabó, 2018). In 1995, the Kishantos Mezőföldi Népfőiskola, an organic demonstration farm and folk high school was launched based on Scandinavian and German examples. Unfortunately, in 2013 most of its activities ceased, after the government cancelled land lease to the organization, which generated an uproar amidst national environmental and organic movements (Gera, 2018).

Ecovillages also played an important role in shaping the environmental and food movements in Hungary. The first ecovillages in Hungary were formed in the early 1990s but were rooted in the underground green movement of the 1980s. These settlements aimed to fit into the landscape with as little environmental damage as possible, providing good practices in organic farming, environmentally friendly techniques for living, sewage etc., while remaining resilient to the vulnerabilities. The Hungarian Network of Living Villages (Élőfaluk Hálózata) includes some ecovillages based on modern sustainable technologies (Győrűfű), others more low tech (Krishna-valley), some formed newly, some stemming from old villages struck by depopulation. They are important steps on community-level self-sufficiency and organic farming, educational centers, ecology, biodiversity and landscape management (Farkas, 2014).

The grassroots environmental and agricultural movements developed together in Hungary and recent years show a definitive conversion towards each other. Védegylet has been working in national and local causes since 2000 and was an important advocacy organization for small-scale farmers. Joining the EU in 2006 caused some uproar among small-scale and family farmers, around this time organizations formed around ecological, socially just aims of food production, processing and distribution, such as the Association of Conscious Consumers (TVE) (Papp, 2017). Greenpeace has been active in questions of global food production and regulations (e.g. GMOs, pesticides), but since its launch in Hungary actively engages in Hungarian issues of pesticides, toxic substances and related environmental issues, land-grabbing, GMO regulation, public catering and organic farming. Greenpeace provided major support for Kishantos, both in activists and lobbying when the demonstration farm was stripped from its land (Greenpeace, 2019). Also, WWF is showing active engagement in agricultural issues, such as national park land management for sustainability or floodplain management (WWF, 2019). Another important NGO in this field is the National Society of Conservationists – Friends of the Earth Hungary

founded in 1989, comprising over 100 member groups from all counties of Hungary. Their mission is the protection of nature as a whole, as well as the promotion of sustainable development. Large-scale farmer demonstrations started in 2005 due to delays in subsidy payments offered by the government. Most memorable for the public were the thousands of tractors marching to Budapest, and a general assembly of farmers was held in front of the Parliament. The causes and effects of these demonstrations are explained in a separate report issued by Védegylet, that can be found in Appendix 5, which highlights:

“The successful advocacy was a great moment for the farmers’ society and drew public attention to the problems of the countryside. The agreement following the Farmers’ Protest eased the liquidity problems of farmers, provided answers to many current problems, but did not change the strategic directions of agricultural policy. The concentration of land has further increased, and the beneficiaries of agricultural and rural development subsidies co-financed by the European Union have mainly become large landowners and agricultural companies. Measures for rural development have been relegated to the background in the allocation of resources”

2.3. Definitions of agroecology

The term agroecology is not widespread and often leads to confusion - as experienced at the interviews, events and in the literature. Agroecology (“agroökológia” or “agrárökológia” in Hungarian) is primarily presented in the literature as a scientific discipline studying the ecology of agro-ecosystems. In his summary “Agroecology -Landscape ecology” Várallyay (Várallyay, 2005) defines agroecology as the following:

“Agroecology is the science of understanding the relationships between the agroecosystem and the environment. An agroecosystem is a collective of habitats and living organisms, and humans have altered that for their own goals. Agroecology is an ecology: agroecosystems are ecosystems, crop plants and

their environments are populations, only the grade and means of regulation are different. One of the basics of agroecology is the water stored in the soil that affects the whole system of water management.”

In an educational material called “Agro-ecology” Godo (2011) frames agroecology as the ecology of the agroecosystem; including the effects of the environment on crop plants, but not the effects of agriculture on the ecosystem. Basics of soil ecology, plant and microbial connections are described; however, chapters on soil improvement present mostly industrial methods: deep tillage, watering systems, detailed description of herbicides and pesticides (Godo, 2011). The Lexicon on Nature Conservation also gives a short definition:

“Agroecology is a field of ecological sciences, that focuses on the populations living in agricultural areas, ecosystems managed by humans and the relationship between their environment.”

These definitions hold meaning in the context of agronomy and ecology exclusively, mostly indicating agroecology as a discipline to enhance productivity in cropping systems; although the definition of the Lexicon suggests nature conservation implications as well. More recently, Apolka Ujj argued for the necessity of including traditional knowledge in agricultural education, highlighting an important aspect of agroecology: the integration of different knowledge systems (Ujj, 2016).

“Agroecology, as a science that approaches agriculture from an ecological perspective, that aims to stabilize and optimize agricultural systems as a whole. Agroecological farming relies on the techniques of traditional farming, that could fall behind the productivity of conventional farming, but it is more sustainable and energy-efficient. Combining traditional peasant and agroecological knowledge and by that endorsing a truly holistic approach in farming poses a huge challenge not only for farming but also for science and education.”

A similar definition is provided by the Hungarian Embassy of Italy (Magyar Nagykövetség Róma, 2018) in a summary of an agroecology themed event:

“Agriculture always played a central role in the history and economy of Hungary. Environmental sustainability, protecting the natural ecosystem, biodiversity and genetic resources are priority areas in Hungary. This is served by agroecology, in which traditional professional knowledge is present alongside technological innovation in the Hungarian agricultural sector, except for GMO products, which are consistently rejected by Hungary. Zoltán Kálmán also mentioned several Hungarian governmental, local and social initiatives that help local producers and promote healthy eating; while drawing attention to the economic, environmental and social tripartite requirement of sustainability for future generations.”

These definitions expand agroecology to the food system level, while also implying a reciprocal relationship between agriculture and the environment, highlighting the importance of practices that are environmentally sustainable in the long term. A social angle is also introduced in the form of helping local producers, social initiatives and providing healthy food for the population. Definitions of agroecology similar to those in the international literature, highlighting its sectors and more elaborately connecting it to the themes of food system-level transformation, social justice, food, seed and land sovereignty are scattered. Only two examples were found during the literature review; both were presented as information materials online by Civil Society Organisations (CSOs). The Hungarian Association of Nature Conservation, member of Friends of the Earth Europe has published so far the most extensive material on agroecology, introducing it as a science, a practice and a socio-economic movement (MTVSZ, 2015). They also highlight the importance of transforming the whole food system based on local communities and needs with a mind for social justice:

“We believe that by transitioning to agroecology, we rediscover and capture local knowledge, the emphasis is moved to local needs. Our food system will support the local economy and people, resulting in a more just and environmentally friendly economy. For the Hungarian Association of Nature Conservation (...) agroecology entails looking at the whole food system, including food production, distribution and consumption. (...) Agroecology must accommodate active citizens and communities; it enables them to decide what food to grow, consume and how to manage local resources.”

However, as it will be discussed in Chapter 4. as well, this definition is mostly unknown-and the term agroecology - especially its implications for society - leads to confusion among professionals.

2.4. Previous mapping projects, reports

During the literature review, no exclusively Hungarian mapping project was found comparable to the mapping reports shown as examples in Chapter 1.2; however, several mapping projects were found related to certain segments of agroecology.

Moudry et al. (2018) mapped the development of agroecology in Eastern Europe - including country reports from the Czech Republic, Bulgaria, Hungary, Poland, Romania and Slovakia. The chapter on Hungary, written by Apolka Ujj, highlights some private initiatives and large-scale agroecological zone mapping projects in Hungary of Láng. The report concludes that agroecological farming practices in Eastern Europe are mostly embedded in organic farming, and the role of agroecology could be in mitigating the effects of intensive farming practices.

Other mapping projects found for the last 10 years are more or less loosely related to agroecological topics. A number of reports present collections on good practices of rural development, including initiatives in local food systems and community level food self-sufficiency, such as farming as an activity for social cooperatives or food production for local procurement:

- “Regional Development Booklets: Local economy development, inspirational good practices” (Dr Czene et al., 2010);

- “Transition towards sustainability in Hungary: 38 good practices” (Kajner et al., 2013);
- Hungarian Rural Network - 151 good practices in rural development in 12 specific fields in a mapped online database (No longer available).

“Local communities for the development of agrobiodiversity in Hungary” (C. Kiss et al., 2012) is a collection of seven case studies for actors working in the field of agricultural diversity. The publication also summarizes the concepts related to local food systems, food and seed sovereignty. A qualitative mapping and analysis of the budding community supported agriculture movement in Hungary was presented by Réthy and Dezsény (2013) also introducing concepts and definitions of CSA in Hungarian. In a 2018 study, Szilágyi et al. (2018) mapped permacultural, organic and conventional farms for their environmental performance based on the SMART indicator system.

It is also common of social movements to present on-line maps of stakeholders. The map of the Nyíregyházi Basket Community shows cases shopping communities, local markets and budding consumer networks (Nyíregyházi Kosár Közösség, 2020). Community gardens, activity profile and contact information are collected on the map of the KÉK Association (Kortárs Építészeti Központ, 2020).

2.5. Conclusions for the context of agroecology in Hungary

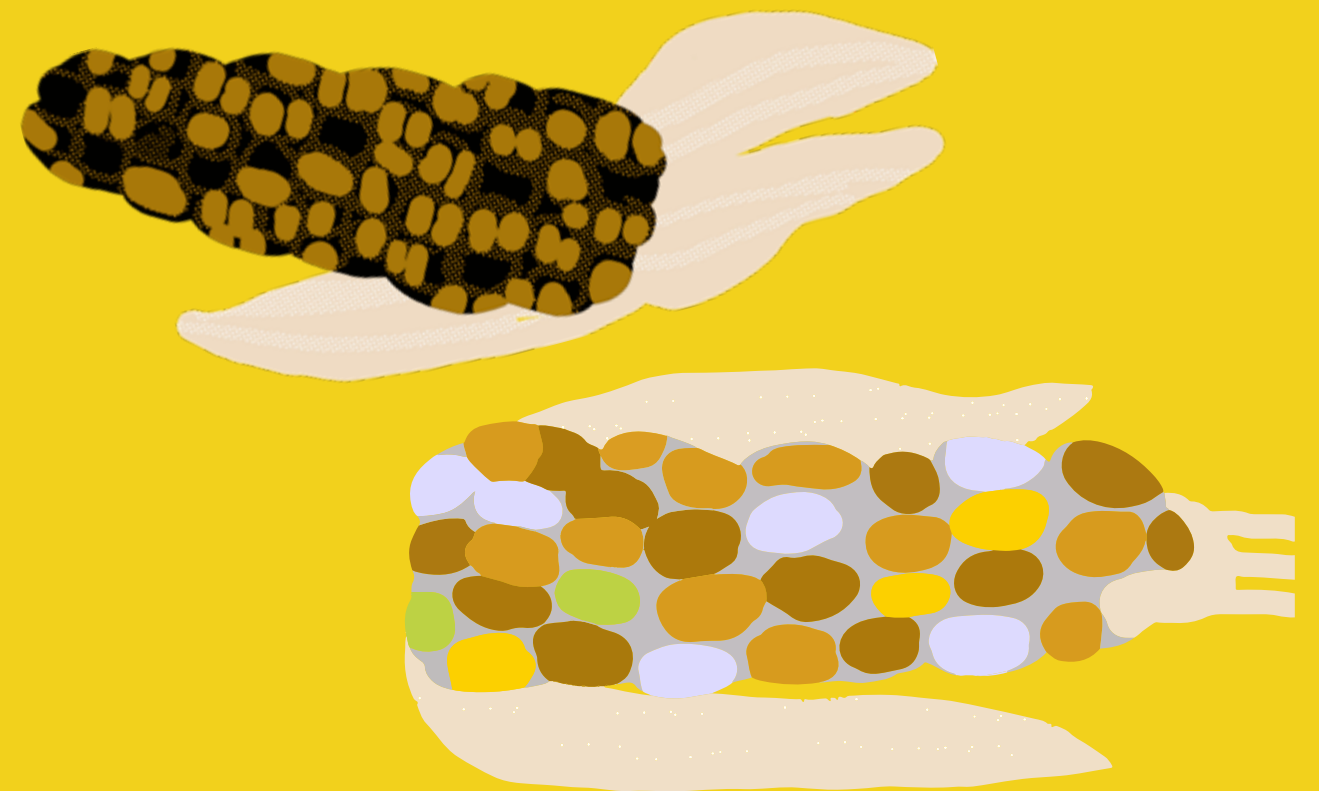
Based on the literature review, it is clear that agroecology, as a holistic, transdisciplinary scientific approach has not yet developed in Hungary. The term agroecology is most widely understood as a scientific discipline studying the interactions between the agroecosystem and the environment. At the same time, these definitions do not include social aspects or a food system approach.

Principles and practices of agroecology are

reflected in previous mapping projects, mostly presented in good practices of rural development for community-level self-sufficiency or approaches in short food supply chains.

Agroecological movements have not developed under this term, farmer and consumer advocacy, lobbying against the adverse effects of industrial agriculture and providing alternatives rooted in the environmental and organic movements from the 1980s.

3. MAPPING RESULTS



The different pillars of agroecology are introduced in this chapter, based on the actor lists composed by different sectors (see Appendix 3.). Appendix 2. shows the keywords used during the search and analysis of initiatives.

3.1. Agroecology in practice

The term “agroecological” is not commonly used for farming, processing or marketing practices in Hungary; therefore, the collection of actors was based on farming practices, marketing channels and social values related to agroecology. Based on the analysis of the actor lists, the following categories can be defined. Numbers in brackets indicate the number of identified initiatives.

Production and processing

1) CSA farms (19):

Specialized mostly in one or two product categories, such as vegetables, fruits and processed products, or animal products (meat, eggs), there is often a diverse product range within this category. CSA farms are small-scale family farms marketing almost exclusively to a group of consumers with whom they are in contract for the whole season. Production is either certified organic or not certified, but emphasizing low input use and no use of chemicals. Owners are often new farmers who work in strong cooperation with consumers, which show, for example, in advanced payments.

2) Small-scale farms and family farms (53):

Often overlapping categories, these farms are highly diverse in scale, production types and marketing channels. Sometimes they have specialized product category, for example, growing vegetables or fruits or they are mixed systems with an emphasis on self-sufficiency and low input use. Farmers have a different relationship to traditional and innovative practices of grazing, mixed systems, breeds and varieties; reliance on traditional knowledge and peasant traditions. Some farms emphasize the aspect of permaculture, biodynamic farming, agroforestry, low-till farming or market gardening.

On-farm processing (jams, honey, cheese, syrups, herbs, dried fruits, canned goods, flour, bread, dairy and meat products, etc.) is often integrated at the farm level. It relies either on traditional methods or small-scale, but modern processing facilities. Farm income is complemented by activities of agrotourism, sometimes running their own restaurants and workshops for traditional lifestyle and self-sufficiency. Fresh products are either sold directly to restaurants, on producers' markets, shopping communities or in webshops; products are less often sold through third parties (organic shops, etc.). The category includes natural vineyards and wineries, which are small-scale “boutique” wineries with certified or non-certified organic production and practices of natural wine-making. Winegrowing is often accompanied by active landscape and biodiversity management. Production is export-oriented, but the producers generate additional income from wine tourism.

3) Extensive grazing systems (10):

Farms are situated often in natural parks or Natura 2000 areas, large-scale landscape management with cattle or buffalo (wet areas), Hungarian grey cattle (dry areas) or other types of flocks (sheep, goats). There is a very strong emphasis on the tradition of animal husbandry and practice of crafts, the heritage of pastoralism. Farms are often active in agrotourism, environmental tourism for traditional lifestyle, workshops for crafts, and the introduction of the tanya-lifestyle. Fresh and processed meat and dairy products are sold through webshops, on producers' markets or through third parties. The farms are managed by private entities or natural parks, in cooperation with organized environmental protection in natural parks.

4) Farming and processing with a social cause (7):

These initiatives show diverse practices to benefit a disadvantaged group of people, e.g. social farming to employ people with disabilities, community gardening to provide self-sufficiency for minority groups or social cooperatives to employ local people. Farming practices can be certified organic, but in certain cases, small-scale conventional agriculture is practised (for example, goat farm with external fodder). Activities include vegetable production, goat milk and cheese production, vegetable and fruit processing. Products are sold locally, at farmers markets or online. Products are often advertised by “segítő vásárlás”, meaning “helpful purchase” to emphasize the social cause of the procurement. These initiatives are often involved in education and awareness-raising through study tours, farm visits or company volunteer days.

5) Traditional mills and bakeries (15):

Actors are often integrated (farm and mill, mill and bakery). Bakeries work in close relationship with mills for the testing of varieties and providing good quality flour. Traditional methods in bread baking (wild yeast fermentation) are present, as well as the use of some heritage cereal varieties and of functioning old mills. Flour is usually sold online or at markets, while the bread is sold either at the farm gate or bakeries.

6) Other (4):

This group includes two larger-scale organic farms with integrated processing. A good example of environmental management is an organic fishery in the Hortobágy nature park; that is also an important venue of bird conservation. Another farm in this category is the medium-scale self-sufficient farm of the Krishna-valley ecovillage.

	AGROECOLOGY RELATED THEMES AND PRACTICES	PRODUCT RANGE	MARKETING	COMPLEMENTARY ACTIVITIES
CSA Farms	Consumer involve- ment local food systems, organic practices, sharing of knowledge	Vegetables, fruits, processed prod- ucts (of animal origin as well)	Direct marketing to consumer groups, con- tract-based, advanced payment	Training of new farmers, advocacy
Small-scale and family farms	Permaculture, organic practices, agroforestry, no-till methods, food culture, traditional practices	Highly diverse fresh and pro- cessed products, traditional products	Direct marketing in webshop, farmers' market or through third parties, natural wines are mostly exported	Agrotourism, eco- tourism, workshops and trainings, health and spirituality, participatory research
Extensive grazing systems	Management of marginal areas, environmental management, traditional breeds, traditional practices, food culture, pastoralism	Fresh and pro- cessed meat products, tradi- tional products	Direct marketing in webshops, farmers' market or through third parties	Agrotourism, ecotourism, work- shops and trainings, participatory research

	AGROECOLOGY RELATED THEMES AND PRACTICES	PRODUCT RANGE	MARKETING	COMPLEMENTARY ACTIVITIES
Farming and processing with a social cause	Social justice, solidarity, local food systems	Processed animal products, vegetables, fruits, processed products	Direct marketing in webshop, at the farmers market or through third parties	Workshops and trainings, corporate social responsibility services
Traditional mills and bakeries	Local food systems, participatory research, traditional varieties, food culture	Flour and bread	At the farmgate, farmers' market, online or in bakeries	Advocacy, participatory breeding

Table 3.: Types of agroecology related production and processing

Agroecology related practices in farming across the categories include organic farming, permaculture, agroforestry, biodynamic farming, crop rotations, cover crops, use of local plant varieties and animal breeds, no-till or no-dig farming, landscape and environmental management, biological pest control, extensive grazing, preserving food and lifestyle heritage (e.g. animal ploughing), self-sufficient farming, low-input farming, soil carbon sequestration, use of microorganisms, composting, agroforestry and social inclusion of disadvantaged groups.

Complimentary activities to farming entail agrotourism (guest houses, restaurant or gastronomic services, museum), training and education (crafts, farming, self-sufficiency, social farming, traditional crafts), awareness-raising (workshops, farm visits, local museum), health and spirituality (meditation and religious programs, natural medicine, animal therapy), participatory research (farming practices, variety trials) and participatory breeding. “Falusi vendégasztal” is a specific service type defined by the government to enable farmers to provide gastronomic services for tourists from locally produced ingredients.



Marketing

Grouping is based on the level of organization and market access control. The alternative marketing channels are summarized in 'Table 4. CSA farms' and single producer webshops are part of production and processing lists.

NAME	ORGANIZATION	PICK-UP	PRODUCT RANGE	CONTROLLING ACCESS TO MARKET
Community Supported Agriculture	Farmer	Pick-up point	Specialized in one or few categories	Trust-based, mostly one farmer, AMAP charta
Shopping community	CSO, consumer group	Pick-up point, home delivery	Highly diverse, fresh and processed products, authenticity, non-food artisanal products	Community control, based on geographic proximity and product quality
Producers' market	Private entity, consumer group	At market	Highly diverse, fresh and processed products, non-food artisanal products	Controlled by an operator, geographic proximity, trademark, product range
Organic market	CSO, certification body	At market	Highly diverse, fresh and processed products	Based on certification, sellers can be intermediaries
Webshop	Private company	Pick-up point, home delivery	Specialized or diverse	Based on product range and individual decision
Falusi vendégasztal	Farmer, producer	Local consumption	Only products produced and processed by farmer	Must be a licensed service provider

Table 4.: Alternative marketing channels

1) Shopping community (22):

Also called “Basket communities”/“Shopping bag communities” are initiated by consumer groups or civil society organizations (CSOs) to provide access to a wide range of local products. The product range can be highly diverse, but often only one producer per category is present in each initiative. Products can be selected individually, but some shopping communities provide fixed vegetable boxes as well. Ordering can be done on an online

platform or by e-mail. Pick-up is weekly, bi-weekly, or occasionally, payment is made directly to the farmers; sometimes, a percentage is used for the organization of the community. For farmers and producers to access the shopping community is based on some form of community involvement (e.g. farm visits, questionnaires for producers). Still, no clear form of participatory guarantee system is present yet. Geographic proximity and authenticity of products are important, but organic certification

is not a prerequisite. One initiative is an online platform aiding the organization of community shopping events (Veddegyütt), while also collecting a small percentage of purchases for a social cause defined by the consumers. Related activities are community space, community development, workshops related to nutrition and the environment, education, community gardens.

2) Markets (15):

Product range can be highly diverse, multiple producers/category can be present, including non-food artisanal products as well. “Termelői Piac” or producers’ market is a controlled name, and producers must come from 40 km proximity or the same county (except in the capital, Budapest, where the distance is not relevant for market access). Markets are organized by a private entity, consumer groups or municipalities. The operator controls access to the market which can be based on trademark or farm visits, can be free or charge a small fee. In theory, sellers can be only producers, not intermediaries. Organic markets are organized by the certification body or CSOs; access is granted only to certified producers. Intermediaries can be present with imported products. Related activities are agrotourism, cultural programs, community development. This does not include large market halls and municipal markets due to dominance by intermediary sellers and unknown food origin; however, these can be a marketing outlet for small-scale producers as well. It is important to note that there is a strong cultural tradition to get the products from the markets, it is the third most important place where consumers get their food from, after supermarkets and discount chains (Szabó, 2017).

3) Webshops (4):

Product range can be highly diverse, multiple producers per category, or webshop for a producers’ group (for example Youtyuk, Biofalo) organized by private companies, similar to shopping communities, but with a lower level of consumer involvement. Emphasis is on quality or providing Hungarian products. Pick-up points or home deliveries, payment to the webshop that charges a percentage compared to producers prices. Access to market is controlled by the operator, based on organic certification, product category or production methods. Not including webshops for single producer product range and food webshops selling products of unknown or imported origin.

Advisory and services for farmers

There are two national-level organic certification bodies: one of them is embedded in the National Organic Association; the other one is a private firm. Besides certification services, they also provide training, education and are active in lobbying for the interests of certified farmers. Four companies were identified providing services related to soil conservation, reduced input use and animal welfare (no-till, cover crops, nutrient management, farming system design), mostly for conventional farmers in transition to organic or low-input farming. Activities include advisory services, a complete redesign of farming systems, the sales of microbial and biochar products, sale of composting machines, providing access to no-till machinery, sales of cover crop seeds. These companies often organize conferences, workshops and trainings for farmers. There is one small private advisory service in the field of landscape and water management that advocates for a permaculture approach in farming system design. Actors from the research field (institutes, universities) also provide advisory services.

3.2. Social movements, advocacy

As presented in chapter 2.3, Agroecology as a social movement is not known in Hungary with this terminology. However, several local and national initiatives are directly related to the topics and goals of the agroecological movements, historically rooted in environmental and organic movements of the early 90s and more recent grassroots activism. A general overview of wider activities and related specific agroecological principles and topics is given in Figure 1.

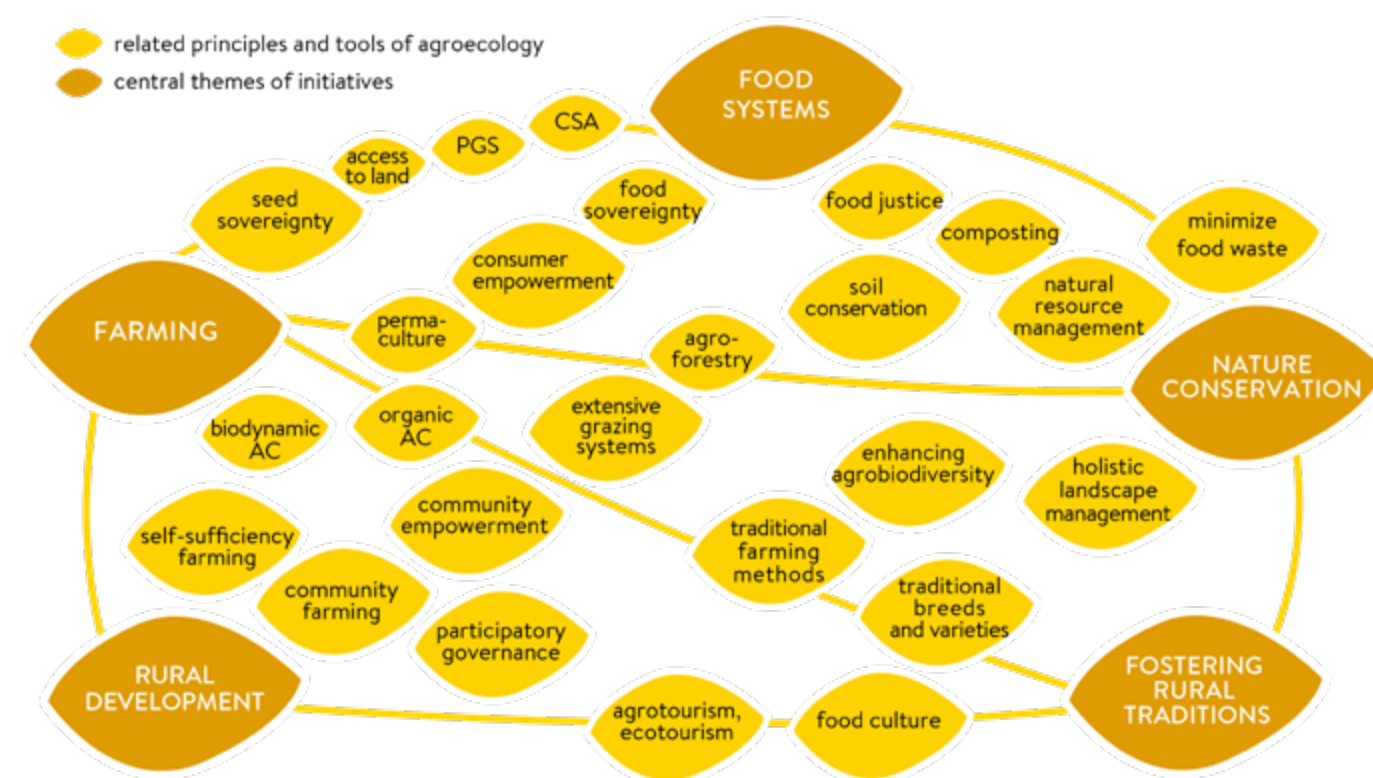


Figure 2.: Central themes of social initiatives and agroecology related principles and tools

Activities of national initiatives are mostly national in scope, but regional/local activities can be present. The activity of local initiatives is mostly town-level or regional in scope; national-level activities relate mostly to networking with other similar initiatives. The following categories were identified:

1) Professional and stakeholder networks (23):

This group compiles individual professionals in a specific scientific discipline (soil science, weed science, environmental management, agroforestry) or practice (breeders of specific animal groups, CSA farmers, biodynamic farmers, agrotourism providers, rural restaurants) or a network of stakeholder organizations (shopping communities, school gardens, arboretums, ecovillages, nature

conservation groups). Local networks are based on activity and geographic scope (local tanya, organic farms, self-sufficient households). Activities include advocacy for the represented individuals or stakeholder groups, education and networking for members, providing access for participation in international projects, awareness-raising of the public and research communication.

2) Grassroots initiatives (20):

Associations or foundations representing a wider topic (nature conservation, rural development, consumer education, environmental awareness); more general activities including awareness-raising (campaigns, publications, videos), the education of children or general activism (charity work based on social solidarity). Town level or regional associations in nature conservation and fostering local

traditions. Due to their high number, the initiative of “Kertbarát Kör” or “Gardening Friends Circles” and local folklore associations are not included in the actor lists; however, they play a very important role in advocating for locally adapted gardening practices and fostering farming and food heritage. Urban and community farms, school gardens are also present and form an important base for environmental and food sovereignty related awareness-raising. Seed swaps organized by local associations are multiplying year by year, providing a venue for grassroots activism related to seed sovereignty. Gyüttment Fesztivál, a festival for people leaving the city for rural life, is an annual meeting point for alternative food and environmental movements, self-sufficient farmers and different groups of craftsmen and women as well as people representing different forms of spirituality.

3) Professional organizations (15):

These organizations are active in research and advocacy in a wide field of topics combined from environmental protection, landscape management, climate change mitigation and sustainable agriculture. Some are larger-scale international organizations playing an important role in forming the public discourse - for example, Greenpeace advocating against political land-grabbing or CeeWeb’s activity in awareness-raising about agricultural diversity. Others are smaller in scope and size, active in a certain field, such as social farming (Diverzitás Alapítvány) or small-scale farmers’ advocacy (Kislépték). Some are in between: smaller in size, but advocating for various topics, such as fair trade, food sovereignty, agroecology, social and environmental justice, etc. (Védegylet, MTVSZ).

4) Trademark, certification (4):

These local trademarks and certifications are discussed under social movement because they are mostly rooted in local communities and rural development. These are often not only for food products but for service providers as well. One exemption is the national level certification for natural park products. To our recent knowledge, there is no actively functioning PGS certification system in Hungary. However, some systems

were tested in recent years (for example for the Pro Lecsó project by Butterfly Development Association).

5) Ecovillages (6):

Ecovillages in Hungary are intentional communities striving for social and environmental sustainability, their members living together in newly built communities, regenerating abandoned villages or forming a part of a larger community. The focus of these communities varies, but subsistence agriculture is a major activity in all. Some are very active, functioning communities (such as the Krishna-valley, Visnyeszéplak or the Nyím eco-community), while others are focused on awareness-raising and education (e.g. Agostyán). Functioning eco-communities are regulated by their members on a participatory basis, serving as an example for community development.

6) Municipality, region (4):

The municipalities collected here are examples of village or regional level cooperation. The villages are examples of municipal-level initiatives that focus on community food self-sufficiency, sustainable local procurement and creating employment for disadvantaged groups. The region shown in the list is the Somló wine region, which is the first to become completely organically certified in the next two years.

7) Museums, local collection (3):

Three national museums are important to point out, the Hungarian National Museum and Library of Agriculture, the Hungarian Open Air Ethnographic Museum (Skanzen) and the newly built Agroverzum in Martonvásár. All three institutions serve as a venue for science communication, the National Agricultural Museum being more concentrated on the history of agriculture, the Skanzen showcasing the different cultural heritages from various Hungarian regions with their agronomical implication, while the new museum of Martonvásár presenting the challenges for agriculture in climate change adaptation. “Tájház” is a local collection for village-level or regional folklore, these collections are widespread across the country, showcasing material and written mementos of local history. These are often related to agricultural and land-use traditions.

3.3. Science and education

Training and education

1) University level:

There are no agroecology BSc. or MSc. programs, but certain topics of agroecology are present in courses (see Table 5.). All major universities offer agricultural education, agricultural engineering, horticultural engineering, organic agriculture-related practices, landscape management; and agricultural, rural development engineering offers insights into local economic development and rural sociology. Some programs offer transdisciplinary approaches - such as Human ecology Msc., which is a master’s degree course mostly sociology and politology related, with insights into questions of food systems and local economic development, ecological ethics. Environmental agricultural engineering program gives a wider environmental context of agriculture and some social aspects.

2) Professional training:

OKJ (Országos Képzési Jegyzék) is the national professional training program, which is currently under the process of restructuring, but it provides 1-year training for farming/organic farming and other farming-related activities (processing, management, marketing, etc.).

3) Non-formal adult education:

This category entails a number of diverse programs, including:

- Several-day-long training for organic, subsistence farming provided by farmers, CSOs or private firms for non-professionals;
- Training for farmers and new farmers in specific topics: nutrient and soil management, market gardening;
- Trainings for farmers and consumers on alternative marketing channels (CSA, PGS, shopping communities) offered by CSOs or non-formal communities or training of trainers (mentors) on social farming, usually as part of Erasmus+ or other international projects, online and in-person trainings, workshops, knowledge exchange between actors;
- Permaculture design courses: there are several lengths and depths of training ranging from a weekend-long of introductory course to a year-long certificate training, for individuals or university students (optional credit course).

4) Pedagogy programs (3):

Nation-wide programs developed for the education of children (kindergarten, elementary school and middle school). One program is for school garden pedagogy offering training for teachers. The other two programs - tanya pedagógia and farm-based learning - are both experience-based programs; the latter connected to the Hungarian Waldorf school movement.

TYPE	NAME	RELEVANT *COURSES/ TOPICS	NUMBER OF INSTITUTIONS
BSc., MSc.	Agricultural Engineer	*integrated pest and weed management, *landscape management and nature conservation, *organic agriculture, soil and resource conservation, agrobiodiversity	9
BSc., MSc.	Agricultural and rural development engineer	*local economy development, *integrated rural development, ecological aspects in land use and rural development, water management, rural sociology	9

TYPE	NAME	RELEVANT *COURSES/ TOPICS	NUMBER OF INSTITUTIONS
BSc., MSc.	Horticultural Engineer	*organic agriculture, environmental management, integrated pest management	5
BSc., MSc.	Environmental Agricultural Engineer	*environmental resource management, *landscape evaluation and management, *water management, *grassland management, *agricultural ecology, *environmental sociology, *sustainable agriculture and practices, transdisciplinary aspects in agriculture and environmental management, ecological aspects in land use and rural development	4
MSc.	Organic Agricultural Engineer	*ecological land use, *organic agriculture practices, *renewable natural resources, *design of organic farming systems, agroecology	1
MSc.	Environmental Sciences, Policy and Management (ME-SPOM) (in English)	*socio-ecological systems, *agroecology, farming systems, *environmental governance, biodiversity, conservation, resource governance	1
MA.	Human Ecology	*human ecology, *sustainable rural development, environmental management, socio-ecological systems, environmental governance, resource governance	1
MSc.	Agricultural water management engineer	*water rights, *habitat management, water management, natural resource management	3
MSc.	Plant doctor	*biological and integrated pest management	4
BSc. MSc.	Plant production engineer	natural grassland management, adaptive soil management, organic plant production	2
Post-grad.	Agroforestry engineer	*agroforestry, *landscape management, ecosystem management	1
Post-grad.	Grazing based animal husbandry engineer	*extensive grazing, *landscape management, *pasture management	1
Post-grad.	Soil engineer	*soil conservation, *soil management, *soil biology	1
Post-grad.I	Plant protection engineer	*biological and integrated pest management	1

Table 5.: University-level education

Science

In this section, university departments, research institutes and research groups are collected, categorized by their wider field of research. Published journal articles, university notes and other sources are collected in the curated bibliography shown in Appendix 1.

1) Organic farming:

There are two active departments at Szent István University, working in international agroecological projects, social farming initiatives and agronomic research for organic agriculture and agro-environmental management. The Research Institute for Organic Agriculture (ÖMKI) is a private research institute for organic farming, using participatory research methods with an on-farm network for field trials in the topics of cover crops, variety trials and organic breeding of cereals, potatoes and tomatoes. In 2019, ÖMKI became the coordinator of an agroecology working group in the Bioeast Project, a Central and Eastern European initiative for bioeconomy.

2) Nature conservation and landscape ecology:

There are two departments at Szent István University, doing research in agricultural landscape management, extensive grazing systems and soil ecology. A newly formed Agroecology research group at the Hungarian National Academy of Sciences and Szent István University is researching resilience of agroecosystems and climate change adaptation, with a focus on soil and water science and GIS mapping.

3) Agricultural research:

Research actors working in specific fields of agriculture, such as animal husbandry, plant production, soil science, water management, agrometeorology, horticulture or viticulture. There is research in a diverse field of topics, from which only some are related to agroecology.

4) Research farms:

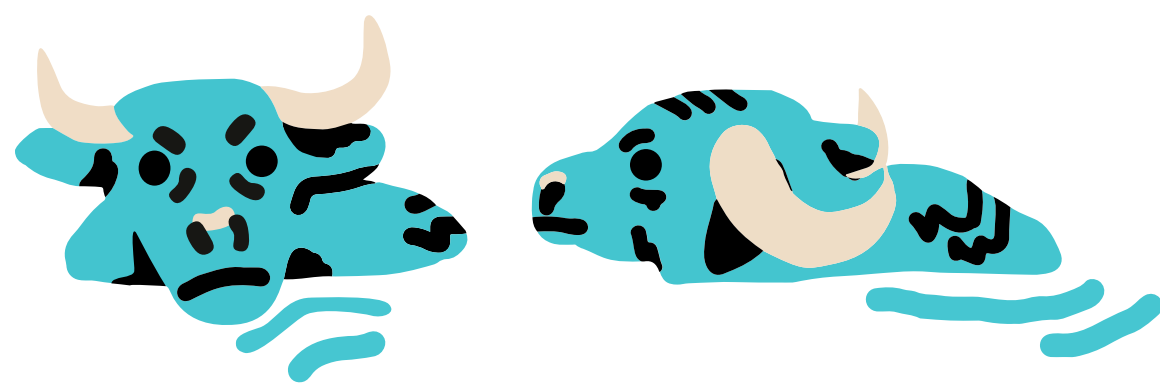
Research institutes for agronomic, agrometeorological and breeding research. Historical breeding institutions for cereals, vegetables and alternative crops now working in adaptive breeding to climate change, biotic and abiotic stress.

5) Socioeconomics, rural development, food systems:

Departments/Research groups of economics, sociology, rural development and anthropology. Research topics include food systems, short food supply chains, community-supported agriculture, local markets and local economic development. There are a number of private (CSO or company) institutions, namely Agrikulti, AKUT, Kisközösségi Program and ESSRG that perform transdisciplinary research, participatory action research, participatory rural development related to topics of short food supply chains, local food systems, seed systems, food justice, traditional knowledge systems in ecology and agriculture. The department of human ecology is a center for research in community development, interactions between social processes and environmental change.

TOPIC/ DISCIPLINE	SUBTOPICS AND KEYWORDS
Soil	Soil biology, soil ecology, biological soil amendments
Water	Irrigation systems, water conservation, drought management
Farming Practices	Organic farming practices, extensive grazing, grassland management, biological and integrated plant protection, traditional breeds, traditional varieties, alternative crops, adaptive breeding, long term crop rotation research, weed management, sustainable agronomic technologies, apiculture, nutrient management
Agroecosystems	Agri-environmental management, nature conservation and agriculture, landscape management, agroecology, ecosystem services, spatiotemporal resilience of agroecosystems, climate change adaptation, agrobiodiversity, agricultural, environmental safety, ecotoxicology
Socio-Economics	Multifunctional agriculture, small-scale agriculture, agrotourism, sociology of farming, participatory action research, pastoralism, tanya sociology, food sovereignty, seed sovereignty, ecovillages, community development, urban-rural fringe
Food system	Community-supported agriculture, local food systems, producers' markets, seed systems

Table 6.: Agroecology related research topics and keywords in Hungarian academia and private research. Adapted from Wezel et al. (2018)



3.4. Geographical dispersion of initiatives

Figure 3. shows farms, processing, marketing and other local initiatives with a specific geographical scope, university departments and research institutes. National scope initiatives are not included in the map.

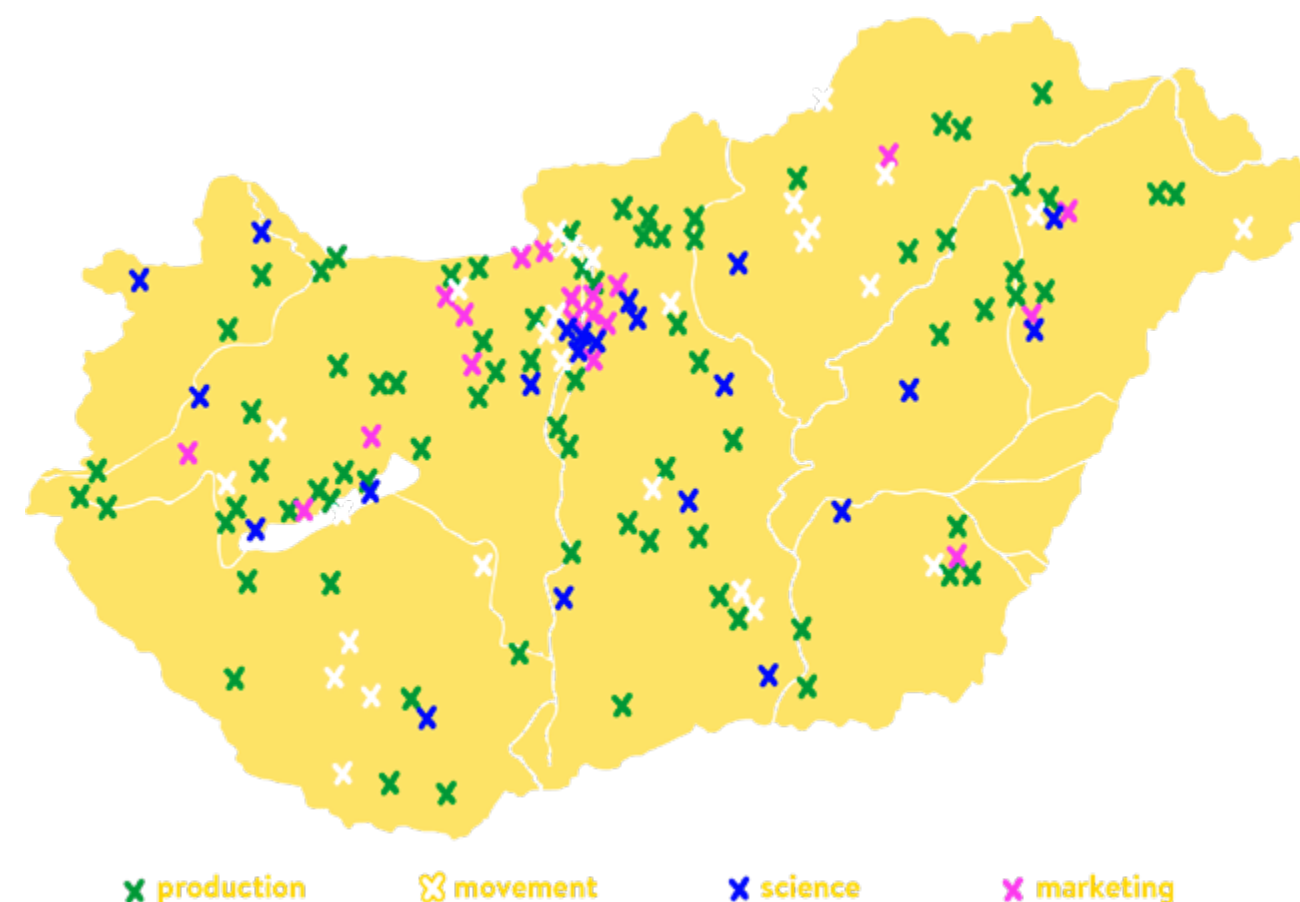


Figure 3.: Geographical dispersion of initiatives (Access the complete map with legend [HERE](#))

Even though there is a possibility that not all agroecology related initiatives are displayed on Figure 3. - due to the limitations of the mapping, it is worth observing that there are several research and educational institutions throughout the country, while agroecological marketing channels can be found on an axis, centred around bigger cities, especially Budapest.

Budapest and surroundings:

Around 20% of the population of Hungary is living in and around of Budapest, while the region also has double of the Hungarian GDP/capita (KSH, 2015)-making it the most densely populated and wealthiest area of the country. This explains the concentration of farms around and marketing outlets within the city. In Budapest, there are 15 different alternative marketing channels (producers' markets, shopping communities, etc.) and CSAs. Farms in the proximity of Budapest are situated in the western part of Nógrád county, the Szentendre region, the Tisza and the Danube basins and the Gödöllő basin, and they are focused mostly on vegetable, fruit and egg production. Budapest and the surrounding suburbs are also the center for social initiatives related to food justice and food activism. Gödöllő - 30 km east of Budapest - is the historical center of agricultural research and education in Hungary, home to Szent István University's several departments and study farms.

North-Western Hungary:

The Balaton region is characterized by seasonal fluctuation in population, it is the most popular area for domestic tourism, including also a historical wine region. Production related to agroecology can be found in vineyards and wineries, buffalo reserves - and a famous farmers' market. Initiatives in this region are heavily focusing on agrotourism and ecotourism. The hills of Zirc and Zala are home to several organic and family farms.

Southern-Hungary:

Most of the Tisza-Danube regions belong as well to the Great Plains of Hungary, being a traditionally agricultural region. Farms found during the mapping are concentrated around the plains of the Danube and Tisza Rivers and in the Villány and Mecsek hills. Towns of Szeged and Békéscsaba show developments of alternative food systems. The eco-communities of Krishna-valley, Visnyeszéplak, Gyűrűfű, Nagyszékely and Szeri Ecological Farms are all situated in this region, making it an epicenter for these initiatives.

Eastern-Hungary:

It is a highly diverse region including the mountain ranges of Bükk, Zemplén and Mátra but also regions of the great plains, such as the Hortobágy and the Hajdúság. Parts of these regions are under national environmental protection, resulting in traditional and environmentally friendly farming methods- such as fisheries, extensive grazing systems and organic farms. Some of the most disadvantaged areas of the country are located in Eastern- Hungary, explaining village-level, municipal programs with a social focus, such as Bioszentandrás or Rozsály. Similar to the capital, larger cities (Miskolc, Nyíregyháza, Debrecen) are centers for local food system marketing channels and university level education. Other smaller, local, environmentally-focused initiatives are more scattered.

3.5. Policy

The 'Farmer demonstrations report' (Appendix 5.) was commissioned in order to gain a better understanding of the socio-political agrarian context of Hungary. In response of inquiring an interview with the Ministry of Agriculture, they highlighted many policy measures related to agroecology in its written material, but detailed analysis of these measures-e.g. their effects and scope-was not performed. All of these measures are part of the Rural Development Program ("Vidékfejlesztési Program" or VP). In general, these policies are aiming at promoting practices that enhance ecological services (i.e. woody edges, multi-layer forests, etc.), organic agriculture and sustainable land-use, innovation with a focus on climate change adaptation, alternative marketing channels (short food supply chains) and the preservation of genetic resources (animal, plant and microbial populations).

- **VP5-8.2.1-16**
"Developing agroforestry systems"
(2016. November)
Supporting the development of woody edges in large-scale cropping fields to improve local micro-climates, reduce erosion, provide habitat for natural enemies of pests and develop ecological corridors.
- **VP5- 8.5.1.-16**
"Improving resilience and natural value of forest ecosystems"
(2017. January)
Transforming the forest structure for the more natural state, developing multi-layer forests and natural forest ecosystems; removing invasive plant species, improving local native biodiversity

- **VP3-16.1.1-4.1.5-4.2.1-4.2.2-8.1.1-8.2.1-8.3.1-8.5.1-8.5.2-8.6.1-17.**
"Developing innovative operative groups and support for innovative projects" (2017. March)
Agri-innovation Operative Groups to perform projects in agricultural production, processing, winemaking, short food supply chains with specific attention to resource efficiency and climate change adaptation.
- **VP4-4.4.1-16.**
"Non-productive investments of habitat development" (2016. June)
It aims to preserve and improve the conservation status of species and habitats with the objectives of agri-environment and climate change payments and to strengthen the public welfare functions of Natura 2000 sites and high nature value management systems.
- **VP4-10.1.1-15 and VP4-10.1.1-16.**
Agri-environmentpayment
(released October 7, 2015, and September 30, 2016)
In the development of agri-environmental payments, special attention was paid to the reduction of the agri-environmental problems typical to Hungary, and to the spread of environmentally friendly farming practices that prevent the occurrence of certain environmental problems and prevent the intensification of present problems. By doing so, negative processes can be stopped and directed toward positive intervention.
- **VP4-10.2.1.1-15.**
Conservation of in situ genetic resources of protected native and endangered farm animal species
(published December 29, 2015)
- **VP4-10.2.1.2-17.**
Ex situ or in vitro preservation of the genetic resources of protected

native and endangered farm animal breeds and support for advisory activities to prevent genetic erosion
(published 30 March 2017)

- **VP4-10.2.2.-15.**
Ex situ conservation of genetic resources and microorganisms of rare and endangered plant species
(published 29 December 2015)
These programs aim to maintain in-situ and ex-situ populations of animal, plant and microbial populations for farming and wild relatives
- **VP-4-11.1.-11.2.-15. And VP4-11.1.-11.2.-18.**
Conversion to Organic Farming, Maintaining Organic Farming
(Published October 7, 2015 and October 29, 2018)
Organic farming support is a voluntary payment system whereby participants undertake to carry out additional farming activities to achieve their organic farming objectives. The aid is based on specific provisions and actual land use.
- **VP4-12.1.1-16.**
Compensation payments for Natura 2000 agricultural areas
(released February 9, 2016)
- **VP4-13.2.1.-16.**
Compensation payments in areas with natural handicaps
(released February 9, 2016)
The main objectives of the support are to create production structures appropriate to the conditions in the area, to strengthen environmentally-friendly farming and sustainable land use. The aids contribute to maintain farming in Natura 2000 areas and areas with natural handicaps and will provide an income supplement for farmers maintaining agricultural activities in these areas.

3.6. Multi-stakeholder networks

“Cooperation is at the heart of agroecology” - according to Wezel et al. (2018) - and indeed in Hungary as well, agroecological aspirations are demonstrated by multi-stakeholder networks in the food system having nationwide coverage. Table 7. introduces four such networks overarching the sectors of science, movement and practice in a certain topic.

NAME	PRACTICE ACTORS	MOVEMENT ACTORS	SCIENCE ACTORS	CENTRAL THEMES	RELATED LITERATURE
ALTERNATIVE FOOD SYSTEMS	CSA farms, small-scale and family farms, CSA and shopping communities, producers' markets, local certification	TVE, Kislépték, KÖKISZ,	Széchenyi István Egyetem, Neumann János Egyetem, Szegedi Tudományegyetem, Budapesti Corvinus Egyetem, ESSRG, Agrikulti, Hétfa Kutató Intézet	Local food system, rural development, consumer and farmer advocacy, food sovereignty	(Benedek, 2014; Benedek et al., 2017; Gombkötő et al., 2017; Koltai et al., 2018; Nemes et al., 2019; Szabó et al., 2018)
PLANT DIVERSITY	On-farm partners, farms, gardeners, mills, bakeries	Kosár Közösség, local grassroots initiatives	ÖMKI, NBGK-NÖDIK, NAIK- NÖKO, ZÖKO Mezőgazdasági Intézet Martonvásár, DE- AKIT- NYKI, Pannnon Egyetem-Georgikon Kar, Eszterházy Károly Egyetem-Fleischmann Rudolf Kutatóintézet, ESSRG	Plant genetic diversity, agrobiodiversity, traditional varieties, participatory research, seed sovereignty	(Aistara & Balázs, 2017; DYNAVERSITY, 2019; C. Kiss et al., 2012; LiveSeed, 2017; Mirek et al., 2015; Toth et al., 2014)
PERMACULTURE AGRO-FORESTRY	Farmers, gardeners, AFINET	MAPER KmGYH, Életfa Permakultúra	Soproni Egyetem Erdőmérnöki Kar, NAIK- ERTI, Szent István Egyetem-Kertészeti Tanszék, Keszthelyi Egyetem-Georgikon Kar	Landscape management-agroforestry, agro- environmental management	(Keserű et al., 2018; Pásztor, 2013; Saláta, 2009; Szalai & Dósa, 2018; Szilágyi et al., 2018; Vityi et al., 2018; Vityi & Gosme, 2019)
REGENERATIVE AGRICULTURE	Kökény Attila, Gyulai Iván, Erzsébet Krumpach, Táncoskert	Ökológiai Intézet a Fenntartható Fejlődésért, gardening clubs	Szent István Egyetem-Kertészeti Tanszék	Soil conservation, no-till, no-dig, mulching	(Bádonyi, 2006; Birkás et al., 2018; Kocsis et al., 2017; Madarász et al., 2016)

Table 7.: Agroecological aspirations in multi-stakeholder networks

1) The network

“Alternative food systems”

is a collection of actors aiding the development of a food system parallel to the conventional channels. At the heart of this network are communities of consumers and producers: CSAs, small-scale and family farmers. Products are either directly sold to consumers through CSAs and shopping communities, at producers' markets, or even when intermediaries are present, they aid the market access of producers (such as trademarks). National level professional associations are actively contributing to the organization of marketing channels, consumer and farmer education and political advocacy. The Association of Conscious Consumers (TVE) organizes trainings for farmers and consumers in the fields of CSA and PGS. At the same time, the “Kosár Közösség” does the same in the field of shopping communities. Kislépték Egyesület is a determining national actor advocating for the interests of small-scale farmers and processors. These organizations also help farmers and consumers participate in international projects, connecting them to a larger Europe-wide community. The topic of local food systems and alternative marketing channels is researched at several universities, at the departments of economics, agricultural economics and rural development. ESSRG and Agrikulti are two private research entities, both applying participatory action research methods for food system change; thereby not only providing research results but also actively contributing to capacity development of these initiatives.

2) The network “Plant diversity”

is focusing on maintaining the genetic heritage of domesticated plants and adapting to new challenges in agriculture by breeding new varieties. A central cooperation of this network is between the Hungarian Research Institute of Organic Agriculture (ÖMKI), National Centre for Biodiversity and Gene Preservation (NBGK- NÖDIK) and Magház (Seed House) Farmer Seed Network. NÖDIK is a national level gene bank, preserving genetic material ex-situ and providing access to its extensive collection of varieties, while ÖMKI

is a private research institute of organic agriculture, active in the fields of participatory breeding and variety trials for organic farming. Magház is a non-formal network of small-scale home gardeners and family farmers fighting the quiet revolution of seed sovereignty through collecting, maintaining and exchanging traditional and unusual seeds. All three actors maintain an overlapping network of on-farm partners who are either farmers or small-scale home gardeners. Members of this network are actively contributing to the initiative by in-situ testing and maintenance of traditional and local varieties and participatory breeding trials. In the case of cereals, a non-formal network of farmers, millers and bakers is associated with the initiative, who are working for revitalizing the traditional bread industry, which requires access and production of heirloom and newly adapted cereal varieties. Besides the gene bank, historical breeding stations of cereals, fruits and vegetables can contribute to providing genetic material for further breeding, but they are also active in breeding new varieties for the challenges of climate change (National Agricultural Innovation Center - NÖKO, ZÖKO; Agricultural Institute of Martonvásár; Debreceni Egyetem Nyíregyházi Kutatóintézet). The Fruit Network of the Carpathian Basin (KmGYH) is a non-formal network of fruit variety collectors, who are an active member of the plant diversity movement. The annual seed swaps organized around the country are meeting points for the advocates of diversity.

3) “Agroforestry-permaculture”

is a network of scientists and citizens working for landscape and community-level transformation. The Hungarian Permaculture Association has been formed officially in 2016, after a longer period of informal status since 2006 to represent the permaculture movement in Hungary and to link it with the international network. Today the association has 60 members, and their activity has increased significantly, progressing year-by-year. MAPER offers communication and collaboration platform for farmers, teachers, academics and civil society members. The association organizes events, convergences, gives lectures and presentations in schools, universities, including the recent develop-

ment together with Védegylet of a 4-day course for small eco-oriented communities and a yearly symposium for connecting practitioners and academics. The AFINET Agroforestry Network, the Network of Traditional Fruit Growers in the Carpathian Basin (KmGYH) have been partners in events, networking and research, collaborating in a yearly event at one of the demonstration farms. Another important academic partner is the Szent István University, Faculty of Horticultural Sciences, Department of Ecological and Sustainable Production Systems (Eco-Dept).

Permaculture design courses (PDC) are also organized through another association, Életfa Permakultúra, in cooperation with the Eötvös Lóránd Human Ecology Department and the Keszthely University Georgikon Faculty. These two universities offer the possibility for students to participate in PDC for a discounted price and credit acknowledgement.

Research in the field of agroforestry systems is carried out at the National Innovation Centers' Forestry Institute (NAIK- ERTI) and the Sopron University Faculty of Forestry as well.

4) According to Terra Genesis International's definition, "Regenerative Agriculture" (RA)

is a system of farming principles and practices that increases biodiversity, enriches soils, improves watersheds, and enhances ecosystem services. At the same time, it offers increased yields, resilience to climate instability, and higher health and vitality for farming and ranching communities (Terra Genesis International, 2020). In Hungary there are several actors (individuals, NGOs, universities, private companies, etc.) promoting regenerative agricultural practices, in more loosely connected networks than the previous two examples, forming around certain experts and their organizations.

Low-till agriculture on arable land: **Kökény Attila**, managing a 700 hectares farm, started the Hungarian Regenerative Agriculture (Talajmegújító Mezőgazdaság -TMMG) movement 10 years ago. In recent years he has advised farmers summing up to more than 20 000 hectares of land, of

which most are utilizing the soil health principles. He influenced the birth of the largest no-till farm in the Carpathian basin (4500 ha). He promotes TMMG individually as well with his colleagues in Talajreform, advising on crop rotation, soil management, no-till practices, use of cover crops, compost and microbial inoculants. The association he established, called TMMG Egyesület counting 45 members holding up to 6000 hectares, who started practising regenerative agriculture. He initiated the Biológiai Talajerő Gazdálkodás postgraduate training course at the University Szent Istvan to reflect the improvements in agriculture-based soil health principles, which is in the third year.

No-dig gardening: **Gyulai Iván** is promoting regenerative gardening both as a private individual and as well within the Institute of Ecology for Sustainable Development (Ökológiai Intézet a Fenntartható Fejlődésért). He has been using the compost-ready deep mulch method in his garden for 19 years; the Institute of Ecology has disseminated the results. Furthermore, the Institute maintains a demonstration center where they have been applying the same techniques for four years, and regularly organize trainings and lectures.

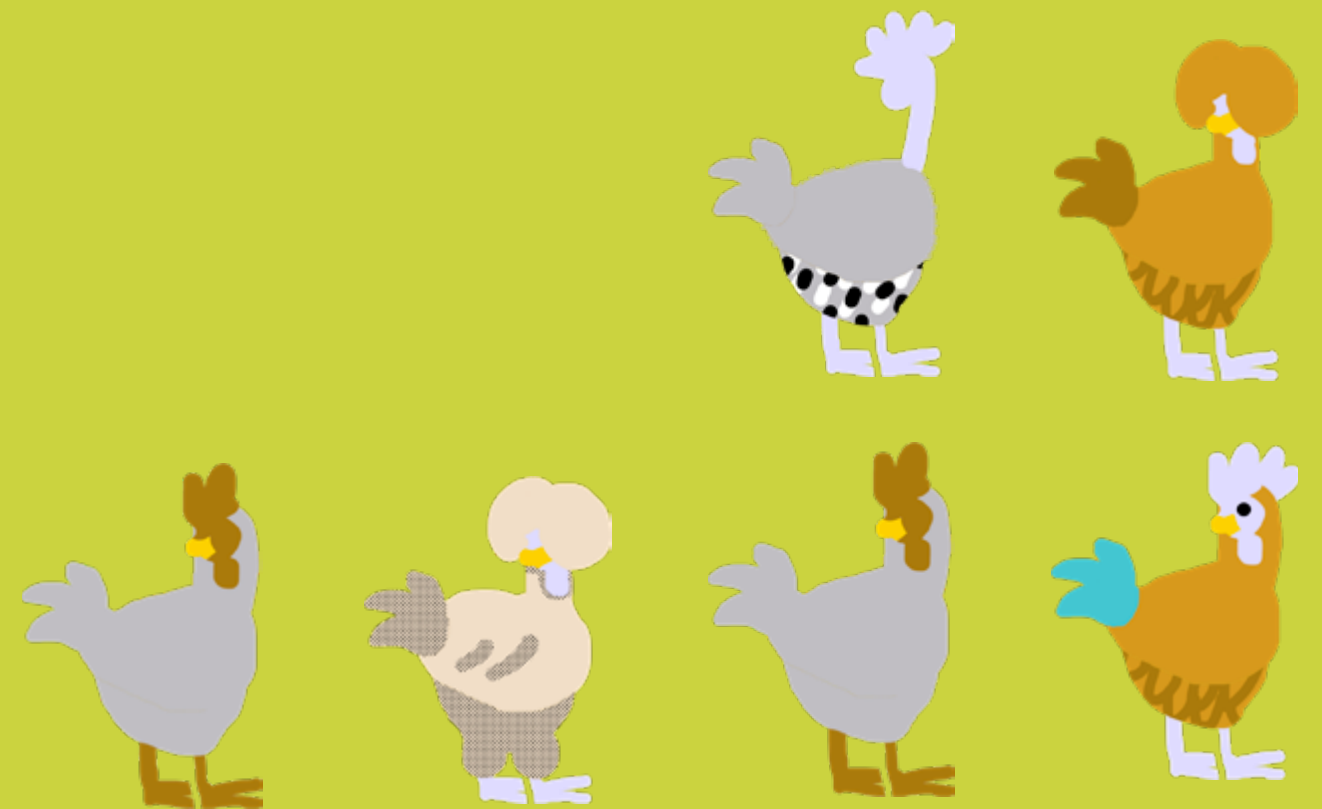
Most recently, during the Planet B project, 35 lectures have been held in many locations across the country, and over 300 people have been trained in 20 trainings. Today, there are more than a thousand users of the method, although they do not know exactly how many gardens there are exactly in the country, they only know about those who get in touch with them with their questions. They cooperate with non-governmental organizations, gardening clubs, universities, and agricultural chambers that already organize such lectures as part of their farmers' training. He gives lectures on this topic at several universities in Hungary, having even students doing their thesis research on the garden's soil and its fauna below and above-ground. **Erzsébet Krumpach** is an agronomical engineer who does no-dig agriculture in her organic kitchen garden and she has created a new model based on her practical experiences, which serves both to keep the paths between the crop beds clean as well as the production of

mulching material. She shared her experiences in "The Garden of Abundance (A bőség kertje)" - both editions were sold out; she also published a book for children on gardening, seeds, the environment with lucrative parts.

Upon invitation, she gives lectures, preparatory courses in garden-friendly circles (Budapest Bioculture Association, Ráckeve Garden Friendly Circle), community gardens (Gyulai Edible Community Garden, KÉK Community Gardens, Szigethalmi Community BIO Garden, Biocultural Association), and for her readers in Ráckeve.

At the university level, the Department of Soil Science and Water Management of Szent István Egyetem has been working on the development of proper soil-plant ecosystem functioning in sustainable agricultural practices. They were involved in previous EU and Hungarian funded project, such as BIOFECTOR in which bioeffective solutions have been used, involved living inoculums and non-living carriers, to improve the fertility and plant protection of organic agricultural systems. Lengyel Zoltán is also worth mentioning, who is running Táncoskert, and applies holistic management and grazing practices in an integrated, mixed farming system.

4. QUALITATIVE ANALYSIS



4.1. Interview keywords

The detailed distribution of chosen keywords is presented in Appendix 5. and it is also visually represented in Figure 4., where the size of each keyword is in positive correlation with the number of times interviewees selected it.



Figure 4.: Wordcloud resulting from the keywords chosen by the 10 interviewees

The most selected words in descending order were (number of times it has been chosen out of 10 is marked between brackets): biodiversity (5), ecosystem services (4), rural development (4), sustainable agriculture (3), ecological principles (3), profitable farming (3), farming without GMOs (3), spiritual and material relationship to the land (3), sustainable and fair food system (3), Farming without agrochemicals (3).

4.2. Interview analysis

In our qualitative interview study, we asked stakeholders about their perceptions of barriers and opportunities for agroecology in Hungary. Furthermore, we were curious about which policy windows of opportunities they identify for agroecology in Hungary.

Agroecology, as a science, started in Hungary as an interdisciplinary field between agronomy and ecology, investigating the biological interactions of crops and natural elements in agro-ecosystems. As a new field of interest, agroecology was born in specialised debates of insect-plant biology and community ecology, where several plant ecologists, entomologists, zoologists, contributed to the proliferation of the early scholarship, including pioneering scholars like János Balogh, Gusztáv Szelényi, Tibor Jermy, Sáringer Gyula just to mention a few. However, professional activity in this area is still somewhat sporadic, and the term agroecology is hardly used to define the problems that are rather promoted as pest management, agro-environmental engineering, applied ecology, environmental health or ecotoxicology. While ecosystems of agricultural lands have been predominantly exciting for natural scientists, socio-economic and political considerations also followed soon. Agroecological practitioners also started to promote the better valuing of indigenous knowledge and investigations of the negative ecological consequences of the agro-industrialization. Today agroecology is a co-evolutionary framework used for the entire agro-food system.

Agroecological approaches comprise a continuum of practices as shown in Table 1.:

- Organic farming;
- Permaculture;
- Biodynamic agriculture;
- Conservation agriculture (Minimum or no-tillage and intercropping);
- Crop diversification;
- Intercropping and poly-cultures;

- Cover crops and mulching and composting, biological pest control;
- Extensive animal husbandry;
- Agroforestry;
- Mixed farming, crop-livestock integration;
- Integrated nutrient management;
- Landscape management;
- Regenerative agriculture.

As a relatively new term, agroecology is considered differently by different stakeholders in Hungary. For the researchers, it is a proper descriptive scientific term. It refers to agroecosystems, and it is first recognised by agronomists in the 1920s, as a holistic study of interactions of organisms and their environment in agriculture; later also, the agricultural management impacts on non-human ecological systems have been included in its meaning.

In contrast, for policymakers, agroecology is a useful hook to engage numerous stakeholders, ranging from small-scale to industrial agriculture. Interviewees representing the policy and extension services often identified agroecology with the agro-environmental program. As one of them explained,

“especially ecological farming has good marketing and value proposition on the level of the product. This sector is just getting stronger in Hungary, such as in the EU and is becoming a strong point in our agriculture.”

Nevertheless, a representative of a large green NGO also added that agroecology became a new policy buzzword without entering the public sphere in Hungary:

“... for a quite long time in the transnational agrarian movement the term food sovereignty was used, and only a few years ago agroecology stepped into the scene. In Hungary, this shift did not happen at all. Nobody understands the term beyond Gödöllő (note: the largest agricultural University in Hungary), and they only use it in its genuine scientific understanding. The complex understanding that entails the movements and the set of practices,

as promoted by the Friends of the Earth or the Nyéléni Declaration of La Via Campesina did not infiltrate the public sphere in Hungary.”

As for the movements, agroecology is often depicting the best practice for sustainable food systems, that also provides the proper representation of sustainable small-scale agriculture. Agroecology movement prefers to work with farmers left out of the industrialisation of agriculture. It all seems that agroecology is now something inevitable, unavoidable in the eye of these publics. There is a general feeling that it is a necessary component of agricultural change and the transformation of our food systems. It also carries hope for reversing the catastrophic trends of biodiversity extinction and the climate crisis.

As for the definition of agroecology in Hungary, our interview study indicated that there is a general feeling of uncertainty around the term. Our interviewee from the Faculty of Agricultural and Environmental Sciences of the St. István University in Gödöllő stated that

“much better explanatory brochures would be necessary to clarify the meaning of agroecology... as it turned out recently, we find it hard even ourselves to define the term for the sake of a project proposal.”

It is also apparent from the interview study that we do not find any institutional actor without seeking a proposition to agroecology, although arguments diverge and often use allusions or agroecology only as a buzzword. Agroecology as a descriptive science provides useful insights and a set of principles to practical farm management, but still, according to our interviews, the actual practice of biological pest control and other agro-ecological approaches are sporadic in the Hungarian agriculture. Agroecological insights well provide sustainable production practices, but the full meaning of the concept, according to one of our interviewee in regenerative agriculture, is “only partially covered by the research institutions... Moreover, many believe it is equal to certified organic farming, which is only one possible approach to agroecology. What is more, certified organic is often going towards commodification.”

PILLARS	FARMING PRACTICES	SCIENTIFIC DISCIPLINE	AGRARIAN MOVEMENTS	POLICY
Production	Crop diversification Circular and solidarity economy Biological pest control Regenerative agriculture	Agronomy Applied ecology Socio-economics Agro-environmental planning Human ecology	Knowledge sharing, participation Circular and solidarity economy	Governance and public policy Agri-environmental Policy Plant protection Action Plan
Intermediaries: processing, marketing	Natural resource management Recycling		Food traditions, lifestyle, identity	Protein Program
Consumption	Social wellbeing, food justice, quality of life		Cooperation and synergies in the food system	

Table 8. Components and characteristics of agroecology based on the interviews

Agroecological farming practices build on complex coevolution of human and nature. Sustainable agroecological production - internalisation of the externalities - also generates social and environmental benefits, quality produce and rural development at the same time. As a farming practice, it is built on closed material loops and involves growing of crops as well as the raising of livestock.

Agroecology is used in a multidisciplinary sense by scientists in Hungary. As one of our interviewees explained

“as a contrast, the circular economy is designed by (bio)technologists and economists from what they have, but for agroecology, they would also need the ecologist to be responsible for the resources. Environmental costs are never budgeted, and therefore, the circular economy concept is limited by the technological component, as if biodiversity, water, soil, air would be all for free.”

The lack of a sophisticated and holistic understanding of agroecology often leads to simplifications. As one interviewee argued,

“...even if I am a conservationist who studied ecology, zoology and botany for five years what nature conservation needs is the knowledge of people and social change. I feel more and more that to be successful as a conservationist, and I would better involve sociologists instead of biologists and agriculturalists. Maybe I should have studied psychology; as nature conservation ignored people as if we were not part of the system. Human factors are ignored, and we construct ecological models without humans.”

Agroecology is also understood as a transdisciplinary and transformative science. The following quote by a senior researcher at the Agricultural Research and Innovation Centre also emphasises the transformative potential:

“Ethics could increase the consciousness about our economy. It is ethics, or better, social organisation.”

Agroecology seeks a radical change in our agri-food system, in the way we produce and consume our food. As our ecologist interviewee explained, for

being successful, agroecology requires participatory research with gardeners, pastoralists, foresters, farmers in their fields. Agroecology is also understood as a combination of western ecological science and traditional ecological knowledge,

“it is predominantly nature conservation interests that motivate research on traditional ecological knowledge. Research happens mostly in forests and grasslands and clearly shows that for specific ecosystems, a particular type of farming is beneficial. We explicate the complex knowledge that maintained these management styles. Pastoralists, peasants know a lot about nature, and it can be converted into decision-making, and finally a landscape. Therefore, innovations are based on tradition, and this tradition is one pillar of agroecology”.

What hinders upscaling agroecology?

Several hindrances and challenges could be highlighted based on the interviews. Our green NGO representative emphasised structural factors such as

“Food sovereignty has become an umbrella term that united several international organisations to show the main challenges for agroecology, such as the EU agricultural policy, the main engine behind unsustainability, the free trade agreements, the new GM. Nevertheless, altogether it is our social, economic, and financial system that makes agroecology uncompetitive, lest we create a solidarity economy.”

Still, the lack of cooperation in the scientific sphere also seems to be an enormous challenge. As a university-based researcher explained

“15 years ago, we started to establish a new agroecology MSc training program, and the Academy of Sciences intervened and argued that agroecology needs to be part of plant production... It illustrated that even if we have a working model, we can never gain support from the establishment. When the French come and say, then we have gone after them. We always have to copy something.”

Furthermore, on the state institutions level, we see only sloganizing agroecology. As one interviewee explained

“the dominant position is not agroecology, but precision agriculture and irrigation. These are the flagships of the Agriculture Chamber that promote efficiency and competitiveness. The fear of decreasing yields is the strongest motivation in farming communities. Therefore, they overuse pesticides to avoid decreasing yields.”

Agroecology could provide a clear technical strategy for social movements, but it is hard to translate the scientific knowledge of how to mimic nature into practice. It seems even the dialogue is most often missing between science and practice and that creates a considerable gap in between the discourse and practice of agroecology that hinders its upscaling. Upscaling, in this sense, would require a far better translation of the scientific insights of agroecology to the level of everyday practice.

What can consolidate Agroecology?

Agroecology is not well established in Hungary currently, even though there is a very fertile ground for it, as traditional knowledge, varieties and practices are still present – but they are very

much endangered. On the one hand, the isolated practices are getting into coalition and network very slowly. In essence, the whole scientific foundation of research and innovation of agroecology lacks support. On the other hand, to create an active and impactful movement, awareness-raising among citizens and decision-makers would be desirable for the potential of agroecology to tackle challenges related to biodiversity extinction and climate crisis.

As a first step to form a new network the workshop “Creating a Common Vision: laying the foundations of the Hungarian Agroecology Network” participants from a wide sector of stakeholders imagined a positive future, where food systems are rooted in local communities, based on the appreciation of producers and are independent of non-renewable resources. Participants also highlighted the growing importance of networks arching across disciplines and sectors. For realizing this long term vision, the first step would be to create an informal, decentralized and locally focused agroecology network that can advocate for agroecology on the political and economic stages.

5. CONCLUSION



Various aspects of agroecology have been present in Hungary for a long time. In contrast, other forms of alternative agriculture spread more in the recent years, but not under the holistic denomination approach of 'agroecology', as this term is not yet widely used in Hungary. If used, it is often leading to confusion. For this reason, there was no extensive previous mapping of agroecology as a science, practice and movement in Hungary, this mapping report is the first of its kind, interpreting agroecology as a transdisciplinary, participatory, action-oriented approach to food production (with processing and distribution included) and consumption - endorsing its three dimensions.

The goal of this research was to gain a general overview of the present state of agroecology in Hungary, through attaining an understanding of the historical and political contexts in which these developed and currently function, but also to map agroecology related initiatives, research and their networks. As the first research of its topic, the goal was also to interpret agroecological principles in the Hungarian context, providing a theoretical background for future research and cooperation. Since the mapping would serve as a basis for advancing agroecology in Hungary, the research was also aimed at apprehending in detail the main drivers and challenges that the different actors and networks are facing. The mixed methodology of the research to gain insights for answering qualitative research questions, such as barriers and opportunities, historical context and definitions of agroecology consisted of an online and offline literature review, mapping the diversity of stakeholders and of conducting and analyzing qualitative, explorative interviews. The selection of the 10 interviewees aimed to reflect the balanced reality of the situation with representatives of different constituencies (NGO, State Institutions, SME, Farmers, Advocacy Groups, Researchers, Academia, etc.). Interviews were anonymized and then analyzed to show common threads and general patterns of thinking about the actual practice of agroecology in Hungary. Moreover, the outcomes of several workshops and other events organized by the research partners

were as well integrated with the study, e.g. the 1st Hungarian Agroecological Conference (November 2019) and the Vision to Action workshop designed to lay the foundations for a Hungarian Agroecological Network (December 2019), supporting a joint action to forge the pathways towards agroecological transition.

The research shows several valuable findings. The first important aspect consists of an overview of some key topics, actors and events that are highly relevant to consider in order to gain a better understanding of the current state of agroecology in Hungary. This part shows several attempts to bring in agroecological approaches to the scientific community as well as to policies resulting in concrete practices. However, Hungary is following the general trend that can be perceived worldwide -with the expansion of industrial agriculture and the globalization of food systems-, supporting administratively, legally, financially and research-wise these initiatives instead of favoring the different paths to transition towards agroecology. It is also important to note that the indispensable social dimension of agroecology is still not fully recognized and considered by the political and scientific community, however there have been some interesting initiatives in the latter one, with the social aspect of agroecology in focus. The social aspect is mostly advocated by social movements and alternative farmers as an opportunity to have a paradigm shift in the current food system.

The lists of actors involved in the practice, movement, science and education show a diversity of stakeholders, regrouping around several themes either regarding the nature or the form of their activities or the motivational reasons driving them. Regarding the actors involved in agroecological farming, processing or marketing, we can observe a mixture between traditional and new knowledge and practices, with a strong presence of social innovation - especially when it comes to marketing. As for the actors and initiatives involved in social movements and advocacy, it is worth mentioning their involvement and work in related issues since the early '90s

and a new strong wave in the last decade. The diversity and richness of these stakeholders present in Hungary show the importance of the existence of a nationwide network of actors and organizations that could be mobilized. Still, for the moment there is a lack of coordination among them due to different factors. In relation to training and education, there is no agroecology BSc. or MSc. programs, but certain topics of agroecology are present in courses in several institutions. However, there are non-formal educational programs for adults related to agroecology which are practice-oriented trainings for both farmers and consumers, that are increasing rapidly in their popularity and their number. There are several university departments, research institutes and research groups working on different topics related to agroecology, and some of them have been using participatory research methods for several years. However, there is a lack of policy support to promote their activities and their findings and to incorporate them into the curriculum. It is also worth noting the existence of several multistakeholder networks overarching the sectors of science, movement and practice in the following topics: agrobiodiversity, regenerative agriculture, polycultures and alternative food systems.

Concerning the geographic dispersion of the actors, we can observe 4 'hot-spots': the first concentrated in and around Budapest (where most of the actors are), the second in Western Hungary - North from

the Lake Balaton, the third in the North-Eastern part of Hungary, and the fourth in the Great Plains. From the qualitative interviews the following challenges and opportunities can be highlighted: from the state institutions level, agroecology is used as a slogan, which is not backed up by concrete actions; there is a lack of cooperation in the scientific sphere; the dialogue is missing between science and practice, and that creates a considerable gap in between the discourse and practice of agroecology that hinders its out- and upscaling.

In conclusion, the report finds that Hungary is well situated with its history and present richness of actors all over the country. Still, the transition towards agroecology will only happen if the actors cooperate more formally, and therefore can advocate for agroecological transition in a coordinated manner on the one hand. On the other hand, there needs to be a real political will to support at all levels this transition, and not only in words but by concrete actions, and not only by top-down approaches but by enabling the bottom-up ones, as they represent the local solutions to the global problem. Agroecology has the potential to become an umbrella under which farmers, researchers, activists and consumers can gather for a common goal: to create a regenerative, socially just, healthy food system in Hungary. As agroecology advances in Europe and the world, Hungarian initiatives could benefit from projects that connect them to similar international partners.

List of abbreviations

AEEU: Agroecology Europe Association
CSA: Community Supported Agriculture
CSO: Civil Society Organization
FAO: Food and Agriculture Organization of the United Nations
IPES: International Panel of Experts on Sustainable Food Systems
KÖKISZ: Közösségi Kisgazdaságok Szövetsége
/ Alliance of Community Supported Agricultural Farms
KmGYH: Kárpát- medencei Gyümölcsész Hálózat/ Fruit Network of the Carpathian Basin
MAPER: Magyar Permakultúra Egyesület/ Hungarian Permaculture Association
NAIK- NÖKO: Nemzeti Agrárinnovációs Kutatóközpont- Növény Önálló Kutatási Osztály/ National Agricultural Innovation Center- Research Center for Plants
NAIK-ZÖKO: Nemzeti Agrárinnovációs Kutatóközpont- Zöldség Önálló Kutatási Osztály/ National Agricultural Innovation Center- Research Center for Vegetables
NBGK- NÖDIK: Nemzeti Génmegőrzési Központ- Növényi Diverzitás Központ/ National Center for Gene Preservation- Plant Diversity Center
NGO: Non- governmental organization
OKJ: Országos Képzési Jegyzék/ Nation Training List
ÖMKI: Ökológiai Mezőgazdasági Kutatóintézet/ Research Institute for Organic Agriculture
PDC: Permaculture Design Course
PGS: Participatory Guarantee Systems
SME: Small and Medium Enterprises
TVE: Tudatos Vásárlók Egyesülete/ Association of Conscious Consumers

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<https://www.facebook.com/agrookologiamagyarorszag>

<https://www.facebook.com/vedegyletegyesulet>

<http://vedegylet.hu>

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