

SUSTAINABLE YIELDS AND AGROECOLOGY THEMATIC STUDIES

SOCIO-ECOLOGICAL INDICATORS OF
AGROECOLOGY-SYSTEMS IN THE
BIOEAST COUNTRIES



THEMATIC STUDY OF THE BIOEAST THEMATIC WORKING GROUP ON SUSTAINABLE YIELDS AND AGROECOLOGY

Socio-ecological indicators of agroecology-systems in the BIOEAST countries

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1. Executive summary

This research presents a comparative situational analysis of the state of agroecology in European countries within the BIOEAST project region. A general focus was to gain a better understanding of necessary conditions for upscaling the adoption of agroecological practices in 11 countries in Europe. A portion of the research was dedicated to comparing established sets of internationally recognized indicators from agricultural, environmental and social fields related to agroecology, and discussing their applicability in the region, in addition to their limitations, with the end goal of describing a supplemental framework of indicators which have specific relevance in BIOEAST countries. In addition to the analysis of the applicability of established indicator sets, interviews with stakeholders with experience in the field of agroecology advocacy within the BIOEAST region were conducted, and suggested social indicators for agroecology were examined during a participatory workshop.

Research indicates that barriers and drivers for agroecology in the BIOEAST region fit into the following thematic categories: Defining Agroecology, Agricultural Legacy and Market Characteristics, Advocacy, Resources and Knowledge, and Policy. Barriers and drivers with specific relevance in the region are summarized in detail and recommendations are made for advancing agroecology at farm, food system and policy levels. This project confirms that the application of agroecological indicators that are commonly accepted and transparent contributes strongly to a common understanding and internalization of agroecology principles and practices; a necessary step for upscaling agroecological transition. It is concluded that the development of a completely new agroecology indicator tool for the BIOEAST region is not recommended, but rather combining the usage of a number of already existing tools with suggested supplementary indicators described. The research provides a summary list of supplemental agroecology indicators at the farm, food system and policy level, making suggestions for applications which correspond to gaps in existing indicator frameworks and account for regional specificities.

List of abbreviations

agroecology	EU Agroecology Europe
BOND	Bringing Organisations and Network Development to higher levels in the Farming Sector in Europe
CAP	Common Agricultural Policy
CSA	Community Supported Agriculture
COMPAS	Comparative Agriculture System Model
FAO	Food and Agriculture Organization of the United Nations
FiBL	Research Institute of Organic Agriculture
NGO	Non governmental organization
NÖSZTÉP	Nemzeti Ökosisztéma Térképezés és Értékelés (National ecosystem mapping and evaluation)
OASIS	Original Agroecological Survey Indicator Tool
PGS	Participatory Guarantee System
SDG	Sustainable Development Goal
SDI	Sustainable Development Indicator
SAT	Systemas Alimentacios Territorializados (Territorial Food Systems)w
SAFA	Sustainability Assessment of Food and Agriculture systems
SMART	Sustainability Monitoring and Assessment RouTine
SoIM	Sustainable and Organic Livestock Modeling
TAPE	Tool for Agroecology Evaluation
trAEce	Agroecological Vocational Training for Farmers
UAA	Utilized Agricultural Area
UNISECO	Understanding and Improving the Sustainability of Agroecological Farming Systems in Europe

2. Research scope and limitations, research method framework

The aim of this research was to perform a comparative situational analysis of the state of agroecology in European countries within the BIOEAST project region. Agroecology was chosen as a governing concept because of its holistic inclusion of the complex social, environmental and human rights impacts of agricultural systems, and reactionary stance towards the damaging impacts of industrial agriculture. The recommendations made in this study take into account the necessity for transition from chemically dependent, monoculture based agriculture systems to more regenerative, diverse and socially inclusive models proposed by agroecology, and acknowledge the continuing importance of providing support for transforming conventional agriculture. A general focus of the project was to gain a better understanding of the necessary conditions for upscaling the adoption of agroecological practices in focus countries. With this goal in mind, agricultural performance indicators were examined, being mindful of the importance of further developing concrete metrics for clarifying the definition of agroecology, and measuring its impact in practice. The aim of the study was not to create a new indicator tool from scratch, but to complete an overview of the already existing assessment tools, evaluate these for their relevance in the BIOEAST region and point out the missing areas which could be included in future iterations of complex assessment tools. The refinement of assessment tools will help guide decision makers and different stakeholders of the agri-food system in implementing transitions toward agroecology. Thematic and subregional policy briefs were prepared to inform decision makers on the state of agroecology, describe necessary interventions, and outline indicators for measuring advancements.

The authors of this study base their understanding of agroecology on the following definition proposed by Gliessman (2018):

“Agroecology is the integration of research, education, action and change that brings sustainability to all parts of the food system: ecological, economic, and social. It’s transdisciplinary in that it values all forms of knowledge and experience in food system change. It’s participatory in that it requires the involvement of all stakeholders from the farm to the table and everyone in between. And it is action-oriented because it confronts the economic and political power structures of the current industrial food system with alternative social structures and policy action. The approach is grounded in ecological thinking where a holistic, systems-level understanding of food system sustainability is required.”

A primary stage of the research included a review of literature which has documented the scope and reach of agroecology as a science, practice, and environmental and social movement in BIOEAST partner countries with the goal of identifying trends, regionally specific challenges and opportunities. This research was unique in the fact that although agroecology has advanced in numerous BIOEAST partner countries in recent years, the majority of literature documenting agroecology as a larger movement has focused geographically on Western Europe, North and South America.

A focused portion of this research was dedicated to comparing established sets of internationally recognized indicators from agricultural, environmental and social fields related to agroecology, and discussing their applicability in the region, in addition to their limitations, with the end goal of describing a supplemental framework of indicators which have specific relevance in the region. An assessment of agroecological indicators has been prioritized on the basis of the pressing need to better define agroecology in practice, in addition to the steps in food policy development and supply chain transition which comply with the socio-political principles of agroecology. The 10 elements of agroecology by the FAO was used as a baseline framework for determining if the measurement tools in other examined agricultural performance indicator sets contain metrics which align with the holistic set of themes. Indicator sets that were developed, adapted or tested in the BIOEAST region and those specifically designed for assessing agroecology were chosen for the analysis.

The comparison of indicator sets incorporated knowledge of characteristics and trends in agricultural markets, production practices, consumer awareness, and agroecology based scientific research within the region. The analysis examined the applicability of existing indicator sets, keeping in mind the geographic specificities and social context within the region. In addition to the analysis of the relevance of established indicator sets, interviews with stakeholders with specific experience in the field of agroecology advocacy within the BIOEAST region were conducted. To understand the barriers of agroecological transition and gain an extended overview of the suggested socio-ecological indicators adaptable to the food system, an expert workshop was conducted. The results of the interviews and workshop helped confirm conclusions reached by the research team with regard to best practices in advocacy, but also barriers and drivers for agroecology and the applicability of measurement indicators within the focus study region.

The research attempted to:

- Outline the strengths and limitations of existing sets of agricultural performance assessment indicators;
- Identify key factors for impactful systematic change in food supply chains in the BIOEAST region within the context of agroecological transition;
- Through a comparative analysis of existing agricultural sustainability indicator sets, provide a summary of available tools and frameworks for inspiration and guidance for the future developments of specific tools for measuring agroecology holistically within the BIOEAST Region;
- By determining the most important barriers for agroecological transition in the BIOEAST countries and also identifying gaps/weaker areas of previous indicators sets, provide suggestions for supplementary indicators specifically tailored to reflect on identified challenges in the BIOEAST countries.

The limitations which influenced the shape and final output of this research project included:

- Time constraints made possible only a broad overview of agroecology based literature within the region of focus.
- A fixed set of agricultural performance indicator sets were analyzed, and analysis included an overview of measurement metrics, not necessarily testing the application in each country of the BIOEAST region. The analysis of some indicator sets was limited by intellectual property rights which protect the right to analyze data calculation methods used by software programs, or to test software without paying additional usage fees.
- Conclusions made regarding established agroecology indicator sets and their applicability were generalized, as the project time frame did not allow for specific scenario analyses to

be conducted for each participating BIOEAST partner country. A number of key case studies were elaborated in an attempt to provide an overview of trends in the region within the limited timeframe of the project.

- Because of time constraints, qualitative interviews with stakeholders were favored in order to confirm the applicability of conclusions reached within the agroecology indicators analysis. The project time frame did not allow for more in depth consultation with a diverse group of stakeholders to confirm assumptions reached within the project timeframe.
- The scope and results of desktop research on agroecology movements in BIOEAST countries was impacted by the usage of English language search criteria which may have excluded relevant materials in local languages.

3. Agroecology in the BIOEAST macro-region

3.1. Agroecology literature and projects

During the literature review, recent reports and projects initiated after the year 2015 were explored. The three year long, Erasmus+ funded trAEce project started in 2020 with the main aim to offer farmers and trainers capacity building education for agroecology based development. Besides the agroecological training curriculum, methodological guide for trainers and learning materials for farmers; the project also included an agroecological situation analysis in partner countries; including the following BIOEAST countries: Czech Republic, Hungary and Romania. The “Background Report for Agroecological Vocational Training” (Bálint et. al., 2020) includes the situation analysis of all partner countries as well as a farmers’ needs assessments for vocational agroecological training.

The **UNISECO** H2020 project with 15 partner countries was aimed at enhancing and understanding socio-economic and policy drivers and barriers to the development and implementation of agroecological approaches in farming systems in the EU. BIOEAST partner countries included Czech Republic, Hungary, Latvia, Lithuania and Romania which each provided a detailed case study of a specific farming system. Public deliverables of the project (UNISECO 2021a) and related scientific articles (Landert et. al. 2020; Székács et. al. 2020) were reviewed.

The **BOND** H2020 project’s aim was to bring organizations and network development to higher levels in the farming sector in Europe, by understanding its challenges and showcasing good examples, organizing training of trainers events, national workshops, regional policy roundtables and research and publications on different related topics. It included 17 partners from 12 European countries, but participants from all over Europe were mobilized during the different activities. Project reports for collective action and regenerative food systems provided insights for the BIOEAST countries Czech Republic, Poland, Hungary and Romania (BOND 2020a, BOND 2020b).

Agroecology Europe (agroecologyEU) was founded in 2016, as an umbrella organization to promote agroecology in Europe. AgroecologyEU has been active in mapping agroecology to understand the realities of science, practice and movement in the region, resulting in a mapping report including Hungary and Croatia (Agroecology Europe, 2020) as well as a deeper analysis of the Hungarian situation (Balázs, Balogh & Réthy, 2020). An overview of agroecological research, education, collective action networks and alternative food systems in Europe was provided by Wezel et. al. 2018; discussing the situation, among others, in Bulgaria, Czech Republic, Hungary, Poland, Romania and Slovakia. In addition to these project related resources, recent publications discussing agroecology were reviewed for Croatia, Lithuania and Slovenia (Šeremešić et. al. 2021; Korže 2016; Korže & Korže, 2018); Eastern-Europe (Moudrý et. al. 2018), as well as a specific report on land policy and agroecological transition by Nyéléni Europe and Central Asia (2021).

The availability of resources on agroecology was limited in the cases of Latvia, Lithuania and Estonia; besides the UNISECO case studies no English language literature was discovered during the desk research for these countries. The resources provided important insights into EU and national agricultural policy; higher education programs, farming practices and case

studies from different actors connected to agroecology. However, a deeper analysis of social movements of food, land and seed sovereignty and approaching agroecology in a wider, food system or territorial context was lacking in the reviewed literature.

3.2. Patterns of agroecology in the BIOEAST countries

Definitions and interpretations of agroecology

The resources showcased varying levels of clarity by the authors regarding the definition of agroecology. Due to the history of the term in traditional agrarian science and education, some associate it with the scientific discipline of agronomic ecology and landscape ecology (Korže, 2016); and some with certified organic agriculture or traditional farming (Moudrý et. al. 2018). On the other hand, there is an emerging trend of interpreting agroecology as a transdisciplinary, holistic approach to food system level transformation with regards to environmental and social aspects (Balázs et. al. 2020; Bálint et. al. 2020). As agroecology is gaining popularity worldwide and in Europe, the newer interpretations in the BIOEAST region can be attributed to European projects and globally recognized elaborations as provided by the FAO, as well as a new generation of professionals working in an international community and participating in the discourse on food sovereignty and sustainable agriculture. It is a general observation of reports that the concept of agroecology has not yet trickled down to the general public or farmers, with a few exceptions of conscious consumers, food sovereignty activists and producers directly involved in agroecological practices.

Practice

Agricultural practices and farm characteristics in the BIOEAST countries are strongly affected by collectivization during the socialist era, the post-transition market liberalization and the accession of countries to the European Union (BOND 2020a; BOND 2020b). Agroecological transformation calls for an acknowledgement of the importance of small to medium sized, diverse family farms strongly embedded in local food systems and rural exchange networks (Agroecology Europe 2022), but the trends in Eastern Europe show a continuous concentration of agricultural land in the hands of large-scale actors and a technology driven intensification of production (Nyéléni Europe and Central Asia 2021). The practices of agroecology are present in organic, biodynamic and traditional farming as well as in approaches of permaculture; but farmers adapting these practices are few in number and often marginalized (Balázs, Balogh & Réthy, 2020), while conventional farmers are hindered to switch to agroecological practices by economic barriers, market pressures, and a lack of motivation (Agroecology Europe, 2020). Patterns in the application of agroecological farming practices were identified. Some areas still preserved traditional farming practices and a closer relationship of farmers with the natural systems due to the areas being unfavorable for large-scale conventional farming. Examples of this can be found for instance in the mountainous areas of Romania and Bulgaria, the coastal - island regions of Croatia, extensive grazing systems of Hungary, and mixed animal husbandry and fruit and vegetable production operations in the Baltic region (Moudrý et. al. 2018; Székács et. al., 2020). Empowering and supporting the guardians of traditional practices, combined with ecotourism and environmental conservation in these areas suggests an important opportunity for agroecology development in the BIOEAST region (Korže, 2016). Land grabbing, land concentration, the absence of a generation of new farmers, and the orientation of current rural development policies and subsidies are however not aiming at the preservation of these practices. Several reports discuss organic farming as one of the practices/disciplines most related to agroecology, but there is also a new generation of farmers who are highly

trained, experienced, and were exposed to innovative practices of agroecology, such as permaculture, regenerative agriculture, agroforestry, market gardening through study visits, education or personal research in international practices (Mogyorós, Farkas & Rodics, 2020; Balázs, Balogh & Réthy, 2020). These professionals can be understood to serve as an important driving force in providing practical knowledge and motivation to other farmers. However, among conventional farmers, there is a general lack of expertise and practical knowledge about making the transition to agroecological farming; agricultural extension services do not focus on this topic with some exceptions for profit-based services (Moudry & Bernas, 2020). Examples of locally embedded food systems are only present in the region on a smaller economic scale; including traditional farmers markets; community supported agriculture, shopping communities, food cooperatives - but are expanding as consumer expectations rise for healthy, locally produced, environmentally sustainable food.

Science and education

Nearly all reports list agroecological higher education programs rooted in traditional agri-environmental disciplines; while some also include topics in organic farming, sustainable farming systems, sustainable use of natural resources or ecotoxicology (Moudry & Bernas, 2020; Balázs, Balogh & Réthy, 2020). However, the transdisciplinary and holistic approach, especially social aspects of agroecology are barely present in agricultural higher education programs in the BIOEAST region; these topics are tackled more in individual research projects and non-formal adult education, for example in the trAEce and the UNISECO projects. The emergence of international projects, such as ERASMUS and Horizon2020 accelerates knowledge transfer from countries where agroecology has been more embedded in farming, distribution, education and research. This includes also sharing the social and market innovations related to agroecological food systems, such as community supported agriculture, participatory guarantee systems or seed saving.

Movement

The strictly scientific definition in Eastern-Europe and socially minded definition of agroecology rooted in the peasant movements of South-America are slowly converging (Balázs et. al, 2020), but this process is not without its own issues of discord. Several actors in grassroots movements are working in alignment with agroecological principles in environmental protection, climate change mitigation, food, seed and land sovereignty; even if they are only starting to identify with the global agroecological movement. NGOs play an important role in conceptualizing agroecology beyond agronomic ecology, emphasizing social and environmental values; the need for policy change and support for small-scale farmers. There are several good examples where NGOs are capable of bringing various stakeholder groups to the table, developing dialogue among them (farmers, consumers, scientists, policy makers). In some cases, these initiatives are farmers organizations, but often change is driven by consumers associations and environmental organizations (BOND, 2020b). As of now, agroecology related movements are mostly self-organized and not well connected to policy making or academia; however, forms of trans-sectoral and transdisciplinary networks working for systemic change in the food system were identified for example in Hungary, Romania and Poland. It is a general trend in Europe that consumers and consumer organizations are the driving force behind agroecological movements - working for accessibility of locally produced healthy food (Agroecology Europe, 2020).

Socio-economic aspects

Some impactful socio-economic aspects of agroecological transformation in the region include a lack of farm workforce, an aging demographic among farmers and the depopulation of rural areas. Aging generations of farmers are less inclined to adopt innovative practices; while they are also locked in to subsidy support programs which prolong conventional farming practices (Bálint et.al, 2020). In the organic sector, the region is mostly providing raw materials for export, thus the potential added value of products is lost within the country of origin. In many cases secondary products return to the country of origin of the primary production as processed products sold under foreign brand names - thus the added value does not benefit the original food producers (Székács et. al., 2020). A common theme in literature is the effect of the socialist era on the food system: with collectivization; large-scale fields were developed and landscape elements removed.

Farmers have lasting reservations about cooperatives due to the forced cooperatives of the 20th century - they are less likely to cooperate in an organized way than their Western European peers (BOND,2020a). The disruption of self-sufficient and small-scale family farming also meant a disruption in farming traditions and related knowledge, in addition to the degradation of localized food chains. Now, new generations of farmers and newcomers often have to rely on literature and internationally recognized best practices. As industrial agriculture gained dominant influence in the 20-30 years after joining the EU, CAP payments formed the attitude of farmers and further influenced the shape of farming systems (Bálint et.al. 2020). In the BIOEAST region, trends in the agriculture sector following EU ascension included early enthusiasm towards certified organic production driven by subsidies followed by a period of stagnation, and overall decline in animal husbandry, the disruption of local markets by international retail chains, land grabbing and concentration, and an increased influence of subsidies in determining what is produced where on landholdings.

Policy

Many reports cite the Common Agricultural Policy (CAP) and EU rural development payments as in support of agroecology (European Commission, 2020a). Some measures of CAP (Agri Environmental Schemes, greening, biodiversity management) can be linked to supporting transition while the continuing dominance of Single Area Payment Schemes (SAPS) is often cited to have negative, or detrimental impacts (Pe'er et. al 2020). The EU Green Deal and its related Farm to Fork and Biodiversity strategies point out agroecology as one of the sustainable farming practices that can help achieve their targets (European Commission, 2020a). The EU has funded several research projects dedicated to advancing agroecological research under its Horizon 2020 programme. These projects are contributing to an increased understanding of the practical implementation of ecological and low-input farming practices, along with their environmental, climate, social and economic benefits. Moreover, the Commission has proposed a candidate European partnership on 'Accelerating farming systems transition: agroecology living labs and research infrastructures' to help boost the advances from H2020 projects. If successful, the overarching goal of this candidate partnership would be to tap into the potential of agroecology and of local innovation to accelerate the transition towards sustainable, climate- and ecosystem-friendly farming systems in Europe (European Commission, 2020b). Individual governments and relevant agricultural departments of BIOEAST countries, through the practical applications of support policy lie, in agreement with large-scale industrial actors, tending to support the new paradigm vision for agriculture as one reliant on precision, digitalization, and the modernization of farming with unchanged power structures (Bálint et. al. 2020; Nyéléni Europe and Central Asia 2021).

3.3. Regional characteristics

The 11 countries within the BIOEAST region are distinct in many aspects, but examination of scientific literature and interviews conducted with key stakeholders helped identify commonalities in the agricultural sector which have implications on the further development of agroecology within the region. Beyond general characteristics outlined above, further analysis uncovers similarities between specific groupings of countries. The subregional groupings assist in making more

accurate, and regionally specific recommendations for future agroecology policy taking into account commonalities in agrarian history and tradition, agricultural system trends, geographic and climatic data, food sector developments, scientific pursuits, civic movements, and policy initiatives within the countries. The BIOEAST country subregional groups are outlined below (Figure 1.). Specific characteristics of the subregions are introduced in Table 1.; barriers, challenges, and opportunities will be discussed in detail in Chapter 3, supplemented with the results of 11 qualitative interviews and a focus expert workshop.

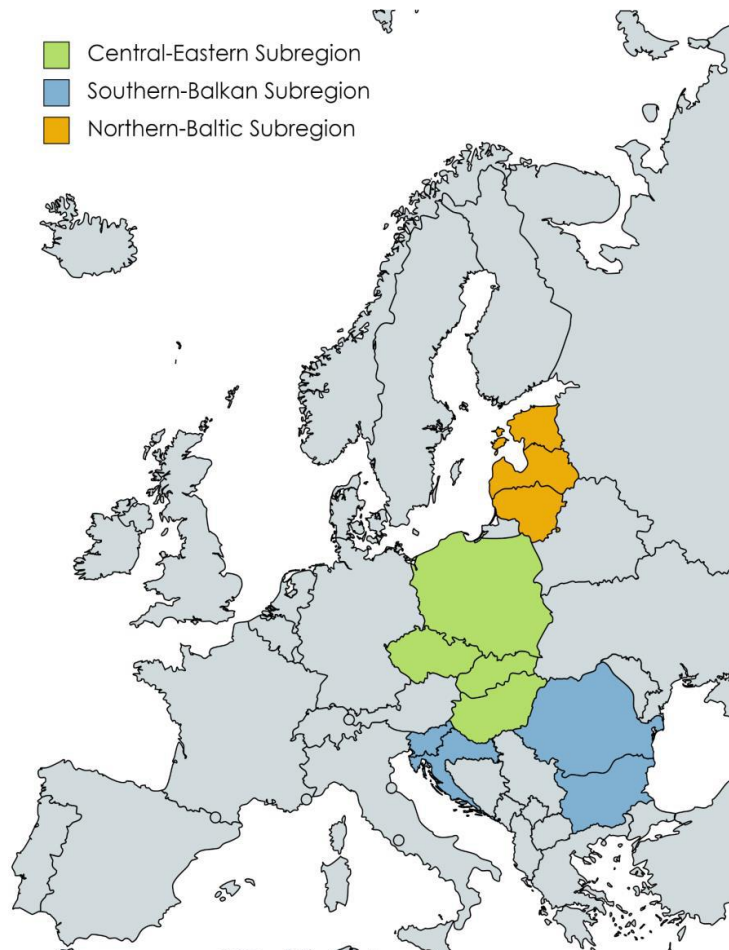


Figure 1: BIOEAST country subregional groups

Table 1: **Subregional characteristics of agroecology in the BIOEAST region**

BIOEAST Subregion and Countries	Defining characteristics relevant to agroecology development within the region
Central-Eastern Subregion: Hungary, Slovakia, Poland and Czech Republic	<ul style="list-style-type: none"> ● Agroecology advocacy spearheaded by newly emerging civic actors in collaboration with longer tenured NGOs, idealist producers and specifically targeted academic research; activity scattered but perceivable, some formalization of agroecology networks ● Similarities in agriculture sector demographic shifts since EU accession in 2004: Average farm size, power relationships, support resources and influence based on landholding size, reduced overall number of employed in agriculture ● Stagnation of growth in organic agriculture after initial peak in early 2010s, small but enduring organic movement ● Commonalities in agricultural support policy trajectories following socialist regime change and EU accession ● Some civic actors and individual farms already involved in EU supported agroecology-specific research
Southern-Balkan Subregion: Romania, Bulgaria, Croatia and Slovenia	<ul style="list-style-type: none"> ● Unique geographic regions focus areas for agroecological production, such as coastal and island landscapes, mountainous regions, national parks and nature preserves ● Agroecology is associated with preservation of local traditional peasant agricultural customs ● Long tenured singular organizations the representative face of agroecology within a country or region (i.e. Eco Ruralis - Romania; Agricultural Cooperative Island of Krk- Croatia) less formalization of agroecology network ● Some involvement of civic actors and individual farms in EU supported agroecology-specific research
Northern-Baltic Subregion: Estonia, Latvia and Lithuania	<ul style="list-style-type: none"> ● Least representation of all European regions in agroecology literature and research projects ● Higher occurrence of mixed animal husbandry and fruit- vegetable production as part of agricultural legacy is accepted to be an opportunity for the future ● Faster growth of organic agriculture as part of total UAA as compared to other regions ● Permaculture and agroforestry movements are small but influential in agriculture policy advocacy and aligned with greater regional environmental movements ● The applications of agroecology in advocating for the preservation of traditional fishing culture and protecting offshore fisheries are not currently well elaborated and must be explored.

4. Indicator sets, projects, tools applicable to assess agroecological performance, transition and practices

4.1. Background of agricultural performance assessment

One of the main goals with this desk research was to have a general overview of what work has been completed so far regarding assessment and indicator systems, sets and tools in the BIOEAST region in the context of agroecology. Assessment of performance and impacts of agricultural systems has a multi decade history now in scientific discourse. From the evolution of theoretical concepts and frameworks through the first trials for real demonstration, today there is a wide array of tools available for measuring various aspects of agriculture, mostly the environmental performance, but also for the economic and social aspects. Most of these indicator sets and tools have been developed to better understand, demonstrate and describe sustainable agriculture in practice.

As the holistic approach of agroecology is a relatively new term even in the scientific sphere, there are only a very few tools specifically developed to assess agroecology. As agroecology seeks to reinitiate and reinforce the transition to a sustainable food system, therefore, relevant topics and themes are in great overlap with sustainability concepts. Since in the BIOEAST region there are some trials and experiences with sustainability assessment tools, they were also selected for evaluation as possible use for assessing agroecology. A summary of the indicator tools and sets can be found in Table 2, with further analysis in Appendix 4.

4.2. Indicators on farm scale

There are numerous tools and indicator sets available to assess the environmental sustainability of agriculture. Some of these tools have been adapted to the Central and Eastern European context.

SAFA is an internationally recognized framework developed by the FAO to assess sustainability of food and agriculture systems. It was published in 2013 along with a set of suggested indicators (**SAFA tool**) and also with a simplified version for assessing small-scale farms in the global-south, the so-called SAFA-Small App. The **SMART tool** was developed by the Swiss FiBL Institute to operationalize the SAFA framework and make possible farm level assessments. Dóra Mészáros has tested and adapted SMART in Hungary as part of her PhD research (Mészáros, 2017).

During the UNISECO project (2018-2020) SMART was used to assess full scope sustainability in the respective BIOEAST countries' case studies while **Cool Farm Tool** was used to measure GHG emissions and on-farm biodiversity, and **COMPAS** for evaluating economic performance of the studied farms. In the European **Bio-Bio project** (2009-2012), a comprehensive

set of indicators was developed for in-depth assessment of on-farm biodiversity, from the BIOEAST region, Hungary and Bulgaria were project partners conducting case studies and testing the indicators.

Within a Leonardo knowledge transfer project in 2012-2014 the French **DIALECTE tool** was tested and adapted for the Hungarian context to assess environmental sustainability at farm level. The Hungarian version is the **AgriDiag** and the aim was to develop this tool for initiating the so-called “green-point” system which is a result based subsidy system inspired by the ostrich Ökopunkte system (Mészáros et.al 2015).

Since agroecology as a concept came to the forefront as a framework for sustainable transitioning of the food system during the last few years, the FAO adopted the term and started to develop an indicator set for assessing agroecology at farm level based on their 10 elements of agroecology. The result is the **TAPE** method (Tool for Agroecology Performance Evaluation). Trials were conducted mostly in South America, Africa and Central Asia, but also in European countries such as Poland and Italy.

The RESOLIS Responsible and Sustainable Food program began in 2013 with the will to support the movement of agroecological transition. During its course 100 Spanish initiatives were analyzed and many experts were consulted, which led to the construction of the Territorialized Food Systems (**Sistemas Alimentarios Territorializados - SAT**), which seeks to showcase the high transformative value of these initiatives and the numerous positive effects they generate in the social, environmental, cultural and political spheres. The SAT assessment tool intends to give these types of initiatives visibility and analyze their impacts in order to scale up and out their activities and replicate. SAT is based on the principles that define Food Sovereignty, Social and Solidarity Economy and Ecofeminism.

A very recent project is developing another tool by Agroecology Europe specially for assessing the agroecological transition stage of farms tailored for the European context, the **OASIS** (Original Agroecological Survey Indicator System). It has been tested during a master thesis research project in Croatia by Karla Škorjanc but has not yet been evaluated in any other BIOEAST countries to date. There are efforts to adapt those tools to the Central and Eastern European context, but its application is still in progress.

4.3. Indicators for food chain level

There are only a few indicator sets which are developed for food chain level assessment. During the H2020 project TRUE, focusing on re-integration of pulses in production and their use in restaurants, short supply chains, the Slovenian partner, the Jozef Stefan Institute has elaborated a sustainability assessment tool, called **Pathfinder** which encompasses the whole food chain from production to consumption (including processing, transport and distribution).

There are some initiatives aiming to increase traceability, transparency and sustainability in the food chain. Those are mostly focusing on Short Supply Chains (Hungary: Nyíregyházi Kosárközösség) or on restaurants. In Hungary, the Heroes of Responsible Dining Foundation (Felelős Gasztrohós Alapítvány) has established a basic criteria to qualify restaurants which include avoiding the use of palm oil, provision of vegetarian meals, procurement of local (national) food ingredients, use of certified organic ingredients, use of environmental friendly cleaning

agents, and having targets to reduce environmental impact. Agrikulti, also Hungarian based, orchestrated a project called Házikó, a catering business supplied by local farmers and they also had a set of criteria to ensure and trace sustainability of suppliers. Agrikulti has launched

a new project called *‘Mit eszel?’* (What do you eat?) which aims to connect growers with top-rated restaurants for supplying high quality crops. One pillar of the project is the elaboration of a sustainability assessment framework called **Agritoolkit** for the participating farms which is transparent and the chefs can choose whether they support more environmentally friendly farms.

We assume that there are several local, smaller-scale initiatives in the BIOEAST region that we could not detect, but they contribute to the local development of agroecology on the food system level, and they utilize self-developed standards for evaluating their sustainability. Besides these initiatives, there are various labels and trademarks for different production standards or geographical indication/origin or processing standards, ingredients which have criteria sets for labeling, these might also be important data sources for evaluating agroecological transition at the food system level. Organic certification is definitely a prioritized data source at the food system level, as well as for farm and national levels.

4.4. Indicators for national or regional level

Indicator sets/tools which assess agricultural performance at the national level for sustainability are almost completely missing. The **SAFA** as a general, theoretical framework for analysis could be one option, but the authors are not aware of any research done on that level. Official national statistical data from **Eurostat** and the agrarian census could be used as reference data for analysis. **Valkó** (2015) in his PhD thesis describes a possible framework for assessing sustainability in agriculture at national level and also suggests composite indicators for the assessment which can be fed with data from national/European statistical sources. One of his core criteria for the indicator selection was the availability of data from national databases.

As part of the European biodiversity policy aims, national ecosystem maps have been created in member countries, for example in Hungary during the **NÖSZTÉP** project which has relevant information for agroecology as well as some services provided by agro ecosystems, which were included in mapping along with other services. National ecosystem mapping was done in the other European countries too, therefore it can be a useful data source for evaluating agroecological transition at the national level.

In the UNISECO project, besides the assessment of sustainability impact of agroecological practices at farm level, a scenario analysis for Europe was carried out with stakeholders and then based on the farm level data, modeling of the possible effects of upscaling was done using BioBaM and SOLm biophysical mass-flow models (UNISECO 2020b). This kind of modeling, evaluation and monitoring could be another option for assessing agroecological transition.

European and national agricultural **policy indicators** like Agri-environmental indicators of the EU could be also integrated in a national level agroecology transition assessment. Also other

national or NGO databases could have relevant information, e.g. the National GHG Inventories, or Farmland Bird Index. The **Sustainable Development Indicators (SDI)**, developed by Eurostat and based on the UN Sustainable Development Goals (SDGs) also contain relevant information to be considered.

Table 2: Summary of selected available indicator tools

Tools/ evaluation criteria	Food system level	Dimension	Relevance for the 10 AE elements	Summary	In which BIOEAST countries has it been tested
TAPE	farm	environmental, social, economic	all 10	Developed by FAO for assessing the 10 AE elements at farm level, mostly tailored for Global South, not so specified, or detailed, low number of indicators, simplified evaluation.	none
SMART	farm (food chain)	environmental, economic, social, governance	all 10	Developed by the FiBL to operationalise SAFA, it has a high number of indicators, more focused on farm level but can be applied to food system level as well, mostly used for research.	Hungary, Czechia, Romania, Lithuania, Latvia
Agri toolkit	farm	environmental, socio-economic	9 (Resilience is not assessed)	Under development by the Agrikulti in Hungary. Currently for assessing mainly horticulture for quality assurance for restaurants.	Hungary
SAFA	farm, food chain	environmental, economic, social, governance	all 10	Developed for providing a general framework for Sustainability Assessments by FAO, also with a set of suggested indicators to inspire the creation of concrete indicator tools.	none
SAFA-Small App	farm	environmental, economic, social, governance	all 10	Developed by FAO along with SAFA tool. It is a very simplistic version to be used by small-scale farmers in the Global South.	none
Agri diag-Dialecte	farm	environmental	4 (Diversity, Synergies, Efficiency, Recycling)	Developed in Hungary based on the french Dialecte tool. Simplified but mostly quantitative data based tailored for research and farm extension.	Hungary
Ökopunkte	farm	environmental	3 (Diversity, Efficiency, Recycling)	Farm level environmental indicator set developed in Austria linked with agri-environmental subsidy program.	none
COMPAS	farm	economic	2 (Efficiency, Resilience)	Farm level economic assessment tool designed for decision support of the farmers.	Hungary, Czechia, Romania, Lithuania, Latvia
CFT	farm	environmental	4 (Diversity, Synergies, Efficiency, Recycling)	Sustainability assessment tool with a focus on GHG, biodiversity and water providing quantitative results. Designed for decision support of the farmers.	Hungary, Czechia, Romania, Lithuania, Latvia

4.5. Representation of the FAO Agroecology elements in the available tools

As presented in Table 2, the 10 elements of agroecology defined by FAO provided a basic context to analyze the tools. **Co-creation and sharing of knowledge** in the classical sustainability assessment tools does not receive as much attention as within agroecology monitoring frameworks. In OASIS, SAT and TAPE it is embedded. All these indicator sets are designed for the farm level, while this principle should also be assessed on the food chain and network level. **Diversity** on the farm and landscape level is assessed in the indicator tools from an ecological point of view. Social diversity is not assessed, although having diversity of people in a community and diversity of different actors in a network are both important. **Synergies** are assessed from a social point of view in the SAT tool; TAPE and OASIS look at ecological aspects of synergies. Sustainability assessment tools normally have relevant data for assessing ecological synergies.

Emphasis on social aspects are significant on the food chain and network level. **Efficiency** is mostly covered at the farm level by collaboration in logistics, machinery use, cooperation for input purchases. Possible modifications and development for assessing the economic performance of selected agroecological practices would be needed, as well as optimization of production on a regional-national level. As for **recycling**, normally the indicators are looking at the amount and reduction of food waste, however they fail to assess what happens with the food waste. **Resilience** can be found in shared resources, logistics support, usage of infrastructure and tools. Operational stability and preserving the legacy of small scale farms relies on ensuring farm succession. **Human and social values**: Transforming and keeping with agroecological practices requires a high level of motivation from the farmer to educate themselves, be innovative and take risks. Innovations are not only present in farming practices, but also on a social level in the new forms of cooperation. Therefore it is important to understand these individual driving forces in more detail. SAT is well developed to assess human and social values on the food system level; however it lacks on the individual farmer level. **Culture and food traditions** is almost not at all covered by the sustainability tools, but it is an important tool in agroecology and well covered in SAT, TAPE and SAFA. A regional characteristic in the BIOEAST region related to this topic is informal channels of food self-provisioning to be measured. Also traditional agricultural landscapes and practices have important cultural value. **Responsible governance** is widely covered in sustainability assessment and agroecology tools as well. Although there are regional specificities and priorities of some topics, further amendments were proposed. **Circular and solidarity economy** is represented in the region in traditional farmers markets and informal food provisioning, as well as in innovative market outlets, such as CSA or shopping communities. TAPE, SAFA and OASIS all deal with this topic on the farm level, while SAT provides a good approach for food system level diagnosis.

4.6. Suggestions for possible use of available tools

A research review indicates that there are numerous indicator systems and tools available for assessing agricultural performance and impacts. Most of them use the overarching term sustainability, and there are a few directly developed for agroecology. Therefore it is not the conclusion of this research that a completely new tool needs to be created, but rather, the task is combining the usage and application of existing ones, and adapting them to regional specificities by modifying some of the indicators or integrating new ones. Some additional concrete suggestions are listed below:

SAFA can be used as an overall sustainability framework, it is strongly advised to highlight the structural connection to it, even if it is not used, for the sake of comparability with other assessments done using other tools; the SAFA indicator set can be useful inspiration for food chain

level tools as well. To assess full-scope sustainability at farm level, **SMART** is an option, as it is the most well-developed tool, with well-established user interface etc. Possible problems with use are accessibility, as it is not a freely available tool and there is a lack of full-transparency in weighting and calculation of indicators.

Cool Farm tool has its strength in modeling on-farm GHG emission quantitatively, the biodiversity module can be also a good option, even though it is not based on real, on-farm examination, only on a farmer survey evaluating possible impacts of practices on the farm, the underlying calculation procedures are not transparent.

The **Bio-Bio project indicator set** is the best option for in-depth biodiversity measurement backed by on-farm inquiry but it is quite resource demanding; expertise is needed and one assessment can take up to 3 days for one farm. **COMPAS** is the only tool directly focusing on farm economics and viability using classic economic indicators. Problems can arise from the sensitivity of economic data, because farmers tend to refuse giving these and also availability of data, as the tool was developed in Germany where farmers have much more data administered than in most cases.

Agridiag can be used for classical, environmental sustainability assessments. It can be mostly used for assessing mid-size arable farms, but it definitely needs upgrading and further development before usage. **Agritoolkit** by Agrikulti has been elaborated so far only for horticulture. One of the main goals is to really adapt the indicators to practical realities of farming, therefore even though it highlights the absolute sustainability goals, it still uses context based evaluations. Although it was developed for the Hungarian context it might be useful for other countries as well.

Pathfinder is a good starting point for developing an indicator set for the whole food chain, as its core structure is well established. But the indicators themselves are quite superficial in the sense of measurement accuracy and can be difficult to interpret by the end user. While the indicators themselves are often well developed, the metric measures remain superficial and provide only a very broad picture in some cases. For example the indicator of Agroecology is measured by the level of presence of agroecology policies or absence of such policies.

Food chain level initiatives from the BIOEAST countries could be used for inspiring and supplementing already existing indicator tools (e.g. Pathfinder, SAFA) in order to better adapt to the regional context. As for national or regional level, the **indicator set described by Valkó** is quite comprehensive, it can be used as a reference. There is no tool or interface based on his work. **TAPE** provides a general framework and inspiration for assessing agroecology directly at the farm level. However it is quite simplistic in its assessment design which was oriented for farming conditions in the global south. **SAT** has its strength on focusing on socio-economic and political-movement aspects of agroecology which are missing points in other tools. It can be used as an inspiration or reference for other tools. **OASIS**: It is well worked out for farm level, to be inherent with AE elements and principles. It is designed specifically to locate farms on the AE transition line.

“OASIS, however, is one of the first analytical frameworks specifically designed to assess where a farm is on the trajectory of transition towards agroecology. OASIS can be used to help farmers in evaluating their progress through yearly evaluations. It can also be useful for decision-makers, advisors, researchers, students, and citizens. It may be used for mapping the state of implementation of agroecological practices and collecting statistical data for larger geographical areas. It can also support a certification system that would inform buyers about the agroecological transition level of the producer, and in this way promote food products produced in an agroecological way.”

5. Adoption and upscaling of agroecological practices in the BIOEAST macro-region

5.1. General description of barriers and drivers

A literature review of the state of agroecology in the BIOEAST macro-region has identified a number of trends which are common for the entire macro-region which can be grouped into thematic categories based on their orientation and impact in promoting or inhibiting the development of agroecology within the macro-region. Both barriers and potential drivers of the development of agroecology within a region can be grouped into the same thematic category. The repeated themes in research have been verified in interviews with stakeholders from various BIOEAST countries and indicate that common barriers and potential drivers for agroecology within the region fall into the following categories:

Agroecology Barrier/Driver Thematic Category	Key issues within the thematic category
Defining Agroecology	The impacts of the varied interpretation of agroecology as applied to food systems and agricultural practice
Agricultural Legacy and Market Characteristics	Historic changes in agricultural sectoral organization and their short and long term ramifications on the development of agroecology in a region
Advocacy	The conditions which contribute to agroecology as a collective movement within a region
Resources and Knowledge	The reach, scope and level of accessibility institutions, support organizations and knowledge promoting agroecology within a region
Policy	Legal and financial support systems for agriculture and food systems within a region

5.1.1. Defining agroecology

Barriers

Within the BIOEAST macro-region agroecology as a term does not have a uniformly accepted definition nor is it understood well conceptually in the local context. One source of misinterpretation of the term stems from its usage and adaptation regionally, as in many languages the translation of agroecology can be mistakenly accepted to be limited to scientific fields related to the ecology of agricultural landscapes. Additionally, agroecology is often equated with certified organic production, in some cases leading to conflict between agroecology advocates and certified organic producers. The problematic nature of determining specifically what is and is not agroecology was identified, and persists. In many occurrences in BIOEAST countries there are a few university departments in agricultural institutions and specific programs dedicated to agroecology, but existing coursework and training often focuses on specific "agro-environmental" (treelines, cover crops, crop rotations) concepts as opposed to holistic farm ecosystem management. The academic interpretation of agroecology in such agricultural institutions is often completely disconnected from the social themes embedded within the greater agroecology movement with the exception of some dedicated researchers. The emergence of agroecology as a more holistic term and one in correspondence with FAO's declaration of the

10 elements of agroecology if present was likely introduced as part of an international research project which included a BIOEAST country as a partner. Inaccurate or superficial usage of agroecology as a term in policy, and in the communication strategy of food market actors has also been documented. Such issues surrounding the challenging nature of increasing knowledge of the definition of agroecology are not only present in the BIOEAST region, but remain a persistent problem within the movement globally.

Drivers

In spite of the challenges described above, as discussed in the first chapter, the principles of agroecology are visible in environmental and consumer movements and agroecological farming practices are applied among others in peasant, organic, biodynamic, regenerative and permaculture farming or local food systems in the BIOEAST macro-region. While the term itself requires continuing clarification in policy and practice, its principles are represented among a dedicated community of farmers, consumers, activists and researchers who may be lacking in resources and land, but are growing in influence.

5.1.2. Agricultural legacy and market characteristics

Barriers

The effects of agricultural management practices during socialist times and the subsequent rapid transition to a globalized market after political regime change led to a disruption in domestic food markets and increased prioritization of large-scale farm industrialization in the BIOEAST macro-region. The occurrence of land consolidation and land grabbing, and continuing disappearance and lack of viability of small and medium sized family owned farms in the BIOEAST macro-region is more drastic than elsewhere in Europe, for example, it is estimated that 10% of utilized agricultural area (UAA) in Romania is owned by non-EU investors, and 20-30% of UAA controlled by non-Romanian investors. (Nurm 2015, Kay et. al 2015). Larger farms have grown in influence and in the amount of total utilized agricultural area which they control (see Table 3.) in most BIOEAST countries, and small farms remain vulnerable both in their ability to compete and also potentially to sales, while accessing usable farm land for newcomers to farming is difficult because of increased land prices. In spite of the dramatic restructuring of agriculture and food distribution,

to a certain extent traditional and peasant farming practices have been preserved during the struggle for survival. The legacy of socialist times is also detectable in the lack of willingness of farmers to cooperate and limited trust in public institutions. EU accession also had an immense impact on farm scale and production orientation, as farm size based subsidies incentivized larger farming operations, and encouraged export-oriented raw material production as part of an open trade market, resulting in a significant decrease in animal husbandry in most BIOEAST countries. Structural changes in agriculture also accelerated rural depopulation as well, as rural workforce from BIOEAST countries left to pursue employment for higher wages in urban areas or Western Europe. The BIOEAST macro-region is a semi-periphery to older EU member states which house a more developed food processing industry; within the macro-region there is a documented transfer of quality raw materials which are turned into high value processed products abroad. This is specifically the case for organically certified products produced in the BIOEAST macro-region, as the majority of products are exported and added value is lost for the site of production. Food processing, especially in the case for specialized products, is not as developed within the macro-region. Short supply chains exist but are limited in number and reach, and often centered in urban areas while bringing high running costs of

managing communication, marketing and logistics. For domestic sales, farmers rely heavily on retailers and wholesalers, who set price expectations for products.

Table 3: **Increasing influence of larger farms and control of total utilized agricultural area (UAA) in specific BIOEAST countries**

BIOEAST country	Number of agricultural holdings in country above 100 hectares	Percentage of total land holdings within BIOEAST country (%)	Percentage of total utilized agricultural area (UAA) controlled by farms above 100 hectares in size (%)
Bulgaria	2,260	1.5	82.4
Czech Republic	4,420	19.6	88.6
Estonia	1,720	8.8	73.2
Hungary	7,450	1.3	64.7
Latvia	2,570	3.1	47.0
Lithuania	3,800	1.9	41.6
Poland	9,650	0.6	21.6
Romania	13,730	0.4	48.9
Slovakia	2,210	9	91.1

Source: Kay et. al 2015

Drivers

Although trends across the BIOEAST macro-region are moving towards increasing industrialization and land concentration, small farms and traditional farming practices and the related ecological knowledge is still present. This is the case for example in the mountainous regions of Romania or the island regions of Croatia, where industrial farming is not viable and traditional methods can be advantageous in promoting ecotourism. While the period following regime change was chaotic in the agricultural sector, it was also the period in collective action by grassroots farmer movements that spawned organic and biodynamic agriculture movements in the BIOEAST macro-region which are still present. Data indicates that conscious consumers are willing to pay a premium for local, organic produce; and alternative marketing channels for small-scale producers and local food systems are expanding. Such outlets include community supported agriculture, mobile and REKO (specific mobile micro markets with fixed produce pick up timeframes) markets and citizen organized food cooperatives. An additional distinctive trait of the region also includes a closer connection to agricultural heritage, preserved home gardening knowledge, and acknowledgement of traditions of the countryside as compared to Western Europe. Along with these it is important to note the survival of traditional producers' markets, the existence of strong informal produce exchanges and the lasting legacy of food self-provisioning and foraging. The rising input prices for industrial farming are driving farmers to alternative practices and independence from external resources; which can be a good base for transitioning to self-sufficient and agroecological farming practices.

5.1.3. Advocacy

Barriers

Research and interviews indicate that civic engagement around agroecology is not well embedded into structured networks, activity is scattered and there is a lack of impact at the policy and farm level. Idealist examples of sustainable farming do not always represent true economic viability from a production standpoint, as supplementary and multifunctional activities may play

a larger role in securing a farm's financial stability than food production. Diversified income sources can work for geographically well situated farms (close to urban centers, tourism areas, or customer bases) but this is not realistic in every farm setting. Some of the most ecologically sustainable farm systems are not financially viable, due to challenges presented by current agronomical subsidies and policies, and enduring challenges within the globalized agri-food system. Idealist farms which have proven to be viable are not necessarily replicable. There are a relatively low number of agroecology themed projects, and existing programs focus mostly on farm production practices and do not have a larger food system and social context. Agroecology as a term has been adopted as a buzzword in policy texts and corporate communication, without acknowledgement of the social aspects or emphasizing the need for systemic change. Advocacy for farmers is often done in the name of large-scale industrial farmers - in many cases linked to political parties, and smaller actors have less representation in policy debates. The interests of minority groups and disadvantaged communities are also not often featured in the focus of debates on food sovereignty or workers' rights.

Drivers

In the BIOEAST region some multi-stakeholder, transdisciplinary networks are organized around themes of environmentalism or food production, such as permaculture, food sovereignty, agrobiodiversity, agroforestry or regenerative agriculture. These networks do present a good form of cooperation among different stakeholders and could be a basis for further agroecology

advocacy. Agroecology has the potential for being used as a uniting force to link fragmented movements, but must be done carefully to not isolate specific groups (i.e. certified organic farmers). Movements of seed saving, peasant agriculture, urban gardens and consumer groups working for strengthening local food systems are also good examples of small-scale actors which have the potential to be a driving force of change.

5.1.4. Resources and knowledge

Barriers

Small-scale, traditional, environmentally managed farms struggle to reach viability in the current economic system with subsidies favoring large-scale industrial agriculture and global trade of cheap commodified food. Consultancy and extension services are oriented to serve industrial scale operations while presenting "greening" solutions incentivized by subsidies; but fail to drive changes in the mindset of farmers. Without a clear financial justification farmers lack motivation and knowledge for transitioning to agroecological practices. Potentially useful resources are often not available in local languages, and the scarcity of high quality educational materials and teaching programs on agroecology in local languages challenges the spread of knowledge. Subsidies for greening which do not transfer knowledge of the potential long term benefits of holistic farm transition do not help enhance motivation of farmers. There is uncertainty in the succession plan for farms, a lack of interest in agriculture as a career for youth, and a relative lack of agroecology based training (both practical and theoretical) and apprentice programs for young farmers. Once older generations stop farming, land is often sold to large-scale actors, while newcomers are facing financial and bureaucratic barriers to access land and resources for farming.

Drivers

In spite of the summarized challenges, there exists a group of newcomer farmers, who are well educated, have international experience or knowledge of agroecological practices, are innovative in production and marketing, appreciate knowledge-driven solutions and possess an openness towards community advocacy. These farmers are often a driving force in local communities for motivating other farmers to adapt innovative technologies or switch production methods completely in accordance with agroecological principles. International networks and projects have the potential to be good sources of information and financial resources for both the newcomers and more experienced farmers. Research and international collaborations must strive to involve practitioners in the primary and planning stages of projects to ensure equality in the distribution of project resources and also to give producers the opportunity to shape the goals and output of projects.

5.1.5. Policy

Barriers

The CAP, greening and agri-environmental measures have limited impact on farmers' motivation towards agroecological transition, as the financial benefits of subsidies outweigh personal motivations for improved on farm practice. There should be policy trends for supporting environmental aspects in agriculture but they are contradictory in reality. Farmers are encouraged by subsidy incentives and market trends. While organic farming is expanding, it is often without adoption of holistic farm management practices. Organic farming can not be considered inherently compatible with agroecology without a stronger focus on localized food systems and social aspects of agriculture. Furthermore, high quality organic produce often leaves the country as a raw material, and returns to the country of origin as a processed product - reducing the likelihood that a producer receives a greater portion of the final sales price of the product and making it more difficult to connect high quality produce to its region of origin. Currently national policies do not focus on agroecology: governments are supporting administratively, legally, financially and with research the industrial, technocratic sustainability solutions as opposed to systemic transition outlined in agroecological narratives. There are several bureaucratic barriers for agroecological systems, for example agroforestry; permaculture and polycultures are not easily categorized for land use; and small-scale, diverse production often poses a data processing problem for administration.

Drivers

But peasant scale production is still well known, and in some cases there is a strong enough force for representation of small scale farming actors (ex. Romania). CAP and certain rural development funds can be accessible with the right level of knowledge for small-scale actors as well, and specific communication programs for informing key stakeholder groups. Protectionist policies and narratives for the promotion of national products and markets; the language of valuing domestically produced products and gastronomic heritage can be a source for developing consumer interest in local products; but a stronger focus on social and environmental aspects is needed from governments and responsible agricultural ministries. Some favorable taxation for small-scale producers and family farms are present and the health and sanitary requirements in some cases are in compliance with realities of small-scale production.

Table 4: **Recommendations for Advancing Agroecology in the BIOEAST Region: Analysis of Key Issues at Three Levels**

	Farm level	Food system level	Policy level
Defining Agroecology	Research and extension outreach must support the spread of knowledge of agroecology in practice at the farm level, taking into account regional context	Research and advocacy must empower a greater understanding of holistic social principles of agroecology which should influence the transformation of food distribution networks.	Policy initiatives must address the lack of notoriety of agroecology as a concept; revision should not selectively adopt portions of agroecology as focus priorities without ensuring a holistic approach; transdisciplinary and participatory research should shape future food and agricultural policy design
Agricultural Legacy and Market Characteristics	Equal opportunities for accessing land for agroecological production must be ensured; resources should be allocated for agroecology transition, the development of new agroecology farming enterprises and the protection of interests of small-scale farmers	Empowering domestic and regionalized food distribution networks must be empowered by public procurement projects and the development of food processing capacity which supports adding value to raw materials within their country of production	The enduring legacy of post-socialist transition/EU accession and their impacts on agriculture must be better understood when shaping policy reform; agrarian tradition and historical knowledge of food production should be complementary in incorporating agroecology principles into policy
Advocacy	Advocacy must empower alliances between different actors (i.e. organic, permaculture, climate justice, feminist and additional citizen environmental movements); promotion of examples of replicable models of agroecological farms	Raise awareness of marketing and distribution outlets which support agroecology transition; provide support to already existing examples of self-organized direct food provisioning.	Policy development must involve multi stakeholder networks in shaping reform while providing financial, legal, educational and institutional support for further network development and convergence
Resources and Knowledge	Financial support for agroecology transition would aid in reducing potential financial risks associated with altered production practices/investment costs; Investing in programs for spreading knowledge about ecological farming which address the motivation of conventional farmers	Develop programs for connecting older farmers with newcomers in support of developing farming succession plans; Involve more farmers in the implementation of international projects, while making it financially appealing for them.	Policy must support the development and advancement of advisory services for transitioning to organic, agroecological practices; policy should empower knowledge transfer between farmers
Policy	Specific policy directives must support on farm transition for agroecology and be catered to serve farms of different scales, without unfairly excluding smaller landholders from incentive and knowledge sharing programs.	Policy must address transition at the food system level, taking into account the roles of actors at different levels within the food chain, i.e. distribution, food processing, catering and retail locations.	Agricultural policy in general needs to shift from being based on market growth incentives, productivism and protectionism and focus on improved holistic ecological performance while also including the social impacts of agricultural production.

6. Suggested indicators for determined gaps and development areas, hot spots

6.1. The role of regionally specific, holistic agroecology indicators in advancing agroecology

A suggested supplemental list of indicators was composed taking into consideration gaps identified during the analyzes of the recent available tools and indicator sets (see chapter 4.), and accounting for regional barriers and specificities (see chapter 5.). Both interviewees and workshop participants suggested that the hypothesis of the study was correct, as the need for further development and application of indicators to assess agroecology in the region was validated. Introducing indicators that are commonly accepted and transparent can contribute strongly to the common understanding and internalization of the agroecology principles and practices and help in the scaling out and up of agroecology. However, experts have emphasized that regional adaptation of the tools was necessary in order for indicators to actually work effectively and have an impact in the BIOEAST macro-region - taking into account local particularities. This chapter provides insights on regional specificities of the application of AE indicators, grouped by locally relevant themes at the farm, food system, policy and network level.

6.2. Farm level

Motivation

Reason for commitment to apply agroecological practices: Existing indicators do not assess whether the motivation to apply agroecology practices comes from inner drive or external factors (subsidies) while in the BIOEAST macro-region this is a specific topic due to the high rate of occurrence of subsidizing environmental performance. Small-scale eco-minded farmers (who are at the forefront of the agroecology movement) often reject applying for such subsidies or simply do not comply with the criteria set by the authorities. Despite this, they apply agroecological practices. Based on stakeholder feedback, it should be emphasized that it is challenging to assess motivation as it is a highly sensitive issue, therefore quantitative assessment is highly risky, it is advised rather to do qualitative assessment by experts (sociologists).

Willingness of innovation in on-farm practices: Conducting experiments is an important topic for agroecology, as agroecology in practice requires local adaptation for successful application. This should be specifically assessed at the farm level, by considering the farmer's actions in conducting their own trials with plant production techniques, seed saving, breeding etc.

Holistic farm management

Diversification patterns present on the farm: The present available tools assess diversity to a high extent, specially agro-biodiversity but only at species level, complex polycultures are often neglected or not handled properly. Diversification at farm level, resulting in complex

mixed farming is also not assessed to the extent which would be desired by agroecology (having plant production and animal husbandry at one farm is the maximum but having more sectors/activities and the functional connections among them is not explored by these tools). This diversification pattern of activities should be combined with assessment of land use diversity and income diversification.

Seed saving and use of heirloom varieties: Use of seeds produced and saved by growers is a crucial topic for food sovereignty, also the conservation of heirloom varieties and traditional breeds is a priority for agroecology for promoting genetic diversity as well as adaptation to local natural assets. Possible measures could be assessing the farm's infrastructure and knowledge about seed saving and the ratio of seeds saved and used at the farm.

Farm level self-sufficiency: Self-sufficiency of the farm by supplying its own input and material needs for production is an important step of agroecological transition through substituting external, artificial materials with natural cycling/ecosystem services. Evaluation of a farm's effort to satisfy its own requirements in seeds, nutrients, water, animal feed, genetic material, medicine for animals-plant protection etc. is a strong agroecological indicator. External input use is assessed in almost every tool for their environmental impacts, but the equation of internally supplied and externally sourced inputs is not emphasized in any existing indicator sets.

Economic viability: Economic viability at farm level is assessed in-depth by only a few tools, as it is a highly sensitive topic for farmers (they don't like to share financial data), therefore most tools loosely evaluate this aspect and rather qualitatively. These indicators typically are applied at the farm level with basic metrics focusing on profitability, as opposed to more nuanced measurements for farm resilience. It is suggested to do that for the introduction and application of agroecological practices (e.g. agroforestry, multispecies cover crops, etc.) separately and if the farmer is willing to share the whole farm's financial data in order to explore the contribution of the agroecological practices to the resiliency of the farm. Economic viability should be assessed at the regional and at the food chain level as well.

Cooperation and networking

On-farm social innovations: There are various methods for farms to connect themselves to the local or outer society. These are present only at a very superficial rate in the current indicator sets, while being strongly advocated and compliant with agroecology. Options for farms include different social farming activities (schools, retirement/care homes, rehabilitation farms, carefarms), open farms (proactively organized or spontaneous visits), knowledge transfer (having volunteer programs, workshops) and on farm employment (internship, field days etc.). Possible metrics for this indicator include: frequency of cooperation, paid/free activities.

Cooperation among farmers: This is a highly problematic issue in the macro-region due to the historical background of socialist collectivization, therefore it is suggested to understand better the social particularities of the macro-region, to see what can be reasonably expected from farmers. Possible points for evaluation: types of cooperation/support for cooperation - self-organized or through an institution, frequency of interaction (sharing knowledge, tools, logistics support) do regional conditions encourage this? Non-monetary benefits of collaboration.

Participation in independent farmers collective/association: Representation of farmers rights is a key point for upscaling agroecology and also problematic in the macro-region as farmers associations are often linked to political parties. Evaluation of the farm's effort to participate in collective representation if possible (e.g. membership conditions) or individual acting to represent farmers rights/ farmers challenges/issues.

Solutions for farm succession: Average age of farmers is increasing in the whole agricultural sector in the macro-region, which poses risk for the entire sector in the very near future. Innovation is highly correlated with younger farmer generations, therefore specialized assessment of this topic is highly recommended in the macro-region. This is included in some of the tools (e.g. SMART), but not to that extent as it would be required. Farm succession plans should be in place, and besides family inheritance there are other ways for farm succession to be achieved which should be evaluated (e.g. practical opportunities for new entrants, different options, stability of the potential succession plan).

Landscape scale projects: Diversity at landscape level is somewhat assessed by the available tools even though they are quite peripheral, except for indicators within the Bio-Bio framework. In SMART there is an indicator on participation in landscape scale programs but it should be further explored, especially examining voluntary measures among neighboring farmers (e.g. joint installation of hedges around the farms, or water retention projects). Possible metrics: participation in initiatives/programs for specific species/wildlife/habitats to develop landscape-scale (in cooperation with other landowners) ecological projects (e.g. water or biodiversity); voluntary participation or subsidized.

Impact/integration of the farm to the local community: BIOEAST macro-region countries share the common characteristic of farming as a unique aspect of cultural heritage, even though many traditional farming methods are in jeopardy because of market realities and the structures of policy support programs. The unique contributions that farmers make in preserving traditional food and cultural traditions, agricultural infrastructure and architectural heritage, folk art, craft and handwork should be acknowledged as important contributions by farming communities in preserving unique aspects of European culture.

Conservation of traditional farming methods/practices/systems/landscapes: Traditional farming practices and land use systems contribute to conserving traditional agricultural landscapes as part of cultural heritage which are still dominant in some regions (mostly the sea and mountain regions) of the BIOEAST countries. A special attention on assessing the contribution of the farms to this is a key indicator for advancing agroecology. Examples for this are the traditional wetland management nearby the rivers in Hungary or the traditional fruit growing apparent in the region. Possible indicators: use of traditional varieties and breeds at farm level, number of projects revitalizing and promoting traditional farming practices, areas dedicated to special management in order to conserve and restore traditional agricultural landscapes, area of pastures under extensive grazing management, area of wooded pastures, gratitude of support given to conserve and promote traditional fruit growing, number of peasant farmers/communities in the countryside.

Workers' rights: Unregistered work and workers' rights being disregarded are more pressing issues than in Western Europe. Agricultural workers' rights must be analyzed in the context of minority rights, especially for Roma, migrants and other minority groups. Rural depopulation and impoverishment are in direct correlation with the lack of ability of some rural regions to provide adequate livelihood to locals. Horizontal decision making and participatory processes in farm management (involving workers to the farm management) are promoted by agroecology while these are completely missing from the everyday farm enterprises in the macro-region, as most farmers do not have the knowledge, motivation and resources required to implement such practices. Suggested metrics include: Ratio of unregistered workforce. Ratio of unregistered/ illegal salary. Presence of work contracts. Ratio of local vs. migrant workers in agriculture. Access to developing knowledge/ skills for workers. Participatory decision making processes on the farm involving the workers. Motivation of farmers to employ workers from minority groups.

Access to technologies: Modern technologies can contribute to the efficient operation of agroecological farms also to increase economic viability and reduce workload and stress on farmers, they can also serve better governance and more conscious management decisions. Digitalisation and modernisation are apparent hot topics in the region (e.g.: sensors, drones, farm management softwares). Agroecology does not deny/reject modern technologies but it advocates reasonable, appropriate scale innovations considering affordability, the need for knowledge to use it and raises the question of ownership of the data. This is assessed to some extent by SAFA and SMART (access to resources) but indicators should have a more complex evaluation of the topic. Technologies can also contribute to tying the farmer to certain corporations and related inputs.

Knowledge and information access: Traditional farming can be an important source of knowledge; while internationally educated newcomers embedded in communities can advance locally adapted innovations. Availability of information in local languages and knowledge about agroecology and agroecological transition, sustainable farming methods. Participation of farmers in informal knowledge exchange.

Life quality: Most of the assessment tools approach quality of life very superficially or not specialized to the regional social context. For example in the Global South, access to food can be a problem, in Western Europe it is more about life standards compared to other sectors. Life quality and motivation can be important aspects for the willingness of farmers to innovate or take risks in transforming farming practices. It would be advisable to develop qualitative methods for assessing satisfaction of farmers with life quality; for example their level of stress, division of labor and responsibilities, feeling of appreciation by the community, burn out or fear of the future. In the poorer areas of the BIOEAST macro-region, security is an issue as thefts of crops and animals often pose a problem, thus demotivating farmers from free-range animal husbandry for instance. Some SDG indicators, such as those from poverty (SDG 1), zero hunger (SDG 2), good health and wellbeing (SDG 3), gender equality (SDG 5) can be adapted for farming communities to assess some of these aspects; however, specific regional problems should be addressed differently.

6.3. Food system level

Transformation of the food system in an agroecological way requires **multisectoral cooperation among stakeholders**, including producers, processing actors, consumers, food cooperatives, public canteens and the public sector. Civil actors in the food system often use their own indicator tools for assessing the sustainability of farms, processors or restaurants; but most often these indicators are lacking social dimensions. Indicators to measure the level of cooperation among actors throughout the food chain should be applied. *Number of connections among actors. Levels and types of cooperation. Sharing of best practices. Synergies among stakeholders.*

Short supply chains refer to both the geographical distance and the number of intermediaries between producer and consumer. These connections can be measured by quantifying the number of intermediaries and also the nature of intermediaries (non-profit; for profit but with a social focus, for profit). The distance in kilometers that the product travels to the consumer is a good indicator for short supply chains; however, defining the radius at 20-50-100 km-s as short supply chain is dependent on the geographical region and context. *The presence of local producers markets/shopping communities/CSAs, their market share and the proportion of income they contribute to the farmers' livelihoods.*

Food sovereignty refers to the level of access to affordable, healthy and culturally appropriate food for consumers produced through ecologically sound and sustainable methods, and their right to define their own food and agriculture systems. Its level can be assessed by how much a household spends on food in proportion to their income; how satisfied they are with the quality of their food; how well fitted their diet is to provide the appropriate macro- and micronutrients needed for a healthy lifestyle, but also by assessing whether they are involved in the decision making processes of their food system. As food self-provisioning and informal channels of food procurement (barter, family connections) still play an important role in many regions in the BIOEAST countries, when assessing the level of food sovereignty, these channels should also be taken into consideration. The ratio of consuming locally produced food on a family, community, regional and national level is a good indicator for food sovereignty. Preservation of food culture and gastronomic heritage is also an important aspect of food sovereignty, therefore *the level of traditional home cooking and the presence of local food festivals*, restaurants are good indicators. *Proportion of household spending spent on food. Satisfaction with available food. Occurrence of diet related health issues. Level of non-formal food provision (self-sufficiency, barter, gifts). Ratio of consuming locally produced food on a family, community, regional and national level. The **existence of PGS (Participatory Guarantee Systems) or other labels** provide transparency of production and processing, their presence and functionality is a good indicator for local food systems.*

6.4. Policy and network level

National/regional level self-sufficiency production optimum: In order to transition towards the relocalization of our food systems it is important *to assess the overall production of a given country/region, its overproduction and processing capacities, and the export of produce* - exposing flaws and opportunities for recalibrating local and international trade. This could be linked to the SDGs Sustainable cities and communities (SDG 11) and Responsible production and consumption (SDG 12).

Existence of national/regional food sovereignty forums: Current indicator tools do not taking into account this aspect, however this could give an idea about how advanced is the social discourse on topics related to agroecology and who takes part in these discussions in the given country/region; furthermore additional information can be extracted on *the organizational aspects of such events (whether it is self-organized or promoted/organized by local governments, who are the main organizers, etc.)*.

Policies supporting the conservation of traditional agricultural landscapes: The existence of such policies could greatly influence willingness to adopt locally developed and adapted agricultural practices and favor less impactful means of production. These policies would not only impact the subsistence and transfer of traditional knowledge but also the local and regional biodiversity and therefore positively contribute to SDG 14 (Life below water) and 15 (Life on land).

Empowerment of rural youth and women in agriculture: Even though it is a crucial part of agroecology, very few indicator tools that have been developed touched this aspect. Having more knowledge on the existence of youth/women supporting initiatives, the number of youth/women representatives present in farmers associations and whether they actively participate in decision making processes could be a start to assess partly the real transformative social power of agroecology. These indicators are clearly related to SDG 5 (Gender equality) and 10 (Reduced inequalities) and can help in evaluating their state in the country/region.

Access to land: Land is fundamental for agricultural production, and therefore it is essential to roughly assess the current state of access to land in the given country/region as it can be a primary barrier to agroecological transition - especially for young/new entrants. It is also relevant to explore how the generational renewal is handled in the country; whether for instance applying agroecological practices or being a young farmer is a prerogative in the given country/region or is there any support given to connect old farmers with younger generations for an optimal handover. Aspects worth looking into are: *the distribution and usage rights/rental conditions of state-owned lands, land ownership, land consolidation, land concentration, land grabbing.*

Change in territorial land use and farm structure: The current indicator tools do not investigate these changes, however they give an important insight on the trend of the given region and can indicate possible solutions of agricultural systems adapted to the local conditions. *Changes in diversity of arable lands. Area of organic farming. Area and number of mixed farming systems.*

Policy environment for seed saving: There have been several attempts to reduce the rights of communities to exchange and use seeds. Having an enabling policy environment for seed saving is also vital to the transition to agroecology, thus the freedom of exchange and preservation of seeds shall be assured. *Regulations in place shall be assessed whether they are favoring these or not.*

Projects, policy initiatives: Local, national and international projects related to agroecology can not only promote its spread but can also trigger new policies in favor of the transition towards agroecology. *Policies and subsidies halting and pushing for agroecology shall be identified.*

National/regional food policies promoting agroecology: It is important to evaluate whether there is a clear definition of agroecology in the policy context and what that implies. *Clear definition of agroecology used by policy actors. Presence of agroecology principles in food policies.*

NGOs/civil initiatives related to agroecology: Having knowledge of how many agroecological initiatives are present in the given country/region and whether these stakeholders engage into networks and if so, do they claim to be an agroecology related network and how active these initiatives are in different domains (education, advocacy, etc.) all give important information on the state of organization of agroecology of that given country/region.

Peer-to-peer networks: The existence of such networks can greatly catalyze agroecological transition, therefore *their presence, number and composition of members and way of governance* and whether *there are existing instruments (legal, financial) supporting these initiatives* can give an important insight on different levels: knowledge transfer, collaboration, involvement of farmers into decision making and within national agriculture policy dialogues.

Research and education: Agroecology related research and education is an essential component of the agroecological transition, therefore further information needs to be gathered on its current state in comparison with conventional or other types of agriculture related research (*number of projects, overall budget allocated for, number of participants enrolled*). Furthermore it is worth *exploring the connections between research and practice for agroecology, if research is directly applied by the end-users, and whether these have been participating in the design and development of the research.*

Education and awareness raising campaigns in the context of agroecology: Assessing this for the wide public, in the school curriculum or extra-scholar spaces would give valuable information about the attitude of consumers and the effectiveness of these activities. *Number of campaigns by governmental organizations. Number of campaigns by NGOs. Number of people reached by the campaigns. Representation of agroecology in the education system (number of education programs, workshops etc.).*

Participation in international agroecological movements and farmers advocacy: Being part of national and international movements can greatly accelerate the transition towards agroecology, therefore connections with international movements shall be examined as well as their composition. *Number of international projects and collaborations in the context of agroecology in the country. Number of institutions/NGOs/other organizations involved in international projects.*

7. Conclusions and follow up

Clarification of the definition of agroecology as a broad holistic concept, and its application in practice across agricultural landscapes, is a clear requirement in the BIOEAST region. It is important that this definition includes social, environmental and economic aspects; as well as the transdisciplinary nature of agroecology. Multi-stakeholder, transdisciplinary networks are needed to advance agroecological transition; which requires both policy and financial support from higher levels, as well as motivation from farmers to change practices. When talking about agroecology, the role of small-scale farmers and grassroots networks in local food systems play the most important role; therefore the central obstacles to their preservation must be overcome. Access to key resources, such as land, subsidies and knowledge must be ensured to a much higher proportion for small-scale actors. It is very important that the topic be approached in a systematic way, and that agroecology not be simplified down to a listed set of agricultural practices.

We suggest that developing a completely new indicator tool for assessing agroecology in the BIOEAST macro-region is unnecessary. Based on our analyses, we assume there are plenty of tools which can be used for the purpose of measuring agroecology in practice, although improvement, contextualization and adaptation must be completed, coupled with testing, and demonstrative applications before their extensive use.

For farm level assessments, the **OASIS** and **SMART** frameworks are recommended as reference tools which can be used in combination with more innovative portions of the other assessment tools, taking into account the inclusion of regional specificities. Nevertheless, a primary step of evaluation includes clarifying the main points of the expectations from an indicators tool: who will be the user, the end-user, what would be the main aim of the tool and what level it should assess. Because as much sustainability metrics literature suggests, there is “no one size fits all” solution. Once these base parameters are determined, the most appropriate indicator sets or tools can be fitted to them.

For the food chain level, **Pathfinder** is the best available tool, and it can be further developed by using **SAT** and contextualized with the national/ local food chain initiatives’ standards. While for the national level assessments the indicator set developed by Gábor Valkó is suggested to be used as base and updated by recently available databases and harmonized by other relevant indicators. Addressing the most pressing challenges for agroecology, analyzing and adapting available tools must be performed simultaneously in order to get the most out of the results.

It must be emphasized to apply participatory processes into the indicator development processes including the representatives from the national agroecology movements and other stakeholders.

A participatory system mapping in each country could highlight the most important variables of agroecology and their interactions; as well as provide important insights into general trends and national specificities. Accessibility and transparency is necessary for adapting tools for local use and enabling their widespread application. Farm and food system level indicators should be available in national languages, possibly with user friendly applications and visualized results for understanding. As agroecology has important sociological aspects, quantitative research should always be accompanied by qualitative analysis to provide context and background. For example, qualitative interviews and participatory action research can all be important tools to involve actors into research focus and development and enable a systematic approach.

8. Annex

8.1. List of Annexes

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Annex 1: **List of interviewees from the BIOEAST countries and list of participants of the expert workshop**

Table 1: **List of interviewees from the BIOEAST countries**

	Country	Gender	Organisation	Role, expertise	Website of organisation
1.	Croatia	F	Agroecology Europe Youth Network/ Local farmers coop	Mapping agroecology with OASIS; shephards cooperative on Krk	
2.	Czech Republic	F	AMPI	CSO regrouping more than 80 CSAs in Czechia	https://www.asociaceampi.cz/english-version/
3.	Ukraine	M	FAO	project coordinator in Ukraine, he works on promoting Conservation Agriculture in UA	https://www.fao.org/europe/news/detail-news/en/c/1180938/
4.	Romania	M	Eco Ruralis	President of the agroecology peasants representation	https://www.ecoruralis.ro/
5.	Croatia	F	Croatian Allan Savory Hub	full-time farmer	
6.	Croatia	F	Croatian Allan Savory Hub	farmer, professor at the University of Agriculture of Zagreb	
7.	Poland	F	AgroPermaLab/Nyéléni Polska	Sociologist, journalist, environmental educator, community garden coordinator in Warsaw, part of Nyéléni Polska, organized the 2nd Polish Food Sovereignty Forum, works for AgroPermaLab (Food Sovereignty in cities, urban farming, permaculture design)	https://agropermalab.org/eng/
8.	Latvia	M	Latvian Permacultura Association, Vidzeme University of Applied Sciences	Chairman of Permaculture Association, Lecturer at Vidzeme University of Applied Sciences	http://www.permakultura.lv/
9.	Lithuania	F	Vilnius University	Director at Centre for LEADER Programme and Agricultural Training Methodology	
10.	Slovakia	M	farmer and participate in Denromass4europe Horizon 2020 project	expertise in environmental planning, and evaluating natural potential of sites for AE use	https://www.dendromass4europe.eu/
11.	Romania	F	WWF Romania	She was project staff member in the UNISECO project.	https://wwf.ro/ce-facem/

Table 2: **List of participants of the expert workshop**

	Gender	Organisation / Institution	Field of expertise
1	F	Corvinus University of Budapest	Decision theory, ecological economics
2	M	Corvinus University of Budapest	Degrowth, ecological economics, economic ethics
3	F	Centre for Economic and Regional Studies, Hungarian Permaculture Association	Social enterprises, role of the social and solidarity economy in counterbalancing the periphery of rural areas, sustainable rural development
4	M	Agrikulti, BirdLife Hungary	Senior researcher of sustainable food systems
5	M	Eötvös Lóránd University, WWF	Sustainable Rural Development, Tisza river sustainable management

Annex 2: Background information for expert interviews

The [BIOEASTsUP](#) project supports the completion of 7 thematic studies related to the scope of the macro regional Thematic Working Groups (TWGs). Thematic studies make a significant contribution to the macro-regional development of a given theme by presenting a new aspect of it. Thematic studies will be one of the cornerstones of the common BIOEAST Strategic Research and Innovation Agenda (SRIA).

The thematic study “Socio-ecological indicators of agroecology-systems in the BIOEAST countries” aims to review existing socio-economic indicators in the context of agroecology and identify gaps regarding their scope; as well as to map the relevant legal and policy environment. The thematic study will provide a set of quantitative and qualitative indicators capable of measuring the socio-ecological performance of agroecology-oriented food systems and networks and present the usefulness of the socio-economic indicators for the policy makers for evaluating agroecology practices. The study is coordinated by [Védegylet](#) and is carried out by experts in agroecology in Hungary.

During the expert interviews we would like to find answers to the following questions regarding the experts country/ region of work and expertise:

1. Introduction
 - Please introduce yourself and your field of work - What do you understand as agroecology?
 - How is it perceived in your country? What does it entail?
2. Evaluating agroecology
 - How do you evaluate agroecology in your country/BIOEAST region at the moment as a science, a practice and a movement
 - What projects, initiatives are you aware of, which are the most successful?
 - What are the barriers and drivers for agroecology in your country? What are the main challenges in upscaling agroecological practices/transition in your country?
 - Are there any policies promoting or halting agroecology in your country/region?
 - Do you see agroecology connected to any social movement?
 - What are some positive changes in the behavior of consumers?
3. Agroecology performance assessments tools and indicators
 - Do you know any assessment tools or indicator sets or initiatives that have been applied in your country to assess agroecological farming and food systems?
 - If yes, which of the [10 elements of agroecology](#) are covered by these tools? Any reference?
 - Do you think there is a need for such indicators/tools? If yes/no why? Which topics should be monitored regarding agroecology on the farm, food system and policy level

Examples of assessment tools:

- [Tool for agroecology performance evaluation \(TAPE\)](#)
- [Evaluation of 100 agroecological initiatives by CERA](#)
- [Sustainability assessment of food and agriculture systems \(SAFA\)](#)

Annex 3: **Agenda of the expert workshop**

Agroecology and sustainable yields thematic study

Socio-ecological indicators of agroecology-systems in the BioEast countries

Expert workshop

Agenda

Time: 2022. February 1st 9.30 – 13.00

Place: Végegylet Office, Budapest, 1137. Pozsonyi út 14. II/9.

9.30	Arrival, presentation of the agenda
09.35	Round of introduction
09.45	1st block: Presentation of the Barriers of AE transition in the BIOEAST region + discussion
10.45	2nd block: Overview of the indicators (their use, pros&cons) turning to the socio-economic aspects related to agriculture in general or the ones that can be adapted to agriculture
11.15	Coffee break
11.30	3rd block: Discussion about proposed socio-economic indicators+ new proposals
13.00	Finish

The results of the following larger international agroecology related projects were taken into account for the research:

- UNISECO
- trAEce
- Mapping Agroecology in Europe
- BOND project

The following indicator sets and assessment tools were overviewed and incorporated during our research:

- | | |
|------------------------------------|---|
| - SAFA (FAO, 2013) | - Agritoolkit |
| - SMART | - Pathfinder |
| - RISE | - TAPE |
| - Cool Farm Tool | - SAT |
| - Agridiag | - Felelős Gasztruhós |
| - Ökopunkte | - Indicators set published in Valkó Gábor' PhD dissertation |
| - Bio-bio project | |
| - COMPAS | |

These mainly focus on the environmental dimension. Only a few of them address social impacts, such are: SAFA, SMART, Pathfinder, TAPE, SAT, indicators set published in Valkó Gábor' PhD dissertation. Please take the time to look at the indicators before the workshop. Thank you!

Annex 4: 10 elements of agroecology (FAO)

10 Elements of agroecology (FAO)	Short explanation	TAPE	SAT	SAFA-SMART-Frédi	Agridiag-Frédi	Cool Farm tool	Pathfinder	Agritoolkit	Others (Compas, Bio-bio, Öko-punkte)	Indicator set from Valkó PhD thesis	OASIS
DIVERSITY	Diversification is key to agroecological transitions to ensure food security and nutrition while conserving, protecting and enhancing natural resources.	Diversity of crops Diversity of animals Diversity of trees Diversity of economic activities, products and services	Conservation of natural resources and biodiversity - Use of techniques that conserve and favour soil fertility, efficient water management and avoid contamination and/or increase natural biodiversity. - Training and awareness-raising on soil fertility conservation, efficient water management and avoiding water pollution and/or increasing natural biodiversity. Preservation and recovery of traditional foods and local productive resources - Promotes, markets and/or consumes varieties, traditional breeds and/or auction fish	- Ecosystem diversity - Species diversity - Genetic diversity	Crop diversity and soil cover Crop diversity Proportion of leguminous crops in the crop rotation Winter soil cover proportion Animal diversity Natural assets and spaces Proportion of Landscape elements Average parcel size	Farmed products Farming Practices Large habitats Small habitats Livestock, crop and variety Soil fauna Beneficial invertebrates Arable flora Wetland & aquatic flora Woodland Grassland flora Grassland birds Arable birds Woodland birds Aquatic fauna	Land sharing/habitat provision Product Diversification	- Ecosystem diversity - Species diversity - Genetic diversity	Crop rotation (Ökopunkte) Landscape elements (Ökopunkte) Indicators for the Genetic Diversity of Livestock and Crops (Bio-bio): - Number and amount of different breeds - Number and amount of different varieties - Origin of crops Species Diversity Indicators (Bio-bio): - Vascular plants - Wild bees and bumblebees - Spiders - Earthworms Habitat Diversity Indicators (Bio-bio): - Habitat richness - Habitat diversity - Average size of habitat patches - Length of linear elements - Crop richness - Tree habitats - Percentage of farmland with shrubs - Percentage of semi-natural habitats	Area of organic farming in proportion to the utilized agricultural area Change in the proportion of arable land within the utilized agricultural area GMO crop production in proportion to the utilized agricultural area Changes in the population of bird species associated with agricultural habitats Standard output of non - agricultural activity as a percentage of total standard output	Use of agroecological soil tillage techniques Agroecological soil fertility management Agroecological crop pest management Agroecological crop disease management Agroecological weed management Maximisation of soil cover Agroecological livestock management Agroecological grasslands management High level of adoption of agroforestry Maximisation of ecological networks High nature value farming (HNVf) Maximisation of agrobiodiversity
CO-CREATION AND SHARING OF KNOWLEDGE	Agricultural innovations respond better to local challenges when they are co-created through participatory processes.	Platforms for the horizontal creation of knowledge and good practices Access to agroecological knowledge and interest of producers in agroecology Participation of producers in networks and grassroots organization	Training and accompaniment towards a food sovereignty model - Training and accompaniment to agri-food initiatives - Training and advice to public institutions Preservation and recovery of traditional knowledge - Recovery, dissemination, exchanges and meetings where traditional knowledge is shared and knowledge exchange networks are strengthened. Social links creation and strengthening - Participation to collective projects or networks - Participatory research with others actors: university, research centers, etc.	- Capacity Development - Indigenous knowledge	-	-	Capacity Development Consumers education Indigenous knowledge	- Capacity Development (Agri Cool Awards) - Participation in education and research projects/programs (Agri Cool Awards)	-	EUR 1000 in value-added research and development in agriculture Proportion of farmers under 35 and over 65 in standard output Proportion of households with Internet access in sparsely populated areas	Substantial and continuous participation in networks, collectives, organisations Substantial and continuous participation in Social and Solidarity Economy Substantial and continuous advocacy and education on agroecology

10 Elements of agroecology (FAO)	Short explanation	TAPE	SAT	SAFA-SMART-Frédi	Agridiag-Frédi	Cool Farm tool	Pathfinder	Agritoolkit	Others (Compas, Bio-bio, Öko-punkte)	Indicator set from Valkó PhD thesis	OASIS
SYNERGIES	Building synergies enhances key functions across food systems, supporting production and multiple ecosystem services.	<p>Crop livestock aquaculture integration</p> <p>Soil plants system management Integration with trees (agroforestry, silvopastoralism, agrosilvopastoralism)</p> <p>Connectivity between elements of the agroecosystem and the landscape</p>	<p>Social links creation and strengthening</p> <ul style="list-style-type: none"> - Participation to collective projects or networks - Promotion and development of synergies and collaboration between actors of the agri-food chain 	<ul style="list-style-type: none"> - Ecosystem diversity - Soil quality - Material Use - Participation - Stakeholder Dialogue 	#NÉV?	<p>Farming Practices</p> <p>Large habitats</p>	-	<ul style="list-style-type: none"> - Ecosystem diversity - Soil quality - Material Use - Participation - Stakeholder Dialogue (Agri Cool Awards) 	<ul style="list-style-type: none"> - Landscape elements (Öko-punkte) - Percentage of semi-natural habitats (Bio-Bio) 	Proportion of farms engaged in both animal husbandry and crop production based on their standard output	<ul style="list-style-type: none"> Use of agroecological soil tillage techniques Agroecological soil fertility management Agroecological crop pest management Agroecological crop disease management Agroecological weed management Maximisation of soil cover Use of plant reproductive material adapted to low input systems High level of animal welfare Agroecological livestock management Agroecological grasslands management Efficient water management Favourable microclimate management High level of adoption of agroforestry Maximisation of ecological networks

10 Elements of agroecology (FAO)	Short explanation	TAPE	SAT	SAFA-SMART-Frédi	Agridiag-Frédi	Cool Farm tool	Pathfinder	Agritoolkit	Others (Compas, Bio-bio, Öko-punkte)	Indicator set from Valkó PhD thesis	OASIS
EFFICIENCY	Innovative agroecological practices produce more using less external resources.	Use of external inputs Management of soil fertility Management of pests and diseases Productivity and household's needs	Reduction of the carbon footprint in the agrifood chain - Reduction and revaluation of food waste - Reduction and recycling of organic and other waste - Use of renewable energies from own or other sources - Use and/or impulse of short marketing circuits - Use and/or promotion of low-carbon logistics/distribution (e.g. distribution by bicycle, carpooling, etc.)	- Material Use - Greenhouse gases - Air quality - Water withdrawal - Water quality - Soil quality - Soil degradation	Used amount of nitrogen Nitrogen balance of the farm Nitrogen excess dose Used amount of Phosphorus Phosphorus balance of the farm Phosphorus application Frequency of pesticide application Danger of used pesticides	Animal grazing Enteric fermentation Manure management Feed production for livestock Seed production Crop residue management Fertiliser production Soil/ fertiliser Paddy methane Crop protection Carbon stock changes Off-farm transport	GHG balance N balance P balance Syn N Fertilizers Syn P Fertilizers Diesel consumption Land Use Ground and Surface Water Withdrawals Electricity Food loss and waste Transport intensity Loss of products Energy efficiency Water use Renewable energy %	- Material Use - Greenhouse gases - Air quality - Water withdrawal - Water quality - Soil quality - Soil degradation	Soil cover (Ökopunkte) Intensity of soil fertilization (Ökopunkte) Fertilizer type and application (Ökopunkte) Average parcel size (Ökopunkte) Application of Plant protection products (Ökopunkte) Total Output (COMPAS) Total Intermediate Consumption (COMPAS) Net Value Added (COMPAS) Labour productivity (Net Value Added/AWU) (COMPAS) Net Farm Income (COMPAS) Farm Management Indicators (Bio-bio): - Total direct and indirect energy input - Intensification/Extensification Expenditures on fuel, pesticides, fertiliser and animal fodder - Area with use of mineral N-fertiliser - Total nitrogen input - Field operations - Pesticide use - Average stocking rate - Grazing intensity	Emission per unit of current productive use in agriculture Final energy consumption of agriculture per unit of value added Change in the proportion of utilized agricultural area in relation to total land Livestock density (livestock / utilized agricultural area) GHG emissions per unit of value added in agriculture Ammonia emissions per unit of value added in agriculture Nitrogen balance per hectare of utilized agricultural area Sales of plant protection products per unit of utilized agricultural area Gross value added per hectare of utilized agricultural area Value added per unit of labor in agriculture Cereal yield per hectare Unutilized agricultural area as a percentage of total agricultural area	Use of agroecological soil tillage techniques Agroecological soil fertility management Agroecological crop pest management Agroecological crop disease management Agroecological weed management Maximisation of soil cover Use of plant reproductive material adapted to low input systems Agroecological livestock management Agroecological grasslands management Efficient water management Favourable microclimate management High level of adoption of agroforestry Minimised variable costs Minimised fixed costs - investments Maximal use of stress-tolerant species, breeds, and cultivars High level of autonomy from commercial inputs
	RECYCLING	More recycling means agricultural production with lower economic and environmental costs.	Recycling of biomass and nutrients Water saving Management of seeds and breeds Renewable energy use and production	Reduction of the carbon footprint in the agrifood chain - Reduction and revaluation of food waste - Reduction and recycling of organic and other waste - Use of renewable energies from own or other sources	- Material Use - Energy use - Waste reduction & disposal	Energy use Water use Water supply sources	Energy use (field) Energy use (processing) Water waste	Food chain level food waste reduction Waste disposal Packaging specification	- Material Use - Energy use - Waste reduction & disposal	Soil cover (Ökopunkte) Intensity of soil fertilization (Ökopunkte) Fertilizer type and application (Ökopunkte)	Proportion of organic manure used within total nutrient inputs (N content)

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RESILIENCE	Enhanced resilience of people, communities and ecosystems is key to sustainable food and agricultural systems.	<p>Stability of income/production and capacity to recover from perturbations</p> <p>Mechanisms to reduce vulnerability</p> <p>Indebtedness</p> <p>Average Diversity</p>	<p>Sustainable economic activity</p> <ul style="list-style-type: none"> - Activity as main source of income - Activity maintained over time: at least 3 years and with prospects of continuing in the future - Income from the activity allows savings and/or reinvestment in the activity itself - The initiative helps the local economy of the region - Promoting the use of a non-monetary economy - Promotion of Social Auditing (SSE) as an evaluation tool for the initiatives of the agri-food value chain. 	<ul style="list-style-type: none"> - Internal investment - Community Investment - Long-ranging investment - Profitability - Stability of production - Stability of supply - Liquidity - Risk management 	-	-	<ul style="list-style-type: none"> Net income Safety Nets Full Cost Accounting Internal Investment Long Term Profitability Sustainability Management Stability of Supplier Dependence on the Leading Stability of the market Price Determination Product Diversification Control Measures Food Quality Certified Production Regional Workforce Local Procurement Food Loss and Waste GHG reduction target Land Use and Land Cover 	-	<p>COMPAS indicators:</p> <ul style="list-style-type: none"> UAA (utilised agricultural area) Annual Working Unit (AWU) Family Working Unit Total Output Total Intermediate Consumption Net Value Added Labour productivity (Net Value Added/AWU) Net Farm Income 	<ul style="list-style-type: none"> Food price volatility index Gross fixed capital formation per unit of depreciation in agriculture Agricultural subsidies as a percentage of value added 	<ul style="list-style-type: none"> Short and local food marketing chains High level of diversification of products High level of diversification of clients Good temporal distribution of revenue Low share of subsidies in gross farm income Ability to attract and keep motivated workforce High level of autonomy from commercial inputs Minimised variable costs Minimised fixed costs - investments High proportion of quality enhancement product valorisation practices High proportion of locally or self-processed products Short marketing chain Local marketing chain High level of diversification of activities

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HUMAN AND SOCIAL VALUES	Protecting and improving rural livelihoods, equity and social well-being is essential for sustainable food and agricultural systems.	<p>Womens empowerment</p> <p>Labour productive conditions, social inequalities</p> <p>Youth empowerment and emigration</p> <p>Animal welfare</p>	<p>Sensibilization towards a food sovereignty model</p> <ul style="list-style-type: none"> - Workshops and activities of sensibilization for all citizens, with special emphasis on more vulnerable groups - Workshops and activities of sensibilization towards the educative community <p>Help and employment of persons with difficulties in work integration</p> <ul style="list-style-type: none"> - Integration of people and/or groups risking social exclusion <p>Equality ways of internal organization</p> <ul style="list-style-type: none"> - Personal and / or family conciliation carried out by men and women equally and non-transferable - Horizontal and participative decision making - Women are involved in decision making <p>Commercialisation local, fair and/or collective</p> <ul style="list-style-type: none"> - Fair prices for producers - Final price that covers the costs of: production, transformation, commercialisation, distribution and administration - The values behind the marketed products are made visible - Access to local food is easy and sustainable (and/or agroecological) for all (both economically and physically), with special emphasis on the most vulnerable groups. <p>Social links creation and strengthening</p> <ul style="list-style-type: none"> - Participation to collective projects or networks - Participation to social or solidarity economy networks, and put into practice of its principles - Promotion and development of synergies and collaboration between actors of the agri-food chain <p>Contribution to supporting and creating decent jobs</p> <ul style="list-style-type: none"> - Employed people have fixed and stable contracts - There's pay equity 	<ul style="list-style-type: none"> - Animal welfare - Decent livelihood - Fair trading practices - Labour rights - Equity - Human safety & healths 	-	-	<p>CAP Food Sovereignty</p> <p>Agro-ecology</p> <p>Safety and Health Trainings</p> <p>Safety of Work Place</p> <p>Health Coverage and Access to Medical care</p> <p>Employment relations</p> <p>Wage level</p> <p>Capacity Development</p> <p>Non Discrimination</p> <p>Gender Equality</p> <p>Support to Vulnerable People</p> <p>Fair Access to means of production</p> <p>Freedom of Association and Right to Bargaining</p>	<ul style="list-style-type: none"> - Animal welfare - Civic Responsibility (Agri Cool Awards) - Support to vulnerable people (Agri Cool Awards) - Social farming (Agri Cool Awards) - Social inclusion (Agri Cool Awards) 	-	<p>Rate of change in the rural population</p> <p>Per capita rural development support in rural areas</p> <p>Proportion of poor households in sparsely populated areas</p> <p>Proportion of households living in severe housing conditions in sparsely populated areas</p> <p>Dependence rate of people over 65 within the rural population</p> <p>Incidence of pollution in residential areas in sparsely populated areas</p>	<p>Humane and safe working conditions</p> <p>Fair wages, high job stability, solid provision of social protection</p> <p>High level of gender equity</p> <p>Large comparative contribution to job creation</p> <p>High ratio of employment of people at risk of poverty and social exclusion</p> <p>Substantial use and promotion of traditional local seeds and heritage breeds</p> <p>Strong involvement in preservation of traditional foods</p> <p>High proportion of quality enhancement product valorisation practices</p> <p>Short marketing chain</p> <p>Local marketing chain</p> <p>High proportion of locally or self-processed products</p> <p>Substantial and continuous participation in networks, collectives, organisations</p> <p>Substantial and continuous participation in Social and Solidarity Economy</p> <p>Substantial and continuous advocacy and education on agroecology</p>

10 Elements of agroecology (FAO)	Short explanation	TAPE	SAT	SAFA-SMART-Frédi	Agridiag-Frédi	Cool Farm tool	Pathfinder	Agritoolkit	Others (Compas, Bio-bio, Öko-punkte)	Indicator set from Valkó PhD thesis	OASIS
CULTURE AND FOOD TRADITIONS	By supporting healthy, diversified and culturally appropriate diets, agroecology contributes to food security and nutrition while maintaining the health of ecosystems.	<p>Appropriate diet and nutrition awareness</p> <p>Local or traditional (peasant / indigenous) identity and awareness</p> <p>Use of local varieties/breeds and traditional (peasant & indigenous) knowledge for food preparation</p>	<p>Health improvement through local or sustainable foods</p> <ul style="list-style-type: none"> - Produce, market or consume agroecological or ecological foods - Market or consume local foods <p>Preservation and recovery of traditional foods and local productive resources</p> <ul style="list-style-type: none"> - Artisanal food production and processing - Promotes, markets and/or consumes varieties, traditional breeds and/or auction fish <p>Preservation and recovery of traditional knowledge</p> <ul style="list-style-type: none"> - Local food production/processing/processing taking into account traditional knowledge and gastronomic culture - Recovery, dissemination, exchanges and meetings where traditional knowledge is shared and knowledge exchange networks are strengthened. 	<ul style="list-style-type: none"> - Cultural diversity - Indigenous knowledge - Food sovereignty 	-	-	<ul style="list-style-type: none"> Indigenous Knowledge Food Sovereignty Traditional Recipes Education and Information Culture 	<ul style="list-style-type: none"> - Genetic diversity - Regional marketing 	-	<ul style="list-style-type: none"> Average annual consumption of vegetables and fruits per capita Incidence of microbiological foodborne illness per 100,000 population 	<ul style="list-style-type: none"> Substantial use and promotion of traditional local seeds and heritage breeds Strong involvement in preservation of traditional foods High proportion of quality enhancement product valorisation practices Short marketing chain Local marketing chain

10 Elements of agroecology (FAO)	Short explanation	TAPE	SAT	SAFA-SMART-Frédi	Agridiag-Frédi	Cool Farm tool	Pathfinder	Agri toolkit	Others (Compas, Bio-bio, Öko-punkte)	Indicator set from Valkó PhD thesis	OASIS
RESPONSIBLE GOVERNANCE	Sustainable food and agriculture requires responsible and effective governance mechanisms at different scales – from local to national to global.	Producers empowerment Producers organizations and associations Participation of producers in governance of land and natural resources	<p>Sensibilization towards a food sovereignty model</p> <ul style="list-style-type: none"> - Workshops and activities of sensibilization for all citizens, with special emphasis on more vulnerable groups - Workshops and activities of sensibilization towards the educative community <p>Help and employment of persons with difficulties in work integration</p> <ul style="list-style-type: none"> - Integration of people and/or groups risking social exclusion <p>Equality ways of internal organization</p> <ul style="list-style-type: none"> - Personal and / or family conciliation carried out by men and women equally and non-transferable - Horizontal and participative decision making - Women are involved in decision making <p>Commercialisation local, fair and/or collective</p> <ul style="list-style-type: none"> - Fair prices for producers - Final price that covers the costs of: production, transformation, commercialisation, distribution and administration - The values behind the marketed products are made visible - Access to local food is easy and sustainable (and/or agroecological) for all (both economically and physically), with special emphasis on the most vulnerable groups. <p>Social links creation and strengthening</p> <ul style="list-style-type: none"> - Participation to collective projects or networks - Participation to social or solidarity economy networks, and put into practice of its principles - Promotion and development of synergies and collaboration between actors of the agri-food chain <p>Contribution to supporting and creating decent jobs</p> <ul style="list-style-type: none"> - Employed people have fixed and stable contracts - There's pay equity 	- Corporate ethics - Accountability - Participation - Rule of Law - Holistic Management	-	-	Sustainability Management GHG Reduction target CAP Control Measures Certified production Product Labeling Traceability system Innovation and licensing	- Corporate ethics (Agri Cool Awards) - Accountability (Agri Cool Awards) - Participation (Agri Cool Awards) - Rule of Law (Agri Cool Awards) - Holistic Management (Agri Cool Awards)	-	Proportion of area under agri- environmental schemes within the utilized agricultural area Proportion of standard output produced by a farmer with a tertiary agricultural education Percentage of all graduates in agriculture and veterinary medicine	Substantial and continuous participation in Social and Solidarity Economy Short and local food marketing chains High level of diversification of clients Low share of subsidies in gross farm income Ability to attract and keep motivated workforce High level of autonomy from commercial inputs Substantial use and promotion of traditional local seeds and heritage breeds Strong involvement in preservation of traditional foods Use of plant reproductive material adapted to low input systems

10 Elements of agroecology (FAO)	Short explanation	TAPE	SAT	SAFA-SMART-Frédi	Agridiag-Frédi	Cool Farm tool	Pathfinder	Agritoolkit	Others (Compas, Bio-bio, Öko-punkte)	Indicator set from Valkó PhD thesis	OASIS
CIRCULAR AND SOLIDARITY ECONOMY	Circular and solidarity economies that reconnect producers and consumers provide innovative solutions for living within our planetary boundaries while ensuring the social foundation for inclusive and sustainable development.	<p>Products and services marketed locally</p> <p>Networks of producers, relationship with consumers and presence of intermediaries</p> <p>Local food system</p>	<p>Contribution to supporting and creating decent jobs</p> <ul style="list-style-type: none"> - Employed people have fixed and stable contracts - There's pay equity <p>Commercialisation local, fair and/or collective</p> <ul style="list-style-type: none"> - Fair prices for producers - Final price that covers the costs of: production, transformation, commercialisation, distribution and administration - The values behind the marketed products are made visible - Access to local food is easy and sustainable (and/or agroecological) for all (both economically and physically), with special emphasis on the most vulnerable groups. <p>Sustainable economic activity</p> <ul style="list-style-type: none"> - Activity as main source of income - Activity maintained over time: at least 3 years and with prospects of continuing in the future - Income from the activity allows savings and/or reinvestment in the activity itself - The initiative helps the local economy of the region - Promoting the use of a non-monetary economy - Promotion of Social Auditing (SSE) as an evaluation tool for the initiatives of the agri-food value chain. <p>Social links creation and strengthening</p> <ul style="list-style-type: none"> - Participation to social or solidarity economy networks, and put into practice of its principles - Promotion and development of synergies and collaboration between actors of the agri-food chain - Participation in Participatory Guarantee Systems and / or associations of consumers <p>Reduction of the carbon footprint in the agrifood chain</p> <ul style="list-style-type: none"> - Reduction and revaluation of food waste - Reduction and recycling of organic and other waste - Use of renewable energies from own or other sources - Use and/or impulse of short marketing circuits - Use and/or promotion of low-carbon logistics/distribution (e.g. distribution by bicycle, carpooling, etc.) 	- Fair trading practices - Local economy - Product quality & information	-	-	<ul style="list-style-type: none"> - Fair trading practices - Local economy - Product quality & information - Regional workforce - School meals - Public Procurement - Community Supported Agriculture - Connect farmers to markets - Food Sovereignty - Non Discrimination - Gender Equality - Support to Vulnerable People 	<ul style="list-style-type: none"> - Local value creation - Local procurement - Community investment - Solidarity and Circular economy - Local marketing - Fair trading practices (Agri Cool Awards) - Product quality & information (Agri Cool Awards) 	-	<p>Proportion of exports and imports of agricultural products</p> <p>Production value of food processing within the processing industry</p> <p>Proportion of exports and imports of agricultural products</p> <p>Development of agricultural income</p> <p>Proportion of GDP per capita in rural areas compared to national data</p> <p>Employment rate in sparsely populated areas (aged 20-64)</p>	<p>Minimised variable costs</p> <p>Minimised fixed costs - investments</p> <p>Satisfaction with economic benefits from farming activities</p> <p>Similar or higher benefits compared to other farmers</p> <p>Humane and safe working conditions</p> <p>Fair wages, high job stability, solid provision of social protection</p> <p>High level of gender equity</p> <p>High ratio of employment of people at risk of poverty and social exclusion</p> <p>Satisfactory workload levels</p> <p>Low-stress work environment</p> <p>Sufficient time for family and social relationships</p> <p>Sufficient time for knowledge and new skills</p> <p>Finding work meaningful</p> <p>Farmer's optimistic perspective on farm's future</p> <p>Young farmer or presence / high chances of successor</p> <p>Short and local food marketing chains</p> <p>High level of diversification of clients</p> <p>Low share of subsidies in gross farm income</p> <p>Ability to attract and keep motivated workforce</p> <p>High level of autonomy from commercial inputs</p> <p>High level of diversification of activities</p> <p>Satisfaction with economic benefits from farming activities</p> <p>Similar or higher benefits compared to other farmers</p> <p>Transparent communication and high level of accountability</p> <p>Substantial and continuous participation in Social and Solidarity Economy</p>

Annex 5: **Suggested indicators**

	Suggested Indicator	Method for measurement	Related agroecology principle
Farm level	Reason of commitment for applying agroecological practices	Qualitative assesment of motivation: subsidies, more stable yields during climate change; inner motivation (eco- consciousness)	Human and social values
	Willingness of innovation in farm practices	Does the farmer try out new practices? Does the farmer conduct small scale trials for new varieties and technologies?	Co-creation and sharing of knowledge
	Diversification patterns present on the farm	Diversification patterns of activities, Diversification patterns for income, Assessing the level of mixed farming	Diversity, Resilience
	Seed saving and the use of heirloom varieties	Ratio of seed from self saved seeds, Ratio of seed from heirloom varieties, Ratio of seed developed for organic farming	Diversity, Recycling, Resilience
	Farm level self- sufficiency	Ratio of self- sufficiency: seeds, nutrients, water, animal feed, genetic material, medicine for animals-plant protection	Efficiency, Recycling, Resilience
	Economic viability	Economic evaluation of agroecology related practices (eg. agroforestry, multispecies cover crops etc.) in comparison with whole farm economic performance	Efficiency
	On- farm social innovations	Presence of social farming activities (rehabilitation, care farms); Presence of open- farm policy (available for visits); knowledge transfer (voluntary and apprentice programs)	Human and social values
	Cooperation among farmers	Participation in self- organized cooperation; Frequency of interaction; Level of cooperation (knowledge transfer,). Cooperation for logistical solutions.	Efficiency, Co-creation and sharing of knowledge
	Participation in independent farmers organization	Evaluation of the effort to participate in collective representation if possible (e.g. membership conditions) or individual acting to represent farmers rights/ farmers challenges/issues. Does the farmer feel like their interests are well represented?	Responsible governance
	Solutions for farm succession	Are there family inheritance plans in place? Are there alternative inheritance/ succession plans in place? (For example with newcomer farmers)	Resilience

	Suggested Indicator	Method for measurement	Related agroecology principle
Farm level	Reason of commitment for applying agroecological practices	Presence of measures for cooperatio among neighboring farms for landscape level enhancement; is the cooperation voluntary or subsidized?	Diversity
	Impact and integration of the farm in the local community	Employment of local workforce; level of contribution to the local economy; sales in the local economy vs. sales in the globalized market	Human and social values, Resilience
	Non- monetary benefits	What do farmers use to assess their success besides economic performance?	Humand and social values
	Conservation of traditional farming methods/practices/systems/landscapes	Does the farmer practice traditional methods? What is their motivation? (Lack of access to modernization or preserving cultural heritage?)	Diversity, Culture and food traditions
	Workers rights	Ratio of unregistered workforce. Ratio of unregistered/ illegal salary. Presence of work contracts. Ratio of local vs. migrant workers in agriculture. Access to developing knowledge/ skills for workers. Participatory decision making processes on the farm involving the workers. Motivation of farmer to employ roma workers.	Human and social values
	Access to technologies	The farmer has access to and knowledge with technologies that reduce workload and make farming more efficient. These technologies are open access, affordable and do not tie the farmer to inputs from a certain corporation	Co-creation and sharing of knowledge, Circular and solidarity economy
	Farm level food waste	Ratio of food not harvested. Food waste used for composting, feeding to animals, donating it to those in need	Recycling
	Knowledge and information access	Forums for informal knowledge exchange . Availability of resources in local language about agroecology and sustainable farming methods	Co- creation and sharing of knowledge
	Life quality	Level of stress, division of labor and responsibilities, feeling of appreciation by the community; burn out or fear of the future, security of crops and animals from theft	Human and social values

	Suggested Indicator	Method for measurement	Related agroecology principle
Farm level	Reason of commitment for applying agroecological practices	Qualitative assesment of motivation: subsidies, more stable yields during climate change; inner motivation (eco-consciousness)	Human and social values
	Willingness of innovation in farm practices	Does the farmer try out new practices? Does the farmer conduct small scale trials for new varieties and technologies?	Co-creation and sharing of knowledge
	Diversification patterns present on the farm	Diversification patterns of activities, Diversification patterns for income, Assessing the level of mixed farming	Diversity, Resilience
	Seed saving and the use of heirloom varieties	Ratio of seed from self saved seeds, Ratio of seed from heirloom varieties, Ratio of seed developed for organic farming	Diversity, Recycling, Resilience
	Farm level self- sufficiency	Ratio of self- sufficiency: seeds, nutrients, water, animal feed, genetic material, medicine for animals-plant protection	Efficiency, Recycling, Resilience
	Economic viability	Economic evaluation of agroecology related practices (eg. agroforestry, multispecies cover crops etc.) in comparison with whole farm economic performance	Efficiency
	On- farm social innovations	Presence of social farming activities (rehabilitation, care farms); Presence of open- farm policy (available for visits); knowledge transfer (voluntary and apprentice programs)	Human and social values
	Cooperation among farmers	Participation in self- organized cooperation; Frequency of interaction; Level of cooperation (knowledge transfer,). Cooperation for logistical solutions.	Efficiency, Co-creation and sharing of knowledge
	Participation in independent farmers organization	Evaluation of the effort to participate in collective representation if possible (e.g. membership conditions) or individual acting to represent farmers rights/ farmers challenges/issues. Does the farmer feel like their interests are well represented?	Responsible governance
	Solutions for farm succession	Are there family inheritance plans in place? Are there alternative inheritance/ succession plans in place? (For example with newcomer farmers)	Resilience
Landscape scale projects	Presence of measures for cooperatio among neighboring farms for landscape level enhancement; is the cooperation voluntary or subsidized?	Diversity	

	Suggested Indicator	Method for measurement	Related agroecology principle
Farm level	Impact and integration of the farm in the local community	Employment of local workforce; level of contribution to the local economy; sales in the local economy vs. sales in the globalized market	Human and social values, Resilience
	Non- monetary benefits	What do farmers use to assess their success besides economic performance?	Human and social values
	Conservation of traditional farming methods/practices/systems/landscapes	Does the farmer practice traditional methods? What is their motivation? (Lack of access to modernization or preserving cultural heritage?)	Diversity, Culture and food traditions
	Workers rights	Ratio of unregistered workforce. Ratio of unregistered/ illegal salary. Presence of work contracts. Ratio of local vs. migrant workers in agriculture. Access to developing knowledge/ skills for workers. Participatory decision making processes on the farm involving the workers. Motivation of farmer to employ roma workers.	Human and social values
	Access to technologies	The farmer has access to and knowledge with technologies that reduce workload and make farming more efficient. These technologies are open access, affordable and do not tie the farmer to inputs from a certain corporation	Co-creation and sharing of knowledge, Circular and solidarity economy
	Farm level food waste	Ratio of food not harvested. Food waste used for composting, feeding to animals, donating it to those in need	Recycling
	Knowledge and information access	Forums for informal knowledge exchange . Availability of resources in local language about agroecology and sustainable farming methods	Co- creation and sharing of knowledge
	Life quality	Level of stress, division of labor and responsibilities, feeling of appreciation by the community; burn out or fear of the future, security of crops and animals from theft	Human and social values

	Suggested Indicator	Method for measurement	Related agroecology principle
Food system level	Multi sectoral cooperation among stakeholders	Number of connections among actors. Levels and types of cooperation. Sharing of best practices. Synergies among stakeholders	Co-creation and sharing of knowledge, Synergies, Circular and solidarity economy
	Short supply chains	Geographical distance between producer and consumer. Number of intermediaries between producer and consumer. Presence of local value addition. Presence of local markets, community supported agriculture, shopping communities, food coops. Access of local producers to public catering. Ratio of locally produced food to be consumed locally.	Circular and solidarity economy, Efficiency, Culture and food traditions
	Food sovereignty	Proportion of household spending spent on food. Satisfaction with available food. Occurrence of diet related health issues. Level of non- formal food provision (self-sufficiency, barter, gifts). Ratio of consuming locally produced food on a family, community, regional and national level	Culture and food traditions, Human and social values
	Preservation of food culture and gastronomic heritage	Level of traditional home cooking. Presence of local food festivals, restaurants. Availability of heirloom varieties for farming. Presence of food related traditions.	Culture and food traditions

	Suggested Indicator	Method for measurement	Related agroecology principle
Policy and network level	Reason of commitment for applying agroecological practices	Overall agricultural production. Level of overproduction. Export/ Import ratio. Level of processing.	Circular and solidarity economy, Efficiency
	Existence of national/regional food sovereignty forums	Existence and quality of food sovereignty forums. Level of organization (grassroots, NGO, policy)	Responsible governance
	Policies supporting the conservation of traditional agricultural landscapes	Existence of such, its content, scope, budget, legal, institutional, educational and research support given to it	Culture and food traditions, Diversity
	Empowerment of rural youth and women	Existence of initiatives supporting youth/women. Ratio of women/youth representatives present in farmers associations. Active participate in the decision making processes of women/ youth.	Human and social values
	Access to land	Distribution and usage rights/rental conditions of state-owned lands. Land ownership. Land consolidation. Land concentration. Land grabbing.	Responsible governance
	Changes in territorial land use and farm structure	Changes in diversity of arable lands. Area of organic farming. Area and number of mixed farming systems.	Responsible governance
	Seed sovereignty	Freedom to preserve and exchange seeds. Access to national gene bank collections heirloom varieties is ensured.	Diversity, Responsible Governance
	National/ regional food policies	Clear definition of agroecology used by policy actors. Presence of agroecology principles in food policies.	Responsible governance
	Civil initiatives	Number of agroecology initiatives. Networks of agroecology initiatives. Activity of initiatives in different domains (science, movement, practice, policy).	Humans and social values, CoCreation and sharing of knowledge, Synergies
	Peer-to-peer networks	Presence, number and composition of members and way of governance. Existing instruments (legal, financial) supporting these initiatives. Diversity of represented actors in size and activity.	Responsible governance, Co- creation and sharing of knowledge, Diversity
	Research and education	Number of projects, overall budget allocated for agroecological research. Number of students enrolled in agroecological programs. Connections between research and practice for agroecology; participatory research methods, use of results by farmers.	Co-creation and sharing of knowledge
	Education and awareness raising	Number of campaigns by governmental organizations. Number of campaigns by NGOs. Number of people reached by the campaigns. Representation of agroecology in the education system (number of education programs, workshops etc.)	Co-creation and sharing of knowledge
Participation in international agroecological movements and farmers advocacy	Number of international projects and collaborations in the context of agroecology in the country. Number of institutions / NGOs / other organizations involved in international projects.	Co- creation and sharing of knowledge	

Annex 6: **Policy briefs**

1. Knowledge is the key driver for advancing agroecological transition
2. Agroecological transition requires grassroots advocacy and multistakeholder networks
3. Traditional agricultural landscapes secure agroecology in the Balkan region
4. Land concentration and land grabbing as main obstacles to agroecology transition in CEU

New partnerships create opportunities for spreading agroecological practices in the Baltic region.



Policy brief

Knowledge is the key driver for advancing agroecological transition

Lili Balogh, Katalin Réthy, Logan Strenchock, Alfréd Szilágyi

Local innovation and sharing of knowledge are key to advancing agroecological transition in the BioEast region. Policies should support farmers to generate knowledge and participate in peer-to-peer networks. Traditional farming can be an important source of knowledge, while internationally educated newcomers embedded in communities can advance locally adapted innovations. General awareness about agroecology should be raised for all actors of the food system. Current indicator tools assess knowledge sharing, but expansion of these is necessary by taking into consideration local characteristics of the region.



Barriers and drivers

Contrary to technology intensive conventional agriculture, practices of agroecology are knowledge intensive and context specific. Transforming production systems to agroecology is a process that requires local innovation and the sharing of knowledge among stakeholders.

Due to the lack of support in educational policy agroecology is barely present in higher education and there are very few practical courses. The low level of foreign language comprehension hinders farmers from accessing international resources. Subsidies for greening without any knowledge transfer do not help enhance the motivation and commitment of farmers, agricultural extension services' focus is on large-scale industrial solutions and not on agroecological approaches. Low level of participatory approaches in academia prevents farmers from actively partaking in knowledge creation and thus its adoption.

However, there are important drivers that can be the focus areas of further development. Traditional farming and related practices are still very much present in the BioEast region and can be enhanced by access to technological and social innovations. Most of the newcomer farmers are well educated, have

international experience or knowledge of agroecological practices, are innovative in production and marketing, appreciate knowledge-driven solutions and possess an openness towards community advocacy. Emergence of international projects accelerates knowledge transfer from countries where agroecology has been more embedded.

Approach

A literature review of the state of agroecology in the BioEast region has identified a number of trends that are common for the entire region which can be grouped into thematic categories based on their orientation and impact in promoting or inhibiting the development of agroecology within the region. These trends have been validated by 11 expert interviews. A review of the existing assessment and indicator tools developed and tested in other regions have been carried out. Missing areas were identified that are not tackled by these assessment tools, but are specifically important for this region.

Willingness of innovation in on-farm practices

Conducting experiments is an important topic for agroecology, as its practices always need local adaptation for successful application. *This should be specifically assessed on farm level, by considering the farmer's actions in conducting own trials with plant production techniques, seed saving, breeding etc.*

Indicators of on-farm innovation: *The farmer tries out new practices and conducts small scale trials for new varieties and technologies. The farmer has access to and knowledge with technologies that reduce workload and make farming more efficient. These technologies are open access, affordable and do not tie the farmer to inputs from a certain corporation.*

Contrary to technology intensive conventional agriculture, practices of agroecology are knowledge intensive and context specific, therefore local innovation and the sharing of knowledge among stakeholders is of key importance.

Knowledge production and sharing
 Agroecology related research and education is an essential component of the agroecological transition, therefore further information needs to be gathered on its current state in comparison with conventional or other types of agriculture related research. Furthermore it is worth exploring the *connections between research and practice for agroecology*, if research is directly applied by the end-users, and whether these have been participating in the design and development of the research.



Indicators of knowledge production and sharing: *Number of projects, overall budget allocated for agroecological research. Number of students enrolled in agroecological programs. Connections between research and practice for agroecology; participatory research methods, use of results by farmers.*

Education and awareness raising campaigns in the context of agroecology for the wide public, in the school curriculum or extra-scholar spaces would give valuable information about the attitude of consumers and the effectiveness of these activities. The existence of peer-to-peer networks can greatly catalyze agroecological transition, therefore *their presence, number and composition of members and way of governance and whether there are existing legal and financial instruments supporting these initiatives* can give an important insight on different levels: knowledge transfer, collaboration, involvement of farmers into decision making and within national agriculture policy dialogue. International organisations working for agroecological transition can provide both knowledge and motivation for actors in the BioEast region.

Indicators of advancement of awareness raising: *Presence, number and composition of members of agroecology initiatives; peer-to-peer networks and way of governance. Existing instruments (legal, financial) supporting these initiatives. Diversity of represented actors in size and activity. Number of national members of international networks (Via Campesina, Agroecology Europe).*

For further information and to access the full report visit <https://bioeast.eu/>
 Balogh, L.; Strenchock, L.; Réthy, K.; Szilágyi, A. (2022). *Agroecology and sustainable yields thematic study: Socio-ecological indicators of agroecology-systems in the BioEast countries*



Policy brief

Agroecological transition requires grassroots advocacy and multistakeholder networks

Lili Balogh, Katalin Réthy, Logan Strenchok, Alfréd Szilágyi

Currently existing farmer advocacy groups fail to represent the interest of agroecological food producers who are mostly small-scale farmers. Disproportionate access to resources such as land and funding due to the distorted lobbying power results in a lack of trust in organized representation.

Civic engagement around agroecology is growing, but is not well embedded into structured networks, activity is scattered and there is a lack of impact at the policy and farm level.

Governmental support and participatory policy making are needed.



Barriers and drivers

The reality in the BioEast region is that agroecological actors rarely have a seat at the table for decision making, as usually they are not formally organized. National farmers' unions represent mostly large-scale conventional farmers' interests. Agroecological farms, who are mostly small-scale actors have disproportionately bad access to resources, such as land, funding and subsidies, technologies and knowledge. Agroecology as a term has been adopted as a buzzword in policy texts and corporate communication, without acknowledgement of social aspects or emphasizing the need for systemic change.

Civic engagement around agroecology is not well embedded into structured networks, activity is scattered and there are a relatively low number of agroecology themed projects, and existing programs focus mostly on farm production practices and do not have a larger food system and social context.

At the same time, the holistic concept of agroecology has the potential for being used as a uniting force to link fragmented movements,

but must be done carefully to not isolate specific groups. Multi-stakeholder and transdisciplinary networks are organized around themes of environmentalism or food production, such as permaculture, food sovereignty, agrobiodiversity, agroforestry or regenerative agriculture. These networks present a good form of cooperation among different stakeholders and could be a basis for further agroecology advocacy.

Approach

A literature review of the state of agroecology in the BioEast region has identified a number of trends that are common for the entire region which can be grouped into thematic categories based on their orientation and impact in promoting or inhibiting the development of agroecology within the region. These trends have been validated by 11 expert interviews. A review of the existing assessment and indicator tools developed and tested in other regions have been carried out. Missing areas were identified that are not tackled by these assessment tools, but are specifically important for this region.

"Agroecology promotes inclusive, responsible and transparent governance of resources. This entails empowerment of local and community leaders." (FAO)

Implications and recommendations/policy options

Cooperation among farmers, participation in independent farmers collectives is a highly problematic issue in the region due to the historical background of collectivization, therefore it is suggested to understand better the social specialities of the region, to see what can be reasonably expected from farmers. Representation of farmers rights is a key point for upscaling agroecology and also problematic in the region as farmers associations are often linked to the current political side. Ensuring access of small scale agroecological farmers to resources, such as land, subsidies and technologies relies heavily on their embeddedness in networks.

Indicators of cooperation and participation: *Evaluation of the effort to participate in collective representation if possible (e.g. membership conditions) or individual acting to represent farmers rights/farmers challenges/issues. Frequency of interaction. Level of cooperation (knowledge transfer,). Non- monetary benefits of collaboration. Cooperation for logistical solutions. Does the farmer feel like their interests are well represented?*

Multisectoral cooperation among stakeholders is required for transformation of the food system in an agroecological way including producers, processing actors, consumers, food cooperatives, public canteens

and the public sector. Civil actors in the food system often use their own indicator tools for assessing the sustainability of farms, processors or restaurants; but these indicators are lacking social dimensions. *Indicators to measure the level of cooperation among actors throughout the food chain should be applied.*

Indicators of multi- sectoral cooperation: *Indicators to measure the level of cooperation among actors throughout the food chain should be applied. Number of connections among actors. Levels and types of cooperation. Sharing of best practices. Synergies among stakeholders.*

Food sovereignty refers to the level of access to affordable, healthy and culturally appropriate food for consumers. Its level can be assessed by how much a household spends on food in proportion to their income; how satisfied they are with the quality of their food; but also how well fitted their diet is to provide the appropriate macro and micro nutrients needed for a healthy lifestyle. As food self provisioning and informal channels of food procurement (barter, family connections) still play an important role in many regions in the BioEast countries, when - assessing the level of food sovereignty; these channels should also be taken into consideration.

Indicators of food sovereignty: *Proportion of household spending spent on food. Satisfaction with available food. Occurrence of diet related health issues. Level of non- formal food provision (self- sufficiency, barter, gifts). Ratio of consuming locally produced food on a family, community, regional and national level. Level of traditional home cooking. Presence of local food festivals, restaurants. Availability of heirloom varieties for farming. Presence of food related traditions. Existence and quality of food sovereignty forums. Level of organization (grassroots, NGO, policy)*

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Policy brief

Traditional agricultural landscapes secure agroecology in the Balkan region

Lili Balogh, Katalin Réthy, Logan Strenchock, Alfréd Szilágyi

Balkan countries have unique geographic regions and focus areas for agroecological production, such as coastal and island landscapes, mountainous regions, national parks and nature preserves. Agroecology is associated with preservation of local traditional peasant agricultural customs. Neither the current agricultural performance assessment tools, nor the agroecology assessment tools account for or have special focus on traditional agricultural landscapes. The unique contributions that farmers make in preserving traditional food and cultural traditions, agricultural infrastructure and architectural heritage, folk art, craft and handwork should be acknowledged.



Barriers and drivers

Traditional farming practices and a closer relationship of farmers with the natural systems are still preserved in some areas due to the unfavorable aspect of these areas for large-scale conventional farming. Examples of this can be found for instance in the mountainous areas of Romania, Bulgaria or the coastal-island regions of Croatia. Empowering and supporting the guardians of traditional practices, combined with ecotourism and environmental conservation in these areas suggest an important opportunity for agroecology development in the BioEast region. Land grabbing, land concentration, absence of a generation of new farmers and the current agroecological and rural development policies and subsidies are however not aiming at the preservation of these practices.

An additional distinctive trait of the region also includes a closer connection to agricultural heritage, preserved home gardening and foraging knowledge, and acknowledgement of traditions of the countryside as compared to

Western Europe. Along with these it is important to note the survival and importance of traditional producers' markets, the existence of strong informal produce exchanges and the lasting legacy of food self-provisioning and foraging.

Approach

A literature review of the state of agroecology in the BioEast region has identified a number of trends that are common for the entire region which can be grouped into thematic categories based on their orientation and impact in promoting or inhibiting the development of agroecology within the region. These trends have been validated by 11 expert interviews. A review of the existing assessment and indicator tools that were not particularly developed for this region and were not yet extensively tested in these countries have been carried out. Missing areas were identified that are not tackled by these assessment tools, but are specifically important for this region.

"Cultural identity and sense of place are often closely tied to landscapes and food systems. As people and ecosystems have evolved together, cultural practices and indigenous and traditional knowledge offer a wealth of experience that can inspire agroecological solutions"

(FAO)

Implications and recommendations/policy options

Conservation of traditional farming methods/practices/systems/landscapes

Traditional farming practices and land use systems contribute to conserving traditional agricultural landscapes as part of the cultural heritage which are still dominant in some regions (mostly the sea and mountain regions) of the BioEast countries. A special attention on assessing the contribution of the farms to this is a key indicator for advancing agroecology. Ecological tourism can provide a good opportunity for income diversification for guardians of time and knowledge intensive traditional practices.

Traditional ecological and farming knowledge still present in rural areas must be documented, shared and utilized. Enhancing connections between newcomer and traditional farmers, as well as between academic and non-formal spaces of education and research can strengthen the synergies to advance agroecology in the Balkans. The rising input prices for industrial farming are driving farmers to alternative practices and independence from external resources; which can be a good base for transitioning to self-sufficient and agroecological farming practices. The role of traditional agricultural landscapes for agroecology has high priority in the whole BioEAST region, as e.g. extensive grazing systems and wooded pastures in Hungary, and traditional mixed animal husbandry and fruit and vegetable production operations in the Baltic region.

Possible indicators for assessing traditional farming:

Use of traditional varieties and breeds at farm level. Number of projects revitalizing and promoting traditional farming practices. Areas dedicated to special management in order to conserve and restore traditional agricultural landscapes. Area of pastures under extensive grazing management. Area of wooded pastures. Gratitude of support given to conserve and promote traditional fruit growing. Number of peasant farmers/communities in the countryside.

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Policy brief

Land concentration and land grabbing as main obstacles to agroecology transition in CEU

Lili Balogh, Katalin Réthy, Logan Strenchock, Alfréd Szilágyi

Agroecological transformation requires small to medium sized, diverse family farms strongly embedded in the local food systems and the rural network, but the trends in CEU show a concentration of land in the hands of large-scale actors and a technology driven intensification of industrial production. The occurrence of land consolidation, land grabbing and land concentration and the continuing disappearance and lack of viability of small and medium sized family owned farms in the BioEast region is more drastic than elsewhere in Europe. Land rights have been propelled into the global spotlight as vital for achieving the United Nation's SDGs and have been extensively discussed in academia and activist circles. The current agricultural and rural development policies and subsidies are not aiming at reversing these trends and the current agricultural assessment tools and indicator sets do not take into account this crucial aspect.



Barriers and drivers

In the BioEast region, over the last decades, farms have become larger and larger; land has become more and more scarce and expensive and has been lost to urban development and non-farm uses; small-scale farmers have been squeezed off the land; and the systems that feed us have become more and more long-distance and centralized - making them extremely fragile. National and EU subsidies promote mostly industrial and large-scale agricultural practices, requiring larger plots of land, and made the acquisition of arable lands a highly profitable investment for non-farmers. These, along with other factors, have contributed to the hollowing out of rural communities, to frustrated young and newcomers to farming being unable to access land to farm - halting the generational renewal in agriculture and further aggravating rural

depopulation, and to urban centers that are increasingly cut off from the landscapes and countrysides that sustain them.

Approach

A literature review of the state of agroecology in the BioEast region has identified a number of trends that are common for the entire region which can be grouped into thematic categories based on their orientation and impact in promoting or inhibiting the development of agroecology within the region. These trends have been validated by 11 expert interviews. A review of the existing assessment and indicator tools that were not particularly developed for this region and were not yet extensively tested in these countries have been carried out. Missing areas were identified that are not tackled by these assessment tools, but are specifically important for this region.

Policy Brief - Land concentration and land grabbing as main obstacles to agroecology transition in CEU – 2022



"The EU is currently witnessing a massive land grab, which has a direct impact on 25 million of its citizens, changing the way lands are being managed and how food is being produced" (Attila Szócs, Eco Ruralis)

Implications and recommendations/policy options

Land is fundamental for agricultural production, and therefore it is essential to roughly assess the current state of access to land in the given country/region as it can be a primary barrier to agroecological transition - especially for young/new entrants. It is also relevant to explore how the generational renewal is handled in the country; whether for instance applying agroecological practices or being a young farmer is a prerogative in the given country/region or is there any support given to connect old farmers with younger generations for an optimal handover. Local, national and international projects related to agroecology and engaging in international agroecology movements focusing on land justice can also trigger new policies relevant for accessing land in favor of the transition towards agroecology.

The countries in the BioEast region share many similarities due to their common communist past regarding land as well: there are still many state-owned arable lands and forests, there are numerous narrow strips of land plots – inherited and further divided and therefore not used because of their size and ownership matters.

Furthermore, it is worth noting that the leasing conditions of the lands might not be so favorable for implementing long-term investments - such as planting trees, thus holding back farmers from engaging in such practices which would benefit them on the long run and not the same year of their application.

Policies and subsidies related to access to land halting and pushing for agroecology shall be identified.

Aspects worth looking into are: the distribution and usage rights/rental conditions of state-owned lands, land ownership, land consolidation, land concentration, land grabbing.

Number of international projects and collaborations in the context of access to land in the country. Number of institutions/NGOs/other organizations involved in international projects around the question of access to land.

The current indicator tools do not investigate the changes in territorial land use and farm structure, however they give an important insight on the trend of the given region and can indicate possible solutions of agricultural systems adapted to the local conditions.

Changes in the diversity of arable lands shall be examined, with a special attention to the total area and number of organic and/or mixed farming systems.

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Picture: The case of the state-owned lands of Kishantos - Greenpeace Hungary, 2014

Policy Brief - Land concentration and land grabbing as main obstacles to agroecology transition in CEU – 2022



Policy brief

New partnerships create opportunities for spreading agroecological practices in the Baltic region

Lili Balogh, Katalin Réthy, Logan Strenchock, Alfréd Szilágyi

Out of all European Regions, Baltic states are currently underrepresented in agroecology literature and research projects.

The retained legacy of mixed animal husbandry and fruit-vegetable production is accepted to be an opportunity for the future in advancing agroecology in the region.

Permaculture and agroforestry movements in the region are small but influential in agriculture policy advocacy and are aligned with greater regional environmental movements, representing an opportunity for advancing the spread of agroecology in practice.

The applications of agroecology in advocating for the preservation of traditional fishing culture and protecting offshore fisheries are not currently well elaborated and must be explored.



Barriers and drivers

A literature review of the state of agroecology in the BioEast region has identified several trends relevant within the Baltic Region. Both barriers and potential drivers of agroecology within the region must be better understood in shaping future policy initiatives.

Within the Baltic region agroecology as a term does not have a uniformly accepted definition nor is it understood fully conceptually in the local context. Agroecology is often equated with certified organic production, in some cases leading to conflict between agroecology advocates and certified organic producers. The Baltic region countries have had little representation in EU projects focusing on the spreading knowledge of agroecology in practice.

In spite of the lack of notoriety of agroecology as a term and larger global movement, its principles are represented among a dedicated community of farmers, consumers, activists and researchers who may be lacking in resources and land, but are growing in influence.

The amount of certified organic agricultural land is increasing in the Baltic region. Biodynamic and certified organic agriculture has a historic legacy in the region, and organic farmers' organizations representing the interests of farmers have shown to have a high level of activity in comparison with other BioEast regions, and although organic agriculture should not be directly equated with agroecology, the level of organization of farmers in sharing knowledge between peers represents an opportunity for the future.

An additional distinctive trait of the region also includes a higher occurrence of mixed animal and fruit or vegetable production on the same farm than in comparison with other regions. On-farm diversification and closing resource loops on farms are understood as basic pillars of agroecology in practice. Land concentration and the increasing consolidation of average farm size has been observed in the Baltic Region, and policy must shift to preserve the integrity of mixed family scale and traditional small farming enterprises.

It is also of relevance to note the enduring legacy of traditional producers' markets, the existence of strong informal produce exchanges and the persistent practice of food self-provisioning and foraging. In addition to such practices, permaculture and agroforestry movements have aligned with greater regional environmental movements in launching campaigns focusing on farming practices with positive ecological impacts. The further convergence of such movements should be a target of policy in the future.

"As agroecology is gaining popularity worldwide and in Europe, the newer interpretations in the BioEast region can be attributed to European projects and globally recognized elaborations as provided by the FAO, as well as a new generation of professionals working in an international community and participating in the discourse on food sovereignty and sustainable agriculture."

Approach

A literature review of the state of agroecology in the BioEast region has identified trends which can be grouped into thematic categories based on their orientation and impact in promoting or inhibiting the development of agroecology. These trends have been validated by 11 expert interviews. A review of the existing assessment



and indicator tools developed and tested in other regions have been carried out. Missing areas were identified that are not tackled by these assessment tools, but remain important in the region.

Implications and recommendations/policy options

Policy initiatives must address the lack of notoriety of agroecology as a concept

Policy revision should not selectively adopt portions of agroecology as focus priorities without ensuring a holistic approach; transdisciplinary and participatory research should shape future food and agricultural policy design. Research and advocacy must empower a greater understanding of holistic social principles of agroecology which should influence the transformation of food distribution networks.

Research and extension outreach must support the spread of knowledge of agroecology in practice at the farm level, taking into account regional context

The enduring legacy of post-socialist transition/EU accession and their impacts on agriculture must be better understood when shaping policy reform; agrarian tradition and historical knowledge of food production should be complimentary in incorporating agroecology principles into policy

The role of preserving traditional agricultural landscapes for agroecology has high priority in the whole BioEAST region, as traditional mixed animal husbandry and fruit and vegetable production operations in the Baltic region.

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