



Food and Agriculture
Organization of the
United Nations

AGROECOLOGY IN EUROPE AND CENTRAL ASIA: AN OVERVIEW



AGROECOLOGY IN EUROPE AND CENTRAL ASIA: AN OVERVIEW

Required citation:

FAO. 2020. *Agroecology in Europe and Central Asia - An overview*. Budapest. <https://doi.org/10.4060/ca8299en>

The designations employed and the presentation of material in this information product do not imply the expression of any opinion whatsoever on the part of the Food and Agriculture Organization of the United Nations (FAO) concerning the legal or development status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. The mention of specific companies or products of manufacturers, whether or not these have been patented, does not imply that these have been endorsed or recommended by FAO in preference to others of a similar nature that are not mentioned.

The views expressed in this information product are those of the author(s) and do not necessarily reflect the views or policies of FAO.

ISBN 978-92-5-132318-2

© FAO, 2020



Some rights reserved. This work is made available under the Creative Commons Attribution-NonCommercial-ShareAlike 3.0 IGO licence (CC BY-NC-SA 3.0 IGO; <https://creativecommons.org/licenses/by-nc-sa/3.0/igo/legalcode>).

Under the terms of this licence, this work may be copied, redistributed and adapted for non-commercial purposes, provided that the work is appropriately cited. In any use of this work, there should be no suggestion that FAO endorses any specific organization, products or services. The use of the FAO logo is not permitted. If the work is adapted, then it must be licensed under the same or equivalent Creative Commons licence. If a translation of this work is created, it must include the following disclaimer along with the required citation: "This translation was not created by the Food and Agriculture Organization of the United Nations (FAO). FAO is not responsible for the content or accuracy of this translation. The original [Language] edition shall be the authoritative edition."

Disputes arising under the licence that cannot be settled amicably will be resolved by mediation and arbitration as described in Article 8 of the licence except as otherwise provided herein. The applicable mediation rules will be the mediation rules of the World Intellectual Property Organization <http://www.wipo.int/amc/en/mediation/rules> and any arbitration will be conducted in accordance with the Arbitration Rules of the United Nations Commission on International Trade Law (UNCITRAL).

Third-party materials. Users wishing to reuse material from this work that is attributed to a third party, such as tables, figures or images, are responsible for determining whether permission is needed for that reuse and for obtaining permission from the copyright holder. The risk of claims resulting from infringement of any third-party-owned component in the work rests solely with the user.

Sales, rights and licensing. FAO information products are available on the FAO website (www.fao.org/publications) and can be purchased through publications-sales@fao.org. Requests for commercial use should be submitted via: www.fao.org/contact-us/licence-request. Queries regarding rights and licensing should be submitted to: copyright@fao.org.

Cover photos: © Berin Erturk, © Mukhabbat Mamadalieva, © Dr Sergeij Ivanov

Back cover: © Berin Erturk

CONTENTS

Tables and figures	iv
Abbreviations and acronyms	v
Chapter 1. Agroecology	1
1.1 Agroecological transition	2
1.2 Agroecology in the Food and Agriculture Organization of the United Nations	3
1.3 FAO work on Agroecology in Europe and Central Asia	6
Chapter 2. Agroecology in the region	11
2.1 Albania	12
2.2 Armenia	13
2.3 Azerbaijan	15
2.4 Belarus	17
2.5 Bosnia and Herzegovina	17
2.6 Georgia	18
2.7 Kazakhstan	20
2.8 Kyrgyzstan	21
2.9 North Macedonia	24
2.10 Moldova	24
2.11 Montenegro	27
2.12 Serbia	37
2.13 Tajikistan	31
2.14 Turkey	33
2.15 Ukraine	36
2.16 Uzbekistan	37
Chapter 3. Agroecology and other subjects – synergies and interactions	39
3.1 Agroecology and climate change	39
3.2 Agroecology and biodiversity	40
3.3 Agroecology and gender	40
3.4 Agroecology and organic agriculture	41
3.5 Agroecology for Zero Hunger and the SDGs	42
Chapter 4. Conclusions and final recommendations	43
References	45

TABLES AND FIGURES

Table 1 - Regional FAO multistakeholder seminars on Agroecology	3
Figure 1 - The 10 Elements of Agroecology	5
Figure 2 - Logos for the different types of Tushetian Guda PAO made from sheep's milk, cow's milk and mixed milks defined by the PAO Tushetian Guda producer organization	20
Figure 3 - The Garden of Moldova's 2017 Festival of Biodiversity (Garden of Moldova)	25
Figure 4 - Isolating plants for seed production	26
Figure 5 - Balkan donkeys in a pasture at the Rare Breeds arm	29
Figure 6 - Pasture on the Petrov Biodynamic Farm	29
Figure 7 - Petrov Biodynamic Farm's dairy products	30
Figure 8 - Mangulica pigs, an autochthonous breed of Serbia	30

ABBREVIATIONS AND ACRONYMS

- ADI – Agency of Development Initiatives**
- AFNs – Alternative Food Networks**
- BiH – Bosnia and Herzegovina**
- CSA – Community Supported Agriculture**
- CSOs – Civil Society Organizations**
- EU – European Union**
- FAO – Food and Agriculture organization**
- FFS – Farmer Field School**
- GEF – Global Environment Facility**
- GI – Geographical Indication**
- GMO – Genetically Modified Organisms**
- IFOAM – International Federation of Organic Agriculture Movements**
- IPM – integrated pest management**
- LAG – Local Action Group**
- LSPAs – Local and Solidarity-Based Partnerships for Agroecology**
- MoU – Memorandum of Understanding**
- NGOs – Non-Governmental Organizations**
- PAO – Protected Appellation of Origin**
- PGSs – Participatory Guarantee Systems**
- SDGs – Sustainable Development Goals**
- TAIEX – Technical Assistance and Information Exchange**
- UN – United Nations**
- UNDP – United Nations Development Programme**
- USSR – Union of Soviet Socialist Republics**



© Mukhabbat Mamadaliyeva

CHAPTER 1

AGROECOLOGY

Agroecology offers a unique approach to meeting the needs of future generations while ensuring no one is left behind. With family farmers, including smallholder farmers, indigenous peoples, fisherfolk, mountain farmers and pastoralists at its heart, agroecology seeks to transform food and agriculture systems. By addressing the root causes of problems, agroecology provides holistic and long-term solutions based on co-creation of knowledge, sharing and innovation, including the combination of local, traditional, indigenous and practical knowledge with multi-disciplinary hard and soft sciences.

Agroecology aims to create diversified agroecosystems, mimicking natural systems as closely as possible to enhance sustainable production and self-reliance. Furthermore, it aims to address the problems of unequal access to natural resources and knowledge as among the root causes of poverty – in addition to marginalization and insecurity – and to re-territorialize food systems for a healthy and diversified diet. The full range of benefits is visible in the long term and with sufficient support, particularly from public policies.

Agroecology goes beyond technical solutions and innovations based on incremental changes and can drive genuine transformative change in food and agricultural systems by moving towards socio-ecological systems that place people (farmers and consumers) at the centre of food systems. It takes a systems approach to agriculture to tackle the root causes of unsustainable practices in food production, which often lie outside farms – for instance in market regulations that favour long value chains for commodity crops, in policies that do not support diversification, and in innovation systems that are not adapted to agroecology and create structural barriers to alternatives to intensive systems.

It is important to highlight that there are several ways of understanding agroecology that often differ according to stakeholder group, reflecting diverging visions, objectives and strategies. There are also variations between and within regions due to differing histories and trajectories. This diversity in the way agroecology is understood is at the heart of the debate. While there is consensus around the ecological principles that underpin agroecology, there are multiple views on what sustainability entails in the broadest sense and how to achieve it, pointing to the need for continued evidence building and dialogue. Civil society actors in particular have warned against the risk of agroecology being reduced to a set of farming practices without addressing wider systemic issues, such as governance of food systems.

1.1 AGROECOLOGICAL TRANSITION

The agroecological transition is the gradual change that farmers implement to adapt and move from conventional systems towards an agroecological system. This transition needs to include different levels, such as social, environmental and economic changes. Innovation and new approaches need to be blended with traditional knowledge and ways of farming allowing the farmers to adjust and adapt to a new system while respecting their own process and the limits of nature. To unlock the potential of agroecological transition, changes in all food system chains need to be implemented, from production to consumption, including institutions and policies.

The transition process is a key concept for understanding agroecology. For many farmers a rapid shift to sustainable agroecosystem design and practices is not easy. Moving to a complex and integrated system requires time, knowledge, strong commitment and specific policy support. Framing agroecology as a transition process also engages in dialogue actors who, as already shown, may have different approaches to agroecology. While the importance of sustainable agricultural practices is recognized and well documented, ensuring the progressive transition towards increasingly more integrated production systems, within the broader context of sustainable food systems, is a significant challenge.

One possible way of conceptualizing agroecological transitions is using the five levels of transition proposed by Gliessman (2015). As a result, many transition efforts proceed in small steps towards the ultimate goal of sustainability or are simply focused on developing food production systems that are somewhat more environmentally sound. The levels do not necessarily take place sequentially but do shed some light on the various processes that take place in agroecological transitions. The five levels of transition are socially driven; the need for change has to be bottom up and has to allow social organization to be an active player in the transition process.

- » Level 1: Increase the efficiency of industrial/conventional practices in order to reduce the use and consumption of costly, scarce, or environmentally damaging inputs.
- » Level 2: Substitute industrial/conventional inputs and practices, replacing them with alternative practices.
- » Level 3: Redesign the agroecosystem so that it functions on the basis of a new set of ecological processes.
- » Level 4: Re-establish a more direct connection between those who grow the food and those who consume it.
- » Level 5: On the foundation created by the sustainable farm-scale agroecosystems of Level 3 and the sustainable food relationships of Level 4, build a new global food system, based on equity, participation and justice, that is not only sustainable but also helps restore and protect Earth's life-support systems.

Additionally, agroecology requires context-specific practices and policies that require time to achieve their full potential, bringing to the fore the need to plan transition processes. Agroecological transition involves a diversity of pathways that must be built with stakeholders with due consideration to local contexts. It must be implemented at different paces but with commitment from all levels, farmers, consumers, agencies and policymakers. Isolated initiatives by farmers cannot be effective in achieving the transition and therefore effective change should be sought at a territorial level. The bottom-up work of social organizations often plays an important part in territorial approaches. Also, the transition process calls for profound changes in the organization and governance of food systems, which requires a robust commitment from all actors and can sometimes upset the established order or specific interests for a period of time.

Social mobilization is a key factor in facilitating the transformative potential of agroecology, since it is the sum of local transformations and innovations that will lead to a global transformation. Researchers have always played an important role in the development of agroecology with a growing number of scientists of various disciplines committed to supporting the transition to agroecology. Engaging all actors, especially economic actors, is also essential to complete the transition.

The role of governments is fundamental to creating an enabling environment for agroecology, and the need for reviewing institutional policy, legal and financial frameworks to promote agroecological transition. To allow agroecology to happen and to unlock its potential, a comprehensive approach including multiple issues and sectors needs to be put in place, considering economic, social and environmental levels. The main features of public policies on agroecology are their comprehensive nature, participatory and context-specific approaches, and interdisciplinary and transformative intent. They should have a basis in systems thinking where the consequences of policies have been fully explored to eliminate detrimental outcomes for especially vulnerable farmers and the environment.

1.2 AGROECOLOGY IN THE FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

Because of its potential to transform the food system, agroecology has been attracting interest in recent years from government, research and civil society organizations (CSOs) worldwide. Many actors present it as a strategic pathway to transition to sustainable food and agriculture systems for achieving food and nutrition security. Responding to the growing interest in agroecology, the Food and Agricultural Organization of the United Nations (FAO) organized an International Symposium on Agroecology for Food Security and Nutrition in Rome in September 2014 as part of the activities of the International Year of Family Farming. The objective was to assess the extent and impact of agroecological practices, identify constraints and develop common priorities going forward to support the further implementation and scaling up of agroecology. The need to understand the specific local requirements and realities of agroecology led to a series of regional multistakeholder seminars co-organized by FAO in Latin America and the Caribbean, sub-Saharan Africa, Asia and the Pacific, China, Europe and Central Asia, and the Near East and North Africa from 2015 to 2017 (Table 1).

Table 1 Regional FAO multistakeholder seminars on Agroecology

LATIN AMERICA AND THE CARIBBEAN	SUB-SAHARAN AFRICA	ASIA AND THE PACIFIC	EUROPE AND CENTRAL ASIA	NEAR EAST AND NORTH AFRICA
Brasilia Brazil June 2015	Dakar Senegal October 2015	Bangkok Thailand November 2015	Budapest Hungary November 2016	Tunis Tunisia November 2017
La Paz Bolivia (Plurinational State of) September 2016		Kunming China August 2016		

Source: FAO (2019)

The seminars brought together more than 1 400 participants from 170 members in 5 regions (sub-Saharan Africa, Latin America and the Caribbean, Asia and the Pacific, Europe and Central Asia, and the Near East and North Africa). The meetings were organized with the support of external advisory panels, composed of researchers, representatives of farmers' organizations and civil society, governments and FAO regional and national offices.

Participants from all stakeholder groups – farmers, fisherfolk, representatives of indigenous peoples, consumers, scientists, representatives of NGOs, representatives of the private sector and governments – set out the challenges they face, presented the scope of solutions and agroecological innovations, and debated the obstacles and levers to developing these systems. They made recommendations directed at all stakeholders, which were adopted by consensus at the end of the seminars. Echoing the call for transformation of the 2030 Agenda, it was made clear during the seminars that merely adjusting current unsustainable food systems will not lead to the changes required to tackle the climate, environmental and social emergencies the world is now facing.

These seminars provided many opportunities for exchange and debate and revealed that while the scientific framework for agroecology dates back to the last century, it is a living concept and can be interpreted differently by different actors. The seminars gave rise to significant debates on the future of agriculture and the role of agroecology in food and nutrition security and provided the opportunity for regional actors to work together. The participants' testimonies showed not only the wealth of existing initiatives but also their high expectations about supporting an agroecological transition on a larger scale.

Based on the success of the regional seminars in 2018, FAO organized the 2nd International Symposium on Agroecology: Scaling up Agroecology to achieve the SDGs to move from dialogue to action (FAO, 2019a). The Symposium brought together more than 760 participants and catalysed inter-disciplinary dialogue and collaboration from a wide variety of actors. It enabled and consolidated fundamental agreements and commitments needed to scale up and scale out agroecology at all levels in order to achieve the Sustainable Development Goals (SDGs). Representatives from 72 governments discussed how public policies for agroecology could enable progressive transitions to sustainable agriculture and food systems in the framework of the 2030 Agenda for Sustainable Development (2030 Agenda). Representatives from 350 non-state actors (including CSOs, academia and research organizations, cooperatives, producer organizations and the private sector) discussed the main benefits that agroecology provides on the ground, in terms of local innovations, practices, techniques and integrated approaches that respond to different challenges, built through dynamic interactions among farmers, scientists, researchers, consumers and practitioners.

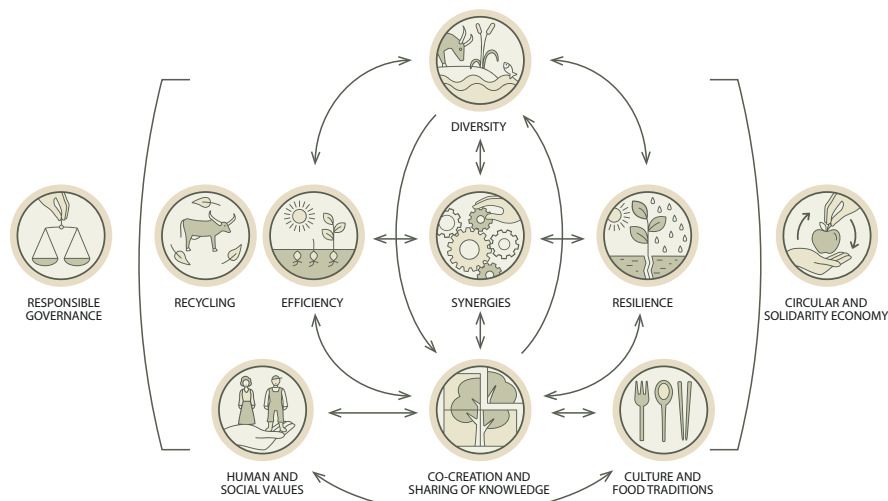
Representatives from six United Nations (UN) organizations identified opportunities to promote agroecology at a global level as well as concrete pathways to bring agroecology into their global programmes of work as a way to support countries in the transition towards sustainable food and agriculture. Some of the Symposium outcomes include the following:

- » The launch of the Scaling up Agroecology Initiative, in collaboration with UN partners.
- » The agreement to include the key outcomes of the Symposium in a discussion paper to be submitted to FAO governing bodies.
- » The validation of a set of 10 Elements of Agroecology, circumscribing the salient features of agroecology.
- » A Chair's Summary outlining the main conclusions and agreements reached during the Symposium discussions.

The 10 Elements of Agroecology

The 10 Elements of Agroecology (FAO, 2018c) provide guidance to achieve the transformation, as appropriate, towards environmentally, socially and economically sustainable agriculture and food systems to achieve Zero Hunger and multiple other SDGs. As an analytical tool, the 10 Elements can help countries to operationalize agroecology. By identifying important properties of agroecological systems and approaches, as well as key considerations in developing an enabling environment for agroecology, the 10 Elements are a guide for policymakers, practitioners and stakeholders in planning, managing and evaluating agroecological transitions. The 10 Elements of Agroecology are interlinked and interdependent. The Ten Elements were approved by the FAO Council in December 2019 (FAO, 2018).

Figure 1 The 10 Elements of Agroecology



Source: FAO (2019)

Diversity - Highly diverse, agroecological production systems such as agroforestry, silvo-pastoral systems, crop-livestock-aquaculture integration, and polycultures contribute to a range of production, socio-economic, nutrition and environmental benefits.

Co-creation and sharing of knowledge - Agroecology depends on context-specific knowledge. Knowledge plays a central role in the process of developing and implementing agroecological innovations to address challenges across food systems. Through the co-creation process, agroecology blends the traditional, indigenous, practical and local knowledge of producers with global scientific knowledge.

Synergies - Agroecological systems selectively combine the diverse components of farms and agricultural landscapes to build and enhance synergies

Efficiency - Increased resource-use efficiency is an emergent property of agroecological systems. By optimizing the use of natural resources such as soil, air, solar energy and water, agroecology uses fewer external resources, reducing costs and negative environmental impacts.

Recycling - By imitating natural ecosystems, agroecological practices support biological processes that drive the recycling of nutrients, biomass and water within production systems.

Resilience - Enhancing ecological and socio-economic resilience, agroecological systems have a greater capacity to recover from disasters such as drought, floods or hurricanes, and to resist pest and disease attack. Through diversification, producers reduce their vulnerability if a single crop or commodity fails. Reducing dependence on external inputs increases producers' autonomy and reduces their vulnerability to economic risk.

Human and social values - Agroecology places a strong emphasis on human and social values, such as dignity, equity, inclusion and justice, all contributing to sustainable livelihoods. It puts the aspirations and needs of those who produce, distribute and consume food at the heart of food systems. Agroecology seeks to address inequalities by creating opportunities for women and youth.

Culture and food traditions - By supporting healthy, diversified and culturally appropriate diets, agroecology values local food heritage and culture, contributing to food security and nutrition while maintaining the health of ecosystems

Responsible governance - Transparent, accountable and inclusive governance mechanisms at different scales are necessary to create an enabling environment that supports producers to transform their systems. Equitable access to land and natural resources is not only key to social justice, but also essential to providing incentives for long-term investments in sustainability.

Circular and solidarity economy - Agroecology seeks to reconnect producers and consumers through a circular and solidarity economy that prioritizes local markets and supports territorial development. Innovative markets that support agroecological production help respond to a growing demand from consumers for healthier diets.

1.3 FAO WORK ON AGROECOLOGY IN EUROPE AND CENTRAL ASIA

FAO organized a regional Symposium on Agroecology for Europe and Central Asia held in Budapest from 23 to 25 November 2016. This was the first regional activity organized by FAO on agroecology. Over 180 participants from 41 countries in the region attended the symposium and developed a set of 37 recommendations to develop agroecology for sustainable food and agricultural systems in Europe and Central Asia was developed.

The meeting was organized around five topics:

» Agroecological concepts, systems and practices

During the Symposium, agroecology was presented as an inclusive approach that has the potential to include all food producers in their progress towards a more sustainable farming system. At the heart of agroecology is the idea that agroecosystems should mimic biodiversity levels and the functioning of natural ecosystems. Such agricultural mimicry, similar to the natural models, can be productive and pest resistant, conserve nutrients and be resilient to climate change. This should be an answer to several problems food production faces now. Increasing land degradation, loss of valuable agrobiodiversity and pollinators, and climate variability were highlighted as significant threats to achieving food and nutrition security. The practices that are conducive to the diversification of systems were considered to be the most strategic as they aim to reduce external inputs and enhance ecosystem services, such as nutrient cycling, biological nitrogen-fixing, natural regulation of pests, pollination, soil conservation, biodiversity conservation, carbon sequestration, water filtration and purification. Linking the animal sector with crop production was presented as crucial to an integrated and holistic approach.

» Research, innovation, knowledge sharing and agroecological movements

Learning, education and knowledge sharing are central processes that can support the expansion of the practical and political aspects of agroecology and empower food producers. In agroecology, there is a shift from the classical transfer of technology models of research and development to a decentralized, horizontal, bottom-up and participatory processes of knowledge creation, tailored to the unique circumstances found in rural, urban and peri-urban contexts. The private sector can play its role in fostering innovation and contributing to agroecological innovation, too. Links between agroecology and high- and low-technological advances are necessary and concerns about the possible contradictions that may appear between technology and farmers' autonomy are an important aspect of agroecology. It is important to ensure that innovations and the outcomes of research remain in the public and collective realm.

» Agroecology and natural resources in a changing climate: water, land, biodiversity and territories

The effect of climate change in Europe and Central Asia remains a primary issue. The region is suffering from water scarcity, salinity and extreme weather events. Agroecology is a possible solution, as it has the potential to adapt agroecosystems to climate change, as well as mitigate its effects. The ecological strategy of agroecological systems comprises the replacement of fossil fuels by ecosystem services underpinned by biodiversity. Inputs requiring large amounts of fossil fuels for their production, such as inorganic nitrogen fertilizers, pesticides, and imported animal feed, are replaced. This is achieved by investing in biodiversity at all levels from soil to landscape and involving people collaboratively. The system relies on local resources and is intensive in its observations, thinking and knowledge. Highlighting the sociocultural aspects of farming systems led to the discussion of the environmental and social impacts of investments

related to indigenous people and their right to land. The importance of the dynamic management of agricultural biodiversity (called *in situ* and *on-farm*), which has been developed throughout the world to renew agricultural biodiversity, was accentuated. In this respect, food producers are insisting on their right to have access to seeds and to exchange them and for peasants to widely develop breeding programmes to ensure food security.

» Agroecology and sustainable food systems

Over 80 percent of the food in the world is sold through local, peasant, regional and informal markets, demonstrating that it is not possible to rely on global markets alone to feed the world. Landscapes with small and medium-sized farms have demonstrated they are better able to support local economies and farmer's well-being as compared to landscapes where there are larger export-oriented enterprises. It was considered that agroecology could potentially ensure access to a diverse and nutritious diet for people at all income levels. Growing evidence suggests that agroecology, by implying diversified farming systems, facilitates the diversification of diets for producers, households and consumers through the increased consumption of a range of important nutritional elements that are often missing in diets based only on staple cereal crops. Public procurement was seen as one of the most significant opportunities among actions governments may take to encourage the adoption of agroecology. It was considered important that governments reinvest in agriculture, through public procurement programmes for agroecological producers, by adapting procurement protocols to the local realities of agroecological production. Further, governments have an important role to play in the development of innovative market models and have a key role in building local economies and markets, as they govern food chains. Also mentioned was support to innovations with, for instance, the creation of food councils at the local, regional and national level and the need for subsidies to establish local markets.

» Public policies to develop agroecology and promote transition

The challenge is to address the lock-ins of the transition towards agroecology, the importance of having a universal framework, such as the SDGs, where Goal 2 (Zero Hunger) is connected to achieving all other goals. Zero Hunger is considered the strongest leverage in dealing with, among others, health, education, climate, water, biodiversity, inequity, gender equality, decent work, sustainable communities, and life on land and below water. Data show how diversified agroecological systems can compete with the productivity of conventional systems, and how they increase biodiversity and the resilience of the production system. It is also necessary to conduct data analyses on the externalities of the current food production system to reverse the dependency on subsidies that support conventional farming, despite the high cost to society. In this respect, farm performance parameters and measures of success should go beyond the common micro-economic parameters. Performance assessments need to be designed and tested that are participatory, reflexive, integrative and systems-based, taking multi-perspectives.

Consequently, during the Thirty-first Regional Conference, countries requested FAO to support a food systems approach in rural and urban policies and planning (FAO, 2018a, 2018b). They asked that it incorporate agroecological approaches and diversification into regional work and bolster its work on agroecology in the context of the United Nations Decade of Family Farming (2019–2028) and the Scaling up Agroecology Initiative. Supportive policies and incentives for the development of alternative markets for agroecological products will be needed, and public procurement should be used to create and support markets for these products.

In this context, FAO in Europe and Central Asia has decided to:

- » Support and promote research and data collection on agroecology at the national level.
- » Provide policy support and guidance, by request, to develop and implement agroecology plans and policies.
- » Implement national projects, on request.
- » Implement the Scaling up Agroecology Initiative in European and Central Asian countries.
- » Contribute to the implementation of the United Nations Decade of Family Farming (2019–2028).
- » Keep a close relationship with CSOs and producer organizations.
- » Enhance dialogue with all relevant stakeholders.

In 2019, FAO organized two sub-regional meetings, one for the Western Balkans and Caucasus and a second one for the Central Asia and adjacent countries. The main objective of both workshops was the same: share information and practices on challenges and opportunities on Agroecology in the subregions. The expected outputs were as follows:

- » Awareness raised on the multiples benefits agroecology can provide to sustainable agriculture and achieving the SDGs.
- » Knowledge and practices on agroecology among the stakeholders shared.
- » Priority actions/activities for agroecology in the targeted counties and territory jointly defined.

a. First Dialogue for in Western Balkans and Caucasus, 3–4 April 2019, Tirana

The first Dialogue on Agroecology for Western Balkans and Caucasus took place on 3 and 4 April in Tirana, Albania, and was attended by 31 participants from government, academia, civil society and farmer's organizations, who came from Georgia, Armenia, North Macedonia, Montenegro, Serbia, Albania, Bosnia and Herzegovina, Moldova, and Kosovo. For two days, they shared information and practices on agroecology in the regional context, and shared challenges and opportunities to develop agroecology whether in the region or at national level. Awareness was raised and priority actions were defined. The participants agreed that agroecology is an important agenda for the region and can play a role in integrating policies for sustainable agriculture while addressing social and economic issues. It has the potential to be strengthened and promoted in all countries and territories. Participants also discussed the lack of understating of the word agroecology in most of the countries. Continuing to raise awareness is crucial as well as promoting knowledge sharing and knowledge exchange within the region.

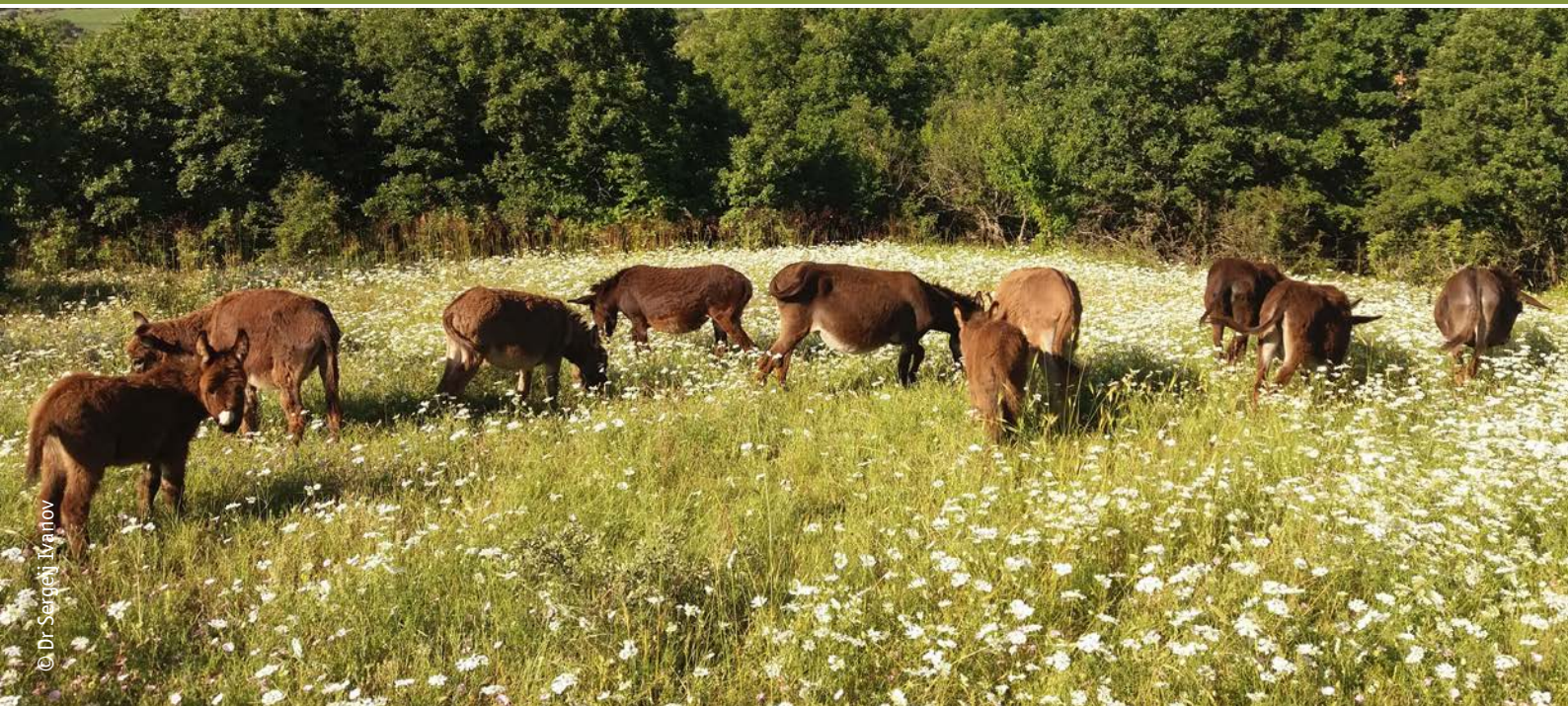
b. Dialogue on Agroecology in Central Asia Countries, 28–29 August 2019, Bishkek

Twenty-five participants from civil society, farmers' organizations and governments from Azerbaijan, Belarus, Kazakhstan, Kyrgyzstan, Tajikistan, Turkey, Ukraine, and Uzbekistan attended the two-day meeting in Bishkek. During the meeting the principles of agroecology were discussed, as well as the countries' priorities. The participants perceived agroecology as an important agenda, one that can play a role in integrating policies for sustainable agriculture while addressing social and economic issues. It has the potential to be strengthened and promoted in all countries. Main activities that could be carried at the regional level were identified during the meeting as follows:

- » Develop curricula for Farmer Field School (FFS) and rural advisory agencies. All countries expressed the need to have special content developed for training and to strengthen capacity on agroecology.

- » Develop curricula for universities. All countries requested support to develop specific curricula on agroecology for universities. This activity can be coordinated at the regional level.
- » Translate material into the local language. There is limited content on agroecology available in Russian and national languages in the region. Translating specific material for all sectors could support the process of raising awareness in the region.
- » Create an enabling environment for policies. All countries considered some changes necessary at the policy level to allow agroecology to flourish at the national level.

Participants also agreed that continuing to raise awareness is crucial as well as promoting knowledge sharing and knowledge exchange within the region. As agroecology can play an important role in the implementation of the Decade of Family Farming, possible synergies should be explored.



CHAPTER 2

AGROECOLOGY IN THE REGION

While there are various critically important examples, good cases, and much potential in these regions, mainstreaming agroecology faces many challenges in Europe and Central Asia. Some rural communities, urban food growers and many consumers are initiating transformative changes to their food systems that are necessary for the survival and resilience of their communities' economies and their regions' environmental integrity through agroecological science, practices and social movements. They are looking to policy and legislative commitments to complement this. There is, however, not enough agroecology-in-action to create and maintain a groundswell movement across all of Europe and Central Asia yet, and little in terms of ongoing commitments from government ministries.

Agroecology currently is not integrated into most of the European or Central Asian countries' way of practising and promoting agriculture and the communities that rely on it. Across most of these countries, agricultural production and environmental protection are seen as separate domains. Even the word agroecology is reported among CSOs, non-governmental organizations (NGOs), private individual stakeholders and governments surveyed here¹ as underused and poorly understood not only by the majority of farming communities but also by those in extension services and other relevant bodies within governments.

Challenges faced by small-scale family farmers appear across Europe and Central Asia to be both broadly similar in nature but also featuring unique local characteristics. Most are experiencing a changing or changed climate, environmental degradation, soil and water issues, declining pollinator populations, an exodus of youth from agriculture, and policies that do not work to sufficiently uphold traditional knowledge or bolster the sustainable livelihoods of small-scale farmers. Issues that directly challenge the uptake of agroecology are the small-scale nature of and, in some cases, complete lack of social movements and official commitments to it. Other challenges mentioned by survey respondents for this report are financial

¹ Survey conducted by FAO in 2019 of selected CSO and government stakeholders working in agroecology in each country in this chapter.

and that knowledge and understanding of the importance of agroecology on all levels of these societies from farmers to lawmakers are still very low.

Agroecology entails a holistic approach that aims to reconcile agriculture and rural livelihoods with nature and natural processes for the benefit of both spheres. It also seeks social and political change. With many dedicated stakeholders across this region presenting a committed front to unsustainable and damaging agricultural practices, agroecology's holistic approach to strengthening the food systems is proving its worth in small pockets. What follows is a country-by-country description of policies and political environments in relation to agroecology, including several case studies. Agroecology aims to bring people and nature along creating a network of resilient communities and food systems. We outline some of the tertiary courses, programmes and subjects in the field of agroecology available in Europe and Central Asia, as well as highlight some of the current research occurring in the field.

2.1 ALBANIA

Policy mapping

Albania, like all other countries in the region, has no direct explicit political support for agroecology. Agriculture is placed within the Ministry of Agriculture, Food and Consumer Protection and there is concern over the aggressive ongoing expansion of industrial agriculture. Through moves that were made by the government in 2018, producers of traditional products, and farmers and consumers of community-supported agriculture (CSA) initiatives have some measure of official support there. Agritourism is also supported and allows farmers to access government subsidies and grants. National extension services, however, are not actively promoting agroecology or perceived to be sufficiently discussing ecosystem services and sustainable, agroecological agricultural practices with Albanian farmers. Furthermore, there is also little to no support for agroecology from universities and NGOs.

Endogenous, mixed systems of small-scale farmers continue to exist in Albania: vegetables, sheep and goats dominate, farmers continue to save and exchange seeds, and they utilize crop rotation and grow green manure when an area is not in use. Farmers themselves emphasize free-range as contributing to the quality and taste of meat. Good quality food can fetch high prices, support sustainable livelihoods and even feed into agritourism. Farmers do this with little to no institutional help and instead communicate techniques and share tools amongst themselves. Due in part to the lack of access to and the inability to afford artificial chemical inputs and hybrid seeds, some of the 360 000 small farms there continue to farm more or less organically. Traditionally, mixed farming systems dominate these numerous small farms, thus fertilizer inputs often come from farm animals. There is no system to support and strengthen this traditionally agroecology-like farming and farmer knowledge exchanges. No formal policies exist and no knowledge sharing arrangements support it.

Smallholder farmers have difficulty accessing markets. Sanitary certifications for their products are often difficult to obtain making legal access to markets impossible for those without them. Food producer CSOs and farmers' associations are included in public discussions during the preparatory work of related legislation. With regard to water, this natural resource is shared based on systems of traditional ownership that are being disrupted by hydropower set-ups providing households with electricity. This is causing conflict amongst those who need the water.

Albania is implementing both the Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries, and Forests in the Context of National Food Security, and the FAO Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries.

Albania's Organic Agriculture Association (OAA), established in 1997, has made relatively significant contributions to agroecology in the country. For seven years, the OAA has published the magazine *Agriculture and Ecology* and successfully led the movement against genetically modified organisms (GMOs) in the country, resulting in Albania's ongoing GMO-free status.

Information about academia and research

The Agricultural University of Tirana's Faculty of Agriculture and Environment (*Fakulteti i Bujqësisë dhe Mjedisit*) offers some subjects relating to agroecology covering some aspects of the field but does not offer specific agroecology programmes.

2.2 ARMENIA

Policy mapping

While Armenia has no strong agroecology movement, much of the country's widespread informal agricultural production aligns with agroecological practices. Organics have been legislated for since 2009, and the development of organic agriculture is a priority defined in the Sustainable Agriculture Development Strategy of the Ministry of Agriculture of Armenia. This strategy could include agroecology but at this stage does not. To promote the improvement of intersectoral relations in the field of biodiversity conservation and use, the Inter-ministerial Coordination Council on Fulfilment of Obligations under the Convention on Biological Diversity was created by the Prime Minister in 2016. It is believed that this push, alongside that of the food producer organizations and other relevant CSO actors, will contribute significantly to the future sustainable improvement of rural livelihoods. The participants during the workshop recognize their role and invites the public to comment. Draft legal acts are placed on relevant websites for public comment, allowing local communities to participate in governmental decision-making processes on matters concerning the local or national environment in line with the principles of the Aarhus Convention².

In Armenia, the national extension service does not explicitly promote agroecology, but sustainable agriculture approaches and the integration of ecosystem services into the agriculture systems of the country are part of the approach to supporting farmers. Thus, a foundation is being laid for agroecology to emerge in the future. In the meantime, there are no specific credit lines for agroecology or for family or smallholder farmers. There is no official system to protect and promote their traditional agricultural knowledge; however, many projects implemented in the country targeting conservation of biodiversity have a component on promoting traditional knowledge to preserve landraces as an essential component of national genetic resources.

The country is implementing the Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries, and Forests in the Context of National Food Security, and the FAO Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries. There is not yet any public procurement programmes for school feeding programmes that are linked to agroecological production, local production or smallholders' and farmers' production.

The number of women engaged in informal employment in agriculture is much higher than that of men; however, women experience entrenched, socially acceptable gender discrimination especially in rural areas

² The United Nations Economic Commission for Europe (UNECE) Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters (pdf ~50K) was adopted on 25 June 1998 in the Danish city of Aarhus (Århus) at the Fourth Ministerial Conference as part of the "Environment for Europe" process. It entered into force on 30 October 2001. The Aarhus Convention establishes a number of rights of the public (individuals and their associations) with regard to the environment. The Parties to the Convention are required to make the necessary provisions so that public authorities (at national, regional or local level) will contribute to these rights to become effective.

(FAO, 2017a). FAO reported in 2017 that increased, concrete links between the country's Gender Action Plan and the Action Plans and Policies on agriculture and rural development exist (FAO, 2017a). There are various examples of NGOs, such as Green Lane, Armenian Young Women's Association and Armenian Women for Health and Healthy Environment, implementing programmes directly with farmers, female farmers in particular, advocating for agroecological principles and contributing to building social movements and women's equality from the grassroots. There is a chair of agroecology at the Armenian National Agrarian University. Finally, there is also space in the private sector being carved out by entrepreneurs.

Practices, a case study

Protecting Wild Berry Populations and Local Traditions

Women in Armenia to this day harvest wild berries for food they make for their households and to generate some income, but some of these species are threatened due to this foraging pressure. A project in Armenia funded by the United Nations Development Programme (UNDP) aimed at preserving threatened species of wild berries and introducing sustainable practices for harvesting plants in the wild, entitled the Berd Berry Project, was established in Berd region in Tavush Marz province. A key component of the project is to improve the women's knowledge of biodiversity conservation as well as sustainable agriculture. This agroecological approach involved researchers identifying four threatened species of concern: bog bilberry (*Vaccinium uliginosum* L.), two types of hawthorn (*Crataegus microphylla* K.Koch and *Tournefortii* Griseb), and barberry (*Berberis vulgaris* L.). Selected, engaged farmers were trained in biodiversity conservation methods in general as well as the cultivation methods for the four threatened species in particular.

The wild berry plants that sparsely populate local forests are now cultivated by these farmer-foragers in their own gardens to reduce pressure on the plants in the wild and still maintain local food traditions. This application of on-farm methods of plant biodiversity conservation has created additional incomes for smallholder farmers and made their farms and livelihoods more agroecological by increasing on-farm biodiversity, safe-keeping important plant genetic material, using organic methods to cultivate, and by working to uphold local biodiversity through maintaining threatened endemic wild plant populations.

Information about academia and research

Agroecology is part of the university curriculum in Armenia. The chair of forestry and agroecology, which sits at the Armenian National Agrarian University, was originally formed in 1999 it solely focused on agroecology and only later merged to include forestry. Since 1999, the Agroecology Department has been functioning at the Armenian National Agrarian University preparing agroecologists with higher education, the majority of whom find professional work within the fields of environmental protection from the impact rural development and implementation of programmes aimed at the ecology of agriculture. (Armenian National Agrarian University, 2018).

In 2005, the Problem Laboratory of Ecology and Organic Agriculture was founded. Here, scientific researchers work on the preservation and effective use of land resources from different regions of Armenia and the problems of obtaining ecologically safe food from polluted areas. At this laboratory the university reports that remediation technology has been developed that is said to enable ecologically safe crop production from industrially polluted areas (Galstyan *et al.* 2015).

Subjects offered:

Agroecology, Environmental Protection and Ecological Expertise, Monitoring of Environment Pollution, Agroecology and Environment Protection, Chemistry of Biosphere, Basics of Ecology, Ecological Security of Auto-transportation and Protection of Environment, Issues of Ecology, Modern Technologies of Agroecology, Environmental Biotechnology, Re-cultivation Technologies of Technical Origin Polluted Soil (Armenian National Agrarian University, 2018)

2.3 AZERBAIJAN

Policy mapping

Azerbaijan has increased its focus on rural development in recent years and has initiated some policies with organic agriculture in mind but not agroecology specifically. The country has some outstanding rural landscapes that combine traditional farming methods and products, agrobiodiversity, and unique agroecosystems. A strategic road map for the national economy was endorsed by the President of Azerbaijan in December 2016 and specifically includes the development of organic agriculture. While not specifically agroecology, this is important. In October 2019, the Azerbaijan State Agricultural University held a conference on the science and practice of the development of organic agriculture in Azerbaijan (Azerbaijan State Agricultural University, 2019). The aim of the conference was to discuss the problems arising from the aspect of the strategic road map which includes not only production and processing of agricultural products and evidence-based proposals for the development industry but also the assessment of its role in solving environmental and economic problems.

National agricultural extension services support some aspects of agroecology including an emphasis on soil fertility and ecosystem services. They also are said to cover some essential ecosystem services like clean water and soil health even though the Ministry of Ecology and Natural Resources is separate to the Ministry of Agriculture. Additionally, the Agriculture Science and Innovation Centre attached to the Ministry of Agriculture works directly with peasants on innovation in agriculture.

Soil conservation and organic, ecological agriculture programmes are provided to some smallholder farmers in the country through the Regional Centre for Ecological Clean Agriculture of the Azerbaijan National Academy of Sciences. One of the stated purposes of this centre is to expand the applications of effective nature conservation and innovative science-based technology for supply, processing and storage of organic production.

One barrier to agroecology may be the increased subsidies for synthetic fertilizers and fuel for farmers available since 2015, although lesser known professional organic fertilizers have also been subsidized. Subsidizing synthetic fertilizers increased their imports in comparison to the years prior to 2015. Smallholder farmers are said to have access to specific lines of credit to assist them in part to take advantage of such subsidies.

The pilot for ecological production of agricultural goods is a region-wide programme supported by the Centre for Ecological Clean Agriculture which advocates a return to traditional methods prior to the Soviet era. The Sheki-Zagatala region is on track to be declared an environmentally friendly production zone by 2025. Furthermore, there is also planned establishment and development of organic production systems and pilot farms in all regions of the country in the coming years. This is in part due to the recognition that this work needs to be accelerated. There is a stated lack of expertise in the area of agroecology as it pertains

to practices and a social movement, but there is clearly a push towards a national understanding of the science. Sheki-Zagatala's agriculture is slated to be declared fully sustainable by 2025. While it will need to be assessed then to see if this ticks all the boxes of being agroecological, it is just the first; more states will also have their agro-food systems overhauled in the coming years.

With regard to traditional knowledge, the Agrarian University and research institutes of the Academy of Sciences study and disseminate traditional technologies for growing local plant varieties. However, there are no Farmer Field Schools or farmer-to-farmer programming.

Some schools have meal programs which specifically source fresh local produce; however, there is no policy on this food being agroecologically produced as yet.

Azerbaijan implements the Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries, and Forests in the Context of National Food Security. It also implements the FAO Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries.

Information about academia and research

The Agrarian University and research institutes of the Academy of Sciences study and disseminate traditional technologies for growing of the local plant varieties. The problems of ecological and agrobiodiverse agriculture are beginning to be tackled by the research institutions of some universities.

The Regional Centre for Ecological Clean Agriculture and the Resource Centre of the Azerbaijan National Academy of Sciences have been conducting agroecological studies since 2016 in the Sheki-Zagatala region. The scientific activity of the Centre for Ecological Clean Agriculture is mainly devoted to the study of energy and soil conservation technologies under smallholder land ownership. It is also invested in expanding the application of effective natural conservation methods and innovative science-based technologies, training and management of personnel, studying and application of scientifically based production technologies, development and implementation of technologies and techniques for supply, processing, storage of environmentally friendly production, as well as scientific and practical support to manufacturers, implementation of relevant projects, awareness raising and information dissemination activities among all involved stakeholders.

An FAO project³ begun in 2017 works to support the Regional Centre for Ecological Clean Agriculture and the Resource Centre of the Azerbaijan National Academy of sciences: Development of organic agriculture and institutional capacity building in Azerbaijan.

The following scientific experiments are ongoing:

- » Predicting economic development objectives of environmentally friendly agriculture in the region.
- » Wheat and barley crop technology on minimum cultivation technology.
- » Strip and mixed sowing technology.
- » Application of phytosanitary bio-preparations for fighting against pests and diseases of agricultural plants.
- » Studies of the adaptive features of the selected varieties.

³ FAO project GCP/AZE/006/TUR: Development of organic agriculture and institutional capacity building in Azerbaijan

2.4 BELARUS

Policy mapping

Within Belarus, the main branches of agriculture are dairy animal husbandry and grain and vegetable production. There are national and legislative frameworks for organic production, but none specifically for agroecology. Large collectivized farms dominate Belarusian agriculture and there is relatively little small-scale family farming, although many rural peoples have small kitchen gardens. Many collective farms, acting as industrial agro-production businesses, continue to function according to the model established during the Soviet era. The average size of these collective farms is around 22 000 hectares. There is very little organic farming in Belarus and no specific agroecological projects known at the point of publication. There is at least one NGO in Belarus that is at least promoting agroecology: the Belarusian working group on organic agriculture (Agro-Eco-Culture, 2019). Their goal is to inform the Belarusian public about this alternative agriculture and organics, and to assist with its development in the country. Organic product legislation was passed in Belarus in late 2018 with the help of this and other NGOs in negotiating with and lobbying of the government (Khamutovskaya, 2019).

Information about academia and research

While the Baranovichi State University in the Brest region has no explicit agroecology courses or programmes, it does offer relevant subjects such as Agricultural Ecology, Environmental Protection, and Elements of Organic Farming. The Lyakhovichi State Agrarian College, part of the Baranovichi State University, researches ecological cultivation and has an educational farm, part of which is already certified organic while the whole farm is beginning to integrate other agroecological practices.

2.5 BOSNIA AND HERZEGOVINA

Policy mapping

Bosnia and Herzegovina's small-scale farmers use low chemical inputs, rely on animal manure as fertilizer and exchange local food products between families and other members of their communities. Integration of agroecology in the country is in its initial stages: there are some planned measures in the latest government strategy for rural development. The national extension service does not promote agroecology, but it does cover some integrated pest management (IPM) and organic approaches.

Despite this, BiH communities continue to maintain some cultural landscapes that combine traditional farming methods, high agrobiodiversity and unique agroecosystems. While it appears that there is fertile ground for agroecological farming practices and grass-roots movements in the country, there is no formal system to promote and protect this traditional and local knowledge. NGOs in this space are doing what they can. Part of their strategy is to advocate for agroecology and policy to promote local traditional knowledge for the state to consider. The country is making some efforts to protect the important intellectual resources of traditional local knowledge and practices. For now, this knowledge, as well as important genetic resources, is being kept alive by committed organic producers with minimal support, some of whom struggle to fulfil EU criteria for the ecological standards of their processes. More broadly, smallholder farmers are not recognized in national sanitary and phytosanitary measures; this has implications for their access to better markets and how they produce with regard to the environment.

There are several agricultural associations, agricultural cooperatives and food producer organization. While public hearings and submissions on relevant policy adoption and legislation exist, CSOs are still not always involved in the hearing process. There are currently no specific lines of credit for agroecology or for smallholder family farmers; however, some such measures are currently included in the new rural development strategy plan that has not yet been implemented. This may go some way to reverse the trend of young people leaving family agriculture. Currently subsidies only exist for cash crops and are based on prescribed yields, encouraging the use of chemical pesticides and herbicides to reach these goals.

Information about academia and research

The science and practice of agroecology is part of curriculum at the University of Banja Luka, which has an institute dedicated to the field, the Institute of Agroecology and Soil. Aside from soil, crops and other plants, and environmental considerations of agriculture, the institute also researches rehabilitating degraded and polluted land for agroecological agriculture. There is a new Master's degree at the University of Banja Luka in Conservation and Sustainable use of Genetic Resources, which fortifies the importance of maintaining indigenous breeds of domesticated livestock. The EU Horizon 2020 project entitled EcoStack works with this university (EcoStack, 2019). EcoStack aims to develop and support ecological, economically and socially sustainable crop production via stacking and protection of functional biodiversity.

2.6 GEORGIA

Policy mapping

In Georgia, a country with a rich and diverse agricultural sector and lively food culture, some agroecological practices based on traditional knowledge are used by small-scale or subsistence farmers. Few, however, knowingly use agroecological approaches or use this term. Georgia showcases various culturally important agroecosystems that combine traditional farming methods and high agrobiodiversity. Knowledge and husbandry of local varieties and breeds contribute significantly to the incomes of smallholder farmers and may be the only source of income for some. These traditional genetic resources are still very much valued. In general, in Georgian society, there is a growing interest in products from agroecological farms. A few young farming entrepreneurs explicitly and conscientiously take an agroecological approach to their farming techniques, make direct sales to consumers, incorporate agritourism activities into their enterprises and participate in different fairs to promote their practices and close relationship to the community.

There is concern over the lack of expertise in agroecology in Georgia, limited political support and little by way of educational material for farmers and communities. Farmer field schools are not in operation and there are no lines of credit for small-scale farmers. Registration and control of synthetic chemicals in the agriculture industry is limited and local farmers receive information mainly from input providers. There are no public procurement programmes and school feeding programmes linked to agroecological production or local production. Despite favourable natural resources in most parts of Georgia, the agricultural sector is operating far below its potential.

There is potential for agroecology to develop professionally in the agriculture sector in Georgia given that the government combines the Departments of Environmental Protection and Agriculture into one ministerial portfolio. This ministry is therefore the appropriate inter-sectoral site for holistic agroecological policy and legislation to emerge from. Within this ministry there is a system to promote and protect some traditional and local knowledge specifically for wines and a few other foods. Although such developments are at an initial stage in the country, there appears to be an interest from the Government of Georgia to

provide extension services on organic production, with the objective of increasing exports but also to be more balance with the environment and to safeguard soils. Efforts to reduce the impact of agriculture on the environment, especially in locations where climate change has already started to affect agriculture, are being initiated.

Georgia implements the Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries, and Forests in the Context of National Food but does not implement the FAO Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries.

There are some laws and regulations that would facilitate the expansion of agroecology if this were to occur. One example is the National Biodiversity Strategy and Action Plan which includes conservation of agricultural biodiversity and considers the introduction of either extensive and or smaller-scale, traditional agricultural practices with regard to protected areas. However, in the course of the EU approximation process, during implementation of some regulations such as the EU Food Safety laws, the rights of smallholder farmers related to the use of their traditional agricultural and processing practices (often the same as agroecological practices) have been disregarded. Sanitary regulations will soon be enforced for dairy smallholders which may prove challenging for them to meet.

There are efforts taking place to develop the food processing sector in Georgia and promote farmers', food processors' and service providers' associations to include them in public decisions and to accelerate growth. Farmers and CSOs are often consulted through workshops. There is strong support from the EU for local action group (LAG) formation and participation in economic growth and policy development. Cross-sectorial committees and LAGs formed in several municipalities develop strategy and action plans for their municipalities. Related to this, the UNDP's EU-funded ENPARD-3 is in the process of promoting conservation agriculture in the Kakheti region of Georgia (UNDP, 2018).

Practices, a case study

Supporting Sustainable Value Chains through the Development of Geographical Indications in the Dairy Sector

Farmers in Georgia in part rely on agroecology-related knowledge and technologies that have been informally transferred from previous generations. There are few donors and local organizations that promote organic farming practices and among them is the non-governmental Biological Farming Association 'Elkana', which recently developed and is currently piloting its agroecological standard among participating farmers (Elkana, 2019).

Since 1994, Elkana has worked on the development of organic farming in Georgia. It has facilitated socio-economic improvement in the lives of its many farmer participants and focused on environmental protection through fostering the development of sustainable organic farming and increasing the self-reliance of the population. It takes a deeply agroecological approach. At present, Elkana works with about 2 000 farmers all over Georgia, although only about 20 percent of these farmers are in an organic certification scheme; an additional 20 percent are UTZ Certified instead.⁴ Others use agroecological approaches in their farming systems, supported by Elkana, without applying for certification.

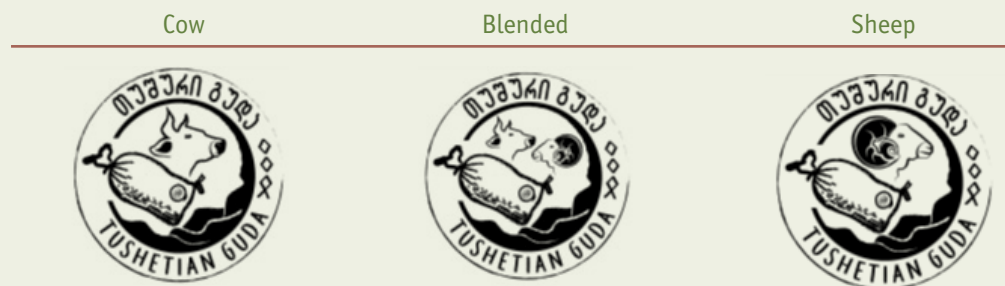
⁴ A sustainable farming certification from the Netherlands that has now merged with Rainforest Alliance, also from the Netherlands (UTZ Certified, 2018).

In 2017–2019, FAO and the European Bank for Reconstruction and Development (EBRD), in collaboration with Georgia’s Ministry of Environmental Protection and Agriculture (MEPA) and the National Intellectual Property Center, Sakpatenti, supported the project “Supporting Sustainable Value Chains through the Development of Geographical Indications in the Dairy Sector”. The implementing partners were REDD SA, a Swiss NGO, and Elkana.

The project worked closely with Tushetian Guda producers, keepers of a centuries-long cheese-making tradition in the Tushetian region. They are mostly small-scale producers and shepherds, and were partners from the beginning of the project, making the decision to develop their product into both having a geographical indication (GI)⁵ and registering it as being a protected appellation of origin (PAO). Restoring the use of traditional animal skin matured Guda instead the modern cellophane bags that were being used by many farmers was the first joint decision of young shepherds involved. Agroecological practices recently started gaining popularity among young people in Georgia, so the five youth shepherds who established the Tushetian Guda Association 2018 have begun to play a role not only in restoring and maintaining this tradition but also in restoring the agroecosystems of their local farmlands.

For marketing purposes special logos have been developed for sheep, cow and blended Tushetian Guda.

Figure 2 Logos for the different types of Tushetian Guda PAO made from sheep’s milk, cow’s milk and mixed milks defined by the PAO Tushetian Guda producer organization



The project has mobilized more local shepherds to revive the specialty of traditional Tushetian Guda and adapt their production methodology to agroecological best practices from sheep-grazing areas and cheese production to cheese maturation, storage and transportation. Environmental and agroecological considerations are considered during every stage. In addition, the project has prepared and published food safety guidelines for Tushetian Guda production, as well as posters, promotional videos and other marketing material. The Tushetian Guda Association continues the cooperation with the Biological Farming Association Elkana for further capacity building and development.

2.7 KAZAKHSTAN

Policy mapping

The use of the term ‘agroecological’ in Kazakhstan appears predominantly in agronomic academic

⁵ A geographical indication (GI) is a specific name of a product that can apply if it has characteristics or reputation due to its origin.

literature, not so much in government or CSO and NGO policy and programming. Agroecology here refers to the science; experimental sustainable, ecological intensification of agriculture as an alternative to conventional industrial agriculture. Large-scale farming dominates in Kazakhstan, with private farms on long-term leases from the government. Soil health and conservation agriculture is a priority of the government. Kazakhstan has rapidly adopted no-till farming practices and the Ministry of Agriculture and Forestry has set a nationwide goal of up to 80 percent reduced tillage by 2022. These large farms, however, continue to use herbicides to manage weeds in fallow years, apply synthetic fertilizers on crops and do not place importance on incorporating leguminous plants into crop rotations to amend the soil. There are massive governmental subsidies to integrate such no-till practices because adapting machinery to this practice is very costly.

Vegetables are not a large part of the Kazakh diet. The main food in Kazakhstan is meat and intake of vegetables is often insufficient. Products produced agroecologically and organically lack reliable market channels and risk reduced quality from the lack of good logistics. There is no government support to address these issues.

Information about academia and research

While there are no agroecology programmes at the universities, research into the science of agroecology is being conducted in Kazakhstan, for example at the Kazakh Agro-Technical University in Astana. In general, the research being undertaken in the country looks at ecological intensification of agroecosystems for higher yields when employing sustainable agriculture on large farms.

2.8 KYRGYZSTAN

Policy mapping

Agroecology is not explicitly supported by the Kyrgyz government; however, NGOs are partnering with the government in concrete projects that are agroecological in nature, for instance grass-roots and participatory projects, and protecting agrobiodiversity, genetic resources and local, traditional knowledge. Given that various globally important traditional varieties are under threat in this country, local communities serve as the genetic custodians and together with NGOs they are working to protect these old varieties. One such example is the recent (2018–2019) creation of a family-run, protected orchard of a wild fruit tree in southern Kyrgyzstan that is the ancestor of many now famous varieties of garden apple trees (Ecological Informational Service, 2019a). Such agroecological work is critical in places like Kyrgyzstan with crop wild relatives and important but at-risk local traditional varieties of domesticated plants and animals.

In Kyrgyzstan in 2019, the government passed a law on organic agricultural production and certification, setting the standard for the first time in this low-income, food deficit country. Actors in the private sector are active in developing village cooperatives and Participatory Guarantee Systems (PGSs) in the area of organics (IFOAM Organics International, 2018), a very agroecological approach to organic agriculture. While Kyrgyzstan has significant deposits of metals including gold and rare-earth metals, the level of poverty amongst the population is high. The country is dominated by mountains and the largest agricultural activity is pastoralism. Less than 8 percent of the land is cultivated. The term agroecology is mainly used in reference to organic production techniques, if it is used at all. Regardless of this lack of use, policy directions, agroecological in nature, are emerging. Dialogue on school gardens in Kyrgyzstan for example, and their school meals, nutrition and production were underway in 2019 (Ecological Information Services, 2019b).

The major commodities based on animal breeding are wool, meat and dairy products. These farmers, however, face low productivity on their small farms. They have poor access to productive resources and markets, with limited employment opportunities in rural areas. They also experience limited access to adequate social protection and social services, agricultural extension and rural advisory services, key inputs (including seeds, fertilizers, and tools/machinery), processing technologies, affordable credit, and marketing. Climate change is also an issue in the region.

There is relatively poor natural resource management with extensive agricultural land seriously degrading. Climate change brings increased volumes of rainfall in the spring and autumn which falls on hillsides and waterways stripped of their protective forest and vegetative cover. Land degradation is a contributing factor in the worsening of dangerous natural disasters.

There remains no official large-scale production of vegetable seeds since the Soviet era in the country, but the government has the capacity to certify the quality of seed in terms of germination and true to form. During the 1st Dialogue on Agroecology in Bishkek, the CSOs' participants reported that the government is currently working with them on issues of agrobiodiversity protection and seeds. In autumn 2018, the Head of the Seed Production Department of the Ministry of Agriculture at a roundtable with NGOs emphasized the need for cooperation between farmers and government organizations (Pers. Comm., 2019). A Memorandum of Understanding (MoU) was signed in February 2018 between the farmer-led NGO Agency of Development Initiatives (ADI) and Kyrgyzstan's Ministry of Agriculture, Food Industry and Melioration assuring cooperation on seed-related issues (Pers. Comm., 2019). Additionally, farming community leaders and CSOs report that they are attempting to incorporate the term 'farming seed systems' into Kyrgyzstan's seed laws. They are exploring seed laws internationally looking into how they protect family farmers and small-scale seed producers in order to report back to government and inform forthcoming seed laws.

Practices, a case study

Dyikan Muras, the Farmers' Heritage Project Revitalizing Local Vegetable Seeds

The Agency of Development Initiatives (ADI) is a Kyrgyz grassroots farmers' NGO with a mission to contribute to social harmony and prosperity and to building an economically just society through facilitating and supporting initiatives spearheaded by local communities. Their major thematic working areas are rural and local development, agrobiodiversity preservation, traditional farming knowledge, school gardens and school farms for school meals. Broadly, ADI promotes and supports good practices, innovations, research and analysis, social entrepreneurship, and the improvement of infrastructure and facilities in rural areas.

Revitalizing the overlooked skills of the rural population in seed production, ADI has been putting women farmers, young adults and schools at the centre of their project Dyikan Muras (Farmers' Heritage) since 2014. During the Soviet era, there was specialized seed production on collectivized farms in Kyrgyzstan, supplying the USSR with a diversity of high-quality seeds. But during the difficult years of independence, seed production was no longer supported. While many farmers continue, unorganized, to grow plants out to seed for their own purposes, the majority of seeds for the country's use are imported hybrids. Dyikan Muras aims to preserve agricultural biodiversity and knowledge through growing and collecting locally adapted, open-pollinated, non-GMO vegetable seeds at household seed plots. The initiative is also developing and documenting a thorough understanding of the philosophical place of seeds in the culture of the Kyrgyz people.

Dyikan Muras was implemented in five regions of Kyrgyzstan with favourable climate conditions for seed production of different types of crops; Chui, Issyk-Kul, Jalal-Abad, Talas and Batken. One aspect of the project supports the establishment of small seed plots (0.02 ha) at the household level, focusing on developing the skills and competencies of farmers and farming communities. Seed-plot farmers acquire knowledge and skills in seed technologies and sustainable agricultural techniques. Education is provided in a variety of ways, for example through training, experience-sharing tours and open field days. To date, they have co-created 19 household seed plots which grow a total of 64 varieties, all locally adapted and producing quality seed. These seed plots are also used as demonstration sites for pedagogy and farm-to-farmer knowledge sharing and for practising seed production with agroecological farming techniques.

The initiative also works on increasing public awareness about the importance of preserving local agrobiodiversity and saving local seeds. Information related to agrobiodiversity is regularly posted on the Dyikan Muras Facebook page and includes short instructional videos. Every spring, Dyikan Muras shares vegetable seeds with school farms and school experimental plots. In 2018, seeds were delivered to 127 schools. Recognizing that consumers are actors in the preservation of local agrobiodiversity when they make a choice to buy local agricultural products, Dyikan Muras facilitates farmers in adding value to some of their produce, making sales of tomato juice, for example, to promote their quality home production.

Dyikan Muras also established a network of seed-keepers in 2016, bringing together supporters of the idea of preserving biodiversity, and preserving and distributing vegetable seeds. To date, the network consists of 73 member-farmers from different regions of Kyrgyzstan, the large majority of whom are women. They have developed a seed catalogue (ADI, 2017). All interested farmers can apply for seeds from this catalogue, not just network members. The network is piloting a PGS, peer reviewing the agroecological standards of the farming systems in the Chui region and acting as a drawcard for new farmers to join by showcasing farmer-to-farmer support: the Dyikan Muras Guarantee System.

The Department for Expertise of Agricultural Plants within the Kyrgyzstan Ministry of Agriculture, Food Industry and Melioration assists in confirming the seed quality and maintaining the characteristics of the crops grown on Dyikan Muras seed plots. Additionally, two representatives from ADI and a leader of Dyikan Muras are members of a working group developing the seed sector and gardens in the country attempting to incorporate the term 'farming seed systems' into Kyrgyzstan's seed law. Their priorities are the conservation of genetic resources and agrobiodiversity, as well as the rights and opportunities for small family farms to be active participants in the seed production process. Through this forum they give their input to an amendment of the seed law on the Treaty on Plant Genetic Resources for Food and Agriculture and Peasant Right Declaration, and on international practices on farm seed systems.

Information about academia and research

An achievement of ADI is farmers' collaboration with academia. In 2019, an MoU was signed with Manas Kyrgyz-Turkish University regarding experimental research in both Master and PhD programmes on local seed resistance to diseases. Since 2017, the network of Dyikan Muras seed keepers has been working with scientific and research institutes. During joint workshops and training sessions, scientists learn about farmers' practices while farmers have the opportunity to hear directly about scientific results of field tests and other research.

2.9 NORTH MACEDONIA

Policy mapping

There was a period in 2012 and for a short time afterwards when agroecology was considered as a possible addition to the overall agricultural strategy of North Macedonia, but unfortunately this was not fully adopted and implemented in the longer term. There remain some policies and measures that support agroecological practices but those have an unclear impact and precise data on their overall effects does not exist (Pers. Comm., 2019). While there are some sporadic campaigns of a promotional nature addressing traditional and local knowledge, there is no official system to promote and protect the traditional and local knowledge of the country. National extension services no longer actively promote agroecology. There is, however, some remaining written material, manuals, guidelines, and brochures on the topic of agroecology, most of them dating from 2012.

No public procurement programmes and school feeding programmes are linked to agroecological production or local production. The roles of food producer organizations and other relevant CSO actors are said not to be recognized and referred to in policymaking and decision-making. At the ministerial level, cross-sectorial committees and commissions discuss inter-sectorial policies implementation.

National support for agriculture is implemented through two different programmes: direct subsidies and the rural development programme. No credit lines for agroecology or for smallholder farming families exist; however, the North Macedonian Ministry of Agriculture, Forestry and Water Economy offer some financial support to farmers who have adopted soil care and the use of natural fertilizers during their production processes (MAFWE, 2012). The phytosanitary standards require investments in technology and infrastructural facilities that are beyond the financial capacity of most smallholder farmers, especially regarding finished dairy products and fruit and vegetable value-added products.

North Macedonia is a popular destination for tourists and is an agricultural region but to date has very modest growth in rural tourism development. There is great potential for promoting the agroecological production typical of the region (Ciglovska, 2016).

North Macedonia implements the Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries, and Forests in the Context of National Food Security as well as the FAO Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries.

2.10 MOLDOVA

Policy mapping

Europe's poorest country has a population that is largely rural. Poverty pushes working adults to find employment in other European countries in order to send remittances home. The government combines portfolios to espouse the Ministry of Agriculture, Regional Development and Environment, a potentially fertile ground for official adoption of holistic agroecological legislation, policy and government programming.

The government created the first legislative framework for organic certification in 2005; however, there is a focus is on larger-scale organics for export and no emphasis on the integration of natural systems. Much agricultural produce is imported from the Ukraine and is often available for prices lower than that of local produce, so small-scale farmers are at a disadvantage in local markets. The national sanitary and phytosanitary measures create further barriers for smallholder farmers to access markets.

The cost of necessary certificates and laboratory testing can be quite high for smallholders. With regards to policymaking, working groups made up of representatives of all organizations within organic agriculture, some of which promote agroecology, are asked for comments and submissions.

The Ministry of Agriculture, Regional Development and Environment is already involved in projects aimed at developing and promoting organic agriculture at the national level. The first is the Strategic Support for Organic Farming in Moldova supported by the EU Commission through the Technical Assistance and Information Exchange (TAIEX) instrument and the second is Institutional Support for Organic Farming in Moldova supported by the Czech Development Agency.

FAO-supported national extension advisors actively promote agroecological approaches and sustainable agriculture for more sustainable food systems in Moldova. Their services include integrated pest management, conservation agriculture and organic production. And although not explicitly agroecological, organic production is subsidized by the government upon completion of a minimum of 40 hours training in ecological agriculture offered by the agricultural extension services.

There is no official system to promote and protect traditional and local knowledge, and no public procurement programmes and school feeding programmes. Moldova implements the Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries, and Forests in the Context of National Food Security and also implements the FAO Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries.

Practices, a case study

Garden of Moldova (in Romanian Gradina Moldovei)

The Garden of Moldova is an NGO located in the centre of the Republic of Moldova, in Cigirleni, a village of 2 500 inhabitants. The association was founded in 2015 and today has members and supporters spread across a country-wide network. Its mission is to promote and teach the different elements of agroecology, and to maintain a seed bank with both local and non-local varieties in order to ensure seed independence and food system resilience. This NGO tackles the big issues of industrial agriculture and disinformation about eco-friendly agriculture in their agroecological pedagogic training sessions and seed production on the family property of its founders. A landscape architect with a tertiary education in botany and plant physiology and identification who is now in charge of experimental gardening and training, is among their group founders. All the founders have sought training on agroecology over the last 9 years from several workshops around Europe, specifically in France, Belgium, Romania, and Austria.



Figure 3 The Garden of Moldova's 2017 Festival of Biodiversity (Garden of Moldova)

This experimental garden and training area covers 3 000 m². It is a system in transition: it was used intensively since 1975 and only became an agroecological plot of productive land in early 2016. It is now managed with knowledge sourced from biology, entomology, ecology, and engineering sciences for their water system and value adding to fresh produce. In terms of agroecological practices, the Garden of Moldova employs organic open-pollinated seeds, crop rotation, green manure, permanent mulch and soil covers, composting and practices no-dig in preparing the soil. There are no fish or livestock, instead the emphasis is on plant-based diets and natural biodiversity. Old trees exist on the property and young fruit trees have been planted from seed or grafted stock. The seed bank was initially stocked mostly with organic seeds received from other international seed banks, seed saver exchange groups and organic seed companies, as well as local private gardeners



© Garden of Moldova

Figure 4 Isolating plants for seed production

Concerns about human health, food intolerances, and the toxic and carcinogenic nature of some chemical farm inputs especially fruit and vegetables grown in Moldova are behind the founding of this NGO. People of all ages participate; the youngest member is 18 years old and the average age of members is 28. At least three participants in the courses offered by the Garden of Moldova have gone on to create vegetable-selling businesses, one of whom is currently transitioning to being fully certified organic. Furthermore, one of their young members has applied to study sustainable agriculture at a university in Romania.

This centre is still in its infancy and has just 20 memberships, some individuals, but mostly couples and family groups. Both men and women as heads of families are involved in the project and in learning about agroecological systems. Members help with different tasks in the garden at different times of the year. They assist with organizing public events and workshops, and pack seeds at the end of the season. In exchange, those with memberships have priority access to the seeds of rarer seed plants. This small NGO has contributed to increasing their members' household food security with fresh organic produce.

The Garden of Moldova is not exclusively for members, however, and since 2016 there has been an open seed market each year, a tomato festival in 2017, and a total of 24 workshops and 18 other activities. Locals are already seeking out more diverse plant species and varieties and are becoming increasingly aware of how open-pollinated seeds adapt and make up an aspect of

community resilience. Thanks to the events and open days, locals can visit and access information normally difficult to find since many have no access to the internet, have relatively limited levels of education and come from poor backgrounds. The garden itself sells products, both fresh and dried, or with other value added and can now employ the family who founded it as staff during the summer period. In 2019, when other villagers lost most of their tomatoes to fungal problems and other crops suffered during a six-week dry period, the Garden of Moldova credits their emphasis on on-farm diversity and application of thick mulch to a very successful tomato harvest and minimal drought stress on other crops as well.

Information about academia and research

The Agricultural State University of Moldova, in Chisinau, houses the Department of Agroecology and Soil Science with relevant subjects and various master's programs.

2.11 MONTENEGRO

Policy mapping

Montenegro has a Ministry of Agriculture and Rural Development. The national extension service promotes some agricultural practices and approaches related to an early transitional stage of agroecology. Importantly, there is a system to promote and protect traditional and local knowledge. This is essential to uphold the various cultural landscapes that exist in the country combining traditional farming methods, high agrobiodiversity and unique agroecosystems.

No county or municipality has public procurement programmes and school feeding programmes linked to agroecological production, local production or smallholder and farmer production. The Government of Montenegro recognizes the roles of food producer organizations and other relevant CSO actors in food systems and includes them in decisions by inviting them to public hearings and involving them in different working groups that do preparatory work for legislation.

2.12 SERBIA

Policy mapping

Agroecology in Serbia is developing alongside a grassroots permaculture movement. Global trends of self-governance and self-sufficiency are motivating people to self-educate and mobilize themselves more in these fields. Small alternative farms are developing in Serbia. Organic farming business models are attempting to find new, more sustainable livelihood solutions. People have access to private or NGO-led courses or are self-taught in permaculture then build a small business starting everything from the scratch. This way requires more time, as permaculture practices are also in their infancy in Serbia. Generally speaking, such alternative small-scale farmers may face fines because of a lack of certification. They work within an alternative economic paradigm, one that could be considered the 'grey economy' which is neither taxed nor monitored by the government (European CSA Research Group, 2016). Sanitary and phytosanitary measures create barriers for smallholder farmers to access markets. Market access for smallholder farmers is still restricted by national legislation. Only legal entities are allowed to offer their processed products without restrictions to certain markets.

Various CSO actors implement different programmes that relate to agroecology by focusing on sustainable food production, biodiversity and the empowerment of small rural households. Additionally, there are two CSA farms in Serbia.

There is a rather underdeveloped organic industry in Serbia. The share of organic production in overall arable land remains extremely low. Consequently, the domestic market of organic and agroecological products is still very small. The major cities in Serbia – Belgrade and Novi Sad – are the major markets for organic food. Organic agriculture is legislated for and organic farmers are supported by Serbia’s Ministry of Agriculture, Forestry and Water Management with policies relating to, for example, premium prices for their milk and basic incentives for plant production. Rare-breeds farmers receive special payments from the government for autochthonous breeds conservation. Agricultural extension services unfortunately do not share information on agroecology specifically, but they have trained advisors on organic farming and are expected to assist farmers in the administrative process of entering the organic farming certification system.

In 2010, the Ministry of Environment and Spatial Planning, supported by the UNDP and the Global Environment Facility (GEF), developed the Biodiversity Strategy of the Republic of Serbia for the period from 2011 to 2018. The strategy was initiated due to a lack of comprehensive policies and measures to prevent further deterioration and support preservation of agrobiodiversity in Serbia. The strategy integrated the principles of conservation and sustainable use of biodiversity into relevant sectoral or inter-sectoral plans, programmes and policies where possible and necessary.

Public institutions are increasingly relied on to enable the procurement of organic food, often from local farms and agricultural holdings. The first steps have been made in procuring organic food for kindergarten and school meals, elderly homes, homes for people with special needs and hospitals.

Practices, two case studies

The Ivanov Family’s Rare Breeds Farm

The Rare Breeds Farm, owned and run by the Ivanov family, is situated in Eastern Serbia nearby Dimitrovgrad, a small border town, and within the Stara Planina Nature Park. Up until the late 1960s and early 1970s, the inhabitants of Dimitrovgrad were predominantly farmers from the surrounding regions. They then moved to town in search of industrial work. This resulted in land abandonment and the disappearance of traditional livestock husbandry practices. The Ivanov family returned to the land in 2005 to regain and rebuild that knowledge on their farm with the mission of conserving the genetic resources of Baltic livestock breeds. They breed rare and endangered autochthonous breeds; the Balkan donkey and Karakachan sheep. And it has been run according to organic and agroecological principles since 2009.

Their Karakachan sheep graze on more than 100 ha of pastures which are undergoing natural ecological succession processes. This farm holds the biggest Serbian population of this trans-border breed. The whole area was previous used for goat and sheep grazing, and for growing hay. And along with their unique practice of keeping donkeys in a large herd, this makes Rare Breeds Farm a relatively new agroecological system. Their 50 donkeys have more than 6 ha of forest and pasture land, where an agroforestry system combines oak trees and open grassland to form a biodiverse mosaic landscape. Rotational grazing maintains the integrity of this system and was adopted when owners were in the early stages of learning donkey grazing behaviours. Dr. Ivanof, one of the farm’s owners, is a veterinarian. He says they noticed early on that the donkeys were damaging some of the trees on the farm but the switch to rotational grazing has halted this damage, saving the oak trees in particular.

Furthermore, this fire-sensitive terrain is now less vulnerable to wild fires due to the rotational grazing and agroforestry practices which leave no low branches, no dried leaves and no dry grasses. With climate change increasing dry periods, there is greater potential now for wild fires in the region. Furthermore, with donkeys being more adaptable and able to withstand higher temperatures and longer periods without rain better than dairy cows, this farm is more adapted to climate change.

This is the only farm in Eastern Serbia with a donkey dairy as a primary activity. The farm sells donkey milk and soap made from this milk. With fewer than 1000 Balkan donkeys registered in Serbia, these are prized products. Agritourism is also one of the farm's income-generating activities. There is accommodation on site in an old, well-maintained traditional house for guests; schools, university students and other tour groups visit these important indigenous breeds. Other income for the farm comes from the Karakachan sheep's wool, milk and meat products. Their dark brown wool is used in hand-knitted clothes while their milk is used for cheese production and lamb meat is delivered to a hotel in Belgrade.

The graziers have ongoing collaborations with the Faculty of Veterinary Medicine at Belgrade University, with students and professors visiting the farm several times per year. Such a collaboration extends the practical skill and knowledge exchanges that are often a feature of agroecological systems.

This partnership has helped in critical identification of a specific neurological disease affecting some of the donkeys that was found to be connected to one of the plants in the pasture. The farm also contributes to the local economy by purchasing hay from surrounding farming families and selling unspun wool to local women who spin and knit it into jumpers and socks that they then sell-on locally and nationally.



© Dr. Sergej Ivanov

Figure 5 Balkan donkeys in a pasture at the Rare Breeds arm

Petrov Biodynamic Farm

Petrov Biodynamic Farm, established in 2009, is certified as organic but follows the principles of biodynamic farming with agroecological approaches to management, practices and community. The farm and dairy are the main source of income for the owners and their family and consists of 40 hectares of agricultural land. Alfalfa is the dominant crop grown specifically for domestic animal forage. In addition, the farm hosts various indigenous, autochthonous breeds of livestock. It is a registered dairy with a processing capacity of 5 tonnes. They produce milk, yogurt, sour milk, sour cream, whey and chopped cheese.



© Zoran Petrov

Figure 6 Pasture on the Petrov Biodynamic Farm

A farm is a self-sustaining agroecological whole, where fertility and feed come from within the farm. Nothing is brought in from the outside. The system does not utilize synthetic agricultural inputs. Production is undertaken without any pesticides and artificial fertilizers. Manure is used from their own livestock to fertilize the crops; in a closed loop they keep the nutrients within the farm. In the case of a disease or pest outbreak, they use biological controls and adjust management practices to bring the farm back into balance, treating it holistically. The farm saves seeds from one year's crop to plant the next year. In this way the farm maintains its independence.

The owner, Mr Zoran Petrov, does not ask for any kind of external help, including government support, bank credit, advice from universities, NGOs, and so on. His property is an oasis for tiger bushes, Mangulica pigs (one of three primitive autochthonous pig breeds in Serbia, considered endangered), sheep, goats, turkeys, ducks, geese, chickens, pheasants, badgers, owls, storks, feral cats and foxes.



Figure 7 Petrov Biodynamic Farm's dairy products

© Mlekara Petrov



© Zoran Petrov

Figure 8 Mangulica pigs, an autochthonous breed of Serbia

Information about academia and research

The State University of Novi Sad teaches agroecology as a special study BSc programme, Agricultural Ecology and Environmental Protection, within the Faculty of Agriculture (University of Novi Sad, 2019). The principles of agroecology are taught in other BSc and MSc programmes as well. PhD programs at the University of Novi Sad also include courses on agro-environmental concepts of sustainable agriculture.

The State University of Belgrade, Faculty of Agriculture also offers BSc, MSc and PhD subjects in agroecology as part of curricula in plant production programmes. An Organic Agriculture MSc study programme is also taught, while PhD programmes include organic agriculture courses as part of their curricula (University of Belgrade, 2019). The EU Horizon 2020 project EcoStack partners with the Faculty of Biology at the State University of Belgrade. EcoStack aims to develop and support ecological, economically and socially sustainable crop production via stacking and the protection of functional biodiversity (EcoStack, 2019).

Newly accredited private universities in Serbia also provide environmental studies promoting agroecological principles and concepts. Some of these schools are University Union Nikola Tesla, Belgrade, Faculty of Ecology and Environmental Protection; University Business Academy in Novi Sad, Environmental Studies programme; University Metropolitan, Belgrade, Faculty of Applied Ecology.

2.13 TAJIKISTAN

Policy mapping

Tajikistan is a mountainous country where the main sector is agriculture. There is an emphasis on small-scale farmers growing non-edible cash crops, but many people have kitchen gardens for their own consumption. Land remains state owned (Lerman and Sedick, 2017), so these farmers apply for long-term leases for their farmland. Many who lease are obliged to grow cotton for export in return for access to this arable land. This restricts farmers in their ability to cultivate food crops that would strengthen food sovereignty, improve nutrition and boost local livelihoods, and has created an overdependence on one single crop by curtailing agrobiodiversity. Despite this Tajikistan has some culturally valuable landscapes that combine indigenous farming methods and products, agrobiodiversity and unique agroecosystems.

As a result of the civil war, as well as high emigration rates among men who travel to Russia in search of gainful employment, an unusually high proportion of households in Tajikistan are headed by women. Women in Tajikistan face a number of obstacles that limit their ability to climb out of poverty, many of which begin with an inability to secure property rights and tenure over the land they work. Women's right to property is under-legislated. The majority of women in the country earn their livelihoods from the agricultural sector. These female-headed households tend to be worse off financially than male-headed households, in large part because of the hurdles that women face in having land held officially in their name. This also has implications for the ability of women to access financial services, which often require land as collateral for loans or credit.

NGOs work with farmers and specialists on agroecology programmes covering, among other things, conserving agrobiodiversity, preserving and protecting traditional knowledge, promoting farmer-to-farmer exchanges, involving youth and women in agricultural knowledge exchanges and other projects, adapting to climate change, and raising awareness of the dangers of pesticides and the benefits of organic production (Ecological Informational Service, 2019c).

Practices, a case study

Zan va Zamin, Women at the Centre of an Agroecological Community Revival

Zan va Zamin is a feminist NGO that evolved to address the challenges faced by Tajikistan after the dissolution of the Soviet Union and the country's subsequent civil war (1992–1996) which destroyed much of the physical infrastructure, education and health systems and displaced over

700 000 people (Equator Initiative, 2017). Today, the spectre of poverty and economic isolation still haunts Tajikistan. In a population of 7.4 million, 73 percent live in rural areas so agriculture is an important contributor both to the national economy and to local livelihoods.

Zan va Zamin, meaning Women and Earth, was created with the explicit goal of reducing the widespread poverty of Tajikistan's mostly rural population and conserving native agrobiodiversity. Zan va Zamin is first and foremost a women's organization. All its programmes and activities are undertaken with women in mind and with the goal of developing women's rights. More specifically, the organization focuses its efforts on three broad areas of programming: the attainment of access to land and securing land tenure for landless farmers; the conservation of biodiversity and the preservation of traditional knowledge through responsible natural management and supporting diversified farming methods; and the creation of farmer associations and cooperatives to improve livelihoods. Furthermore, Zan va Zamin has managed to bring women's rights to the fore of national dialogues on development and poverty reduction and raised the profile and participation levels of women in the social and political life of the country. Importantly, this has meant greater involvement of women in decision-making on natural resource management and the governance of environment and development projects.

Although Zan va Zamin is based in the capital city, Dushanbe, the organization carries out its work primarily in rural regions, particularly marginalized and dangerous border zones. This organization fills a significant void in service delivery and development programming in the region. Khatlon Province borders Afghanistan, and, because of the risks of operating there and the country's own struggles with armed violence, few international and national NGOs operate there.

Zan va Zamin has created 30 seed funds and 20 revolving loan funds for farmers' associations to create opportunities for local entrepreneurs in the Hamadoni, Vose, Parkhar and Muminobod areas. In a country where access to credit and loan services is limited, particularly for women, these revolving funds fill an important void and create space for small-scale enterprises to grow and thrive. Any profits generated from revolving fund investments are shared; 80 percent is used to cover household needs, 20 percent is returned to the community coffers for reinvestment into projects, including health and education. These funds have improved food security and socioeconomic resilience and are particularly vital for women who are not the legal title holders of the land they farm and therefore cannot use the land as collateral to apply for loans through regular banks.

The group has instituted 12 field schools where it teaches agroecological techniques. These field schools work with around 200 farmers, both male and female, and produce over 1 000 tonnes of vegetables annually. Twelve community orchards with tree nurseries have been established to serve as demonstration sites for other communities to visit, for local farmers and school children, as well as plant production facilities for projects. The organization also uses these schools and training to promote agroecological farming methods and reduce the volume of chemical inputs on farms.

Other activities have increased the capacity of local communities to adapt to climate change, including through training on energy-efficiency measures; the construction of solar greenhouses for the production of early spring vegetables like tomatoes, cucumbers and onions; and the establishment of information centres on climate change where farmers can access materials on mitigation and adaptation strategies. Food producers have also benefitted from the distribution

of solar vegetable dryers and energy-efficient ovens. To date, the organization has constructed 10 communal greenhouses, distributed solar vegetable dryers, and set up 12 energy-saving ovens.

The group operates under the belief that the reintroduction of traditional practices, evolved over generations of farming and adaptive landscape management, is the most effective way to conserve agrobiodiversity. Zan va Zamin works directly with traditional knowledge holders to ensure that effective agricultural practices are documented and passed on. The organization promotes the cultivation of native crops suitable to Tajikistan's harsh, extremely variable climate. Since the initiative began, the total area under cotton production has decreased while cultivation of traditional fruit and native crops cultivation has increased. Over 10 000 saplings of traditional fruit varieties have been distributed among community members in the Muminobod and Khovaling mountain regions, and in the Khamadoni area from the community nurseries. The revival of traditional crop and fruit varieties has had a positive impact on household food security. By promoting native food varieties over cotton monoculture, food shortages have been reduced and farmers and their families now have access to a varied diet of locally produced fruit, vegetables and grains. Higher incomes have also led to improvements in community wellbeing, with families investing more readily in local infrastructure, household healthcare needs, clothing, school fees and textbooks.

Through Zan va Zamin's efforts to employ a holistic agroecological approach, rural communities, with women in the lead, are learning the importance and value of conserving local agrobiodiversity and the contribution that traditional knowledge can make to rural livelihoods, food security and ecosystem health. The organization has helped organize women into farmers' associations and cooperatives, which has, in turn, drastically improved the bargaining power of smallholder farmers. To date, more than 300 farmers have organized themselves into self-help groups. Together, these farmers produce and deliver over 2000 tonnes of agricultural products to market every year. These associations afford them an opportunity to collectively set conditions for the sale of their produce. The most notable socioeconomic impacts from Zan va Zamin's work have been in the area of securing land tenure; the organization has successfully brought women into the fold of the formal legal system in Tajikistan by advocating for women's property rights. Over 2 000 landless farmers have received land parcels as a result of Zan va Zamin's advocacy.

2.14 TURKEY

Policy mapping

Agroecology in Turkey comes mostly in the form of food consumer collectives, alternative food networks (AFNs) and CSA farms. Integrated into these AFNs are a number of PGSs with community members evaluating the natural farming practices, often agroecological, instead of an official organic certifying body. Additionally, farmers' markets and urban, grassroots agroecology and permaculture is beginning to flourish and build communities connected to food growing and sourcing their food locally. Such local and solidarity-based partnerships for agroecology (LSPAs) are developing into the foundation of various robust local food systems. Even with these numerous AFNs and CSA initiatives, the national government has not developed policies and legislature that support and multiply these. Instead the government focuses on industrial-scale agricultural expansion. This emphasis overlaps with the government's drive to urbanize and cancel the village statues of thousands of rural settlements and makes for a hostile environment for agroecology and localizing food systems. Fortunately, however, local municipalities and governors' offices are known to independently decide to get behind local initiatives in various tangible ways.

More traditional, small-scale polyculture farming practices can be observed in the eastern parts of the country as compared to the west where larger, monocrop farms tend to dominate. The state's policies in general seem to be designed against small-scale production, although municipalities have been known to act and even support local movements. While some subsidies exist for organic production and for using ecological methods, there is no support from the state to protect traditional knowledge and practices. Nor is there legislation to exempt small-scale producers from hard-to-follow regulations, including Turkey's strict certified seed and plant production laws.

Organic production for exports started in mid-1980s with figs, raisins and citrus to name a few. A steadily but slowly growing internal market began to take shape. High pesticide use is of a large concern in Turkey and internationally for consumers. This includes illegal pesticide use. This overuse of pesticides and the misuse of other agrochemicals severely threatens agroecosystems, environmental integrity and biodiversity of the country.

Practices, two case studies

SAKUDA, a New Agroecological Alternative Food Network

One of Turkey's many AFNs, SAKUDA is in the Sakarya municipality, in north-western Turkey, 200 km east of Istanbul. SAKUDA (Sakarya Small Producers Solidarity Network) was established in the autumn of 2017 and is now a growing network of eight smallholder farmers, bakers and artisans producing food in Sakarya. It was founded by three diverse producers, each of whom already had a direct sales customer-base and focused on high levels of agroecological integration into their farming and community. This group - a fruit and vegetable grower, an animal product producer and an artisan baker - merged their customer and products lists and together promoted the strength of their farms' sound agroecological practices and high-quality produce. Supported also in part by many volunteers amongst their community, this team began to share transportation of goods to collection sites for their customers making for a sound economic strategy but also reducing their individual use of fossil fuels.

The first aim of SAKUDA is to help those who already produce agroecologically to reach alternative markets for their sustainable production. SAKUDA has created a circle of support and solidarity amongst the member producers, such as accessing the market and sharing agroecological knowledge to improve their farming systems. Secondly, SAKUDA aims to be a source of encouragement to small producers who hesitate to switch to agroecological production, due to the decrease in yields and concerns about marketing. SAKUDA also operates a self-regulated guarantee system for consumers to be assured of the form of production on the farms. This way, small producers do not have to afford the often expensive and long organic or biodynamic certification, and a group of peers works to support high agroecological standards. There are more small producers eager to join the network; however, inclusion involves a process that recognizes the time it takes to both transition to an agroecological farming system and examine the working parts of the system to meet the high standards SAKUDA operates at for both the farmers, the producers and the environment.

SAKUDA currently has nine distribution points for its nearly 2 000 consumers where their eight producers deliver goods for collection. These customers not only purchase directly from these farmers and makers, but can also support the network in other ways, further strengthening the link

between producer and consumer by sharing the load of tasks needed for a well-functioning AFN. Amongst the producers themselves, ongoing knowledge sharing and direct support characterizes their network. They are part of a growing social movement in agroecological AFNs across Turkey and while they turn down applications to join from producers from other regions, they encourage and support them to create their own network with their neighbouring producers.

Agroecological Transition with Food Communities in the Güdül District of Ankara

There has been much holistic, agroecology-focused work taking place in the Güdül district near Ankara in Turkey over the last 10 years. This stems from the work done by the Tahtaciörencik Village Ecological Living Collective (TADYA) in the village of Tahtaciörencik. Both the comprehensive agroecological farming practices and the supporting LSPA model developed in this village have been extended across the entire Güdül district. In November 2018, a project - Agroecological Transition with Food Communities in the Güdül District - was initiated by the local Dört Mevsim Association and the Buğday Association and supported by the DBB⁶ Participatory Guarantee Group (PGS) group, as well as the international network of CSA initiatives Urgenci and the agroecology organization Terre et Humanisme. This project is fortunately being conducted in exceptionally favourable conditions, receiving good support from the local municipality and the governor's office (Dört Mevsim Ekolojik Yaşam Derneği, 2019a).

The Agroecological Transitional with Food Communities in the Güdül District initiative includes a number of lead farmers who already practice, or are in a process of transitioning to, agroecological farming methods. There are about 20 such farmers, including small family groups, half of whom are located in Tahtaciörencik village itself while others are scattered throughout Güdül district. The project supports these farmers and fosters agroecological change by linking them with consumers and communities looking for healthy food products grown and raised with ecological sound methods. This involves organizing tours to the farms, creating opportunities for direct sales (in farmers' markets in the centre of Ankara), farmer-to-farmer learning opportunities, training and consultation in agroecological production methods, documentation of farming practices and small-scale demonstration sites.

The initiative is conducted according to the following principles:

- Knowing the producer(s) in person or having direct contact with them.
- Raising and eating natural (not necessarily organic) food (supporting producers in different ways including prepayments).
- Protecting traditional, heirloom seeds.
- Trying to reduce transportation costs by issuing collective orders.
- Protecting natural resources, promoting agroecology and nature-friendly farming techniques.

The farmers are encouraged to continue with traditional, environmentally friendly methods and to also adopt agroecological and restorative farming techniques, including permaculture practices.

⁶ DBB is the "Natural Food, Conscious Nutrition" network and it has its own Participatory Guarantee System, a grass-roots approach to guaranteeing the ecological soundness of the farming system and food production. <https://dogalbilincliibeslenme.wordpress.com/dbb-producers/>

Practices include employing polycultures, companion planting, and food-forests; using and reproduction local seeds and breeds and home-made solutions for pest and disease management and soil regeneration; mulching, composting, and using green manure; raising free-range animals using non-commercial, farm-produced feed for cattle, and much more. Some of the traditional knowledge of the farmers already includes nature-friendly and/or healthy production methods, such as using animal manure rather than artificial fertilizers.

The region has rich genetic agricultural resources, including many varieties of fruit, vegetables and animal breeds such as the Angora goat and Anatolian black cattle. The project encourages farmers to use and reproduce these resources, as these local varieties prove to be more resilient to climatic fluctuations and require less external input. The project, especially via its small-scale demonstration sites, also introduces new, relevant varieties of vegetables which have the potential to adapt to the area, adding to the diversity and resilience of farming systems.

There are a number of young producers amongst the group of leader farmers. The city dwellers that the project aims to connect to the farmers also include many young people who want to help the farmers with labour and also learn some aspects of farming. The direct benefits go first to the lead farms, but there are further benefits, like the recognition of the Gdl district by urban citizens, the preservation of genetic resources, agroecology training and demonstration to local farmers and producers, as well as education on sustainable local food for children, as a lot of activities are designed for the youngest of the community. Several families have moved out from the city to this rural district, or at least have bought a second, small house in the countryside to contribute to the production at least for their family. This contributes to the revitalization of small villages and to a reinforced local economy. Expanding food sovereignty and revitalizing a closer consumer–farmer connection are at the heart of this values-based agroecosystem.

Information about academia and research

While there are no agroecology study programmes offered in Turkey there are, however, dozens of vocational education programmes in organic agriculture (Basarisir Alamalari, 2018).

2.15 UKRAINE

Policy mapping

The Ukrainian government does not directly support agroecology. While the relevant CSO representatives are members of working groups within the various ministries, in practice the voice of CSO actors is weak when it comes to influencing policy.

Ukrainian national extension services do not promote agroecology. But researchers and members of Ukrainian Rural Development Network at the Institute of Economics and Forecasting, National Academy of Sciences of Ukraine, have developed proposals on adapting state programmes to provide food subsidies for low-income groups, linking them directly with small-scale agroecological producers (Pers. Comm., 2019).

It is costly for family farms to get a certificate for organic production. It is also difficult for them to meet all the official requirements and get access to foreign markets. There are, however, smallholder farmers producing with agroecologically sound practices, although official support for them is minimal, if any.

Information about academia and research

The National University of Water and Environmental Engineering in Rivne houses the Institute of Agroecology and Land Management.

The Ukrainian National Academy of Sciences is involved in research on a project entitled Using Innovative Approaches for Realizing Ukrainian Agricultural Potential in the Context of the Challenges for Food and Energy Security. As a part of their working plan for 2020, these researchers plan to focus on studying agroecological systems and developing recommendations for policymakers to incorporate agroecology into the agroecosystems of the Ukraine.

2.16 UZBEKISTAN

Policy mapping

Agroecology in the form of science and practices and as a social movement does not seem to be very active in Uzbekistan or supported by policy and legislation in the country as yet. The organics industry is small and very slow growing (Nurbekov *et al.*, 2018). FAO, while not explicitly working on agroecology, is, among other priorities, working on the sustainable use of natural resources and the implementation of conservation agriculture and IPM in Uzbekistan. Over the past decade, poverty has declined significantly in the country. Gender stereotypes, however, continue to be prevalent and have a profound impact on women's access to opportunities and resources

In Uzbekistan, all land remains under the ownership of the state and is transferred to farmers via a system that imparts a right to use it temporarily; private ownership of land is not recognized by the state. Regardless of evidence suggesting that the production of fruit and vegetables is among the most profitable activity for both small-scale and larger private farms (World Bank, 2017), cotton is the main export crop. This commodity is currently expanding, especially in the south of the country. The National Development Strategy for 2017–2021 recognizes the need for diversification out of cotton which is expected to contribute to significant growth food security. This strategy prioritizes the modernization and intensive development of agriculture and states a concerted effort to deepen structural reforms in order to expand the production of eco-friendly products (*The Tashkent Times*, 2017). Aridity and salinity are the main challenges that farmers and pastoralists face in this region. Additionally, decreased organic matter in the soil and low biological activity because of the excessive desiccation of soils and deforestation are very problematic. The national strategy, in aiming to modernize agriculture, prioritizes the adoption of systemic measures to mitigate the negative impact of climate change and the drying-up of the Aral Sea to the development of agriculture and the livelihoods of people. The Center for Support to Farmers and Entrepreneurship, Uzbekistan, promotes agroecological adaptations such as mulching, conservation agriculture, and agroforestry for remediating the problems in this region of salinity, low soil moisture and organic matter and adapting to climate change in the process (FAO, 2017b).



CHAPTER 3

AGROECOLOGY AND OTHER SUBJECTS – SYNERGIES AND INTERACTIONS

Agroecology as a holistic process interacts with different approaches and topics that can either support the implementation of it, as in the case of the SDGs, or support promoting it as for biodiversity and ecosystem services. This section briefly explores some of these topics and the synergies they have with agroecology and how agroecology can be used as a way forward to boost the implementation and achievement of them.

3.1 AGROECOLOGY AND CLIMATE CHANGE

The Special Report on Climate Change and Land Systems (Arnell *et al.*, 2019) produced by the Intergovernmental Panel on Climate Change pointed out that the Paris climate goals could no longer be achieved without a significant change in the way food has been produced. It is also clear for most stakeholders that climate change and variability will impact food production. Food systems, at the same time, impact climate change and are impacted by it (IPCC, 2014). Furthermore, the increase in extreme climatic events such as droughts and floods as well changes in the temperature throughout the year and the unpredictability of the weather pose an additional challenge to food producers.

Climate change is a real threat to the ability to ensure global food security, eradicate poverty and achieve sustainable development. It is also considered a threat multiplier whereby the impacts of climate change are further increasing the uncertainties and vulnerabilities facing farmers and communities. Observations of agricultural performance after extreme climatic events in the last two decades have revealed that resilience to climate disasters is closely linked to the level of diversity and integrated strategies used by farmers. Therefore, an integrated production system such as agroecology can play an essential role in coping with climate change and all the vulnerabilities and uncertainties that come with it.

Many of the agroecological strategies that reduce vulnerabilities to climate variability include diversification, maintenance of local genetic diversity, animal integration, management of soil organic matter, and water conservation and harvesting are based on local and traditional knowledge. It is important to recognize and strengthen the value and importance of traditional knowledge and traditional farming systems, as these rely on a wide array of management options and designs that enhance biodiversity and are anchored in local reality and local resource availability. Agroecology is not only an effective solution to complex agricultural challenges but also an affordable way to increase yields without external inputs. It can offer low inputs and low emissions in food production.

3.2 AGROECOLOGY AND BIODIVERSITY

For agroecology, diversity is the base for the whole system. It is a source of synergies and resilience. Biodiversity, therefore, is at the core of all agroecological systems and without it, there is no way to promote and develop them. Biodiversity can be preserved and promoted by increasing agroecological systems as they have the capacity to enhance the ecological processes and interactions of functional biodiversity above-ground and below-ground, over space and in time.

Biodiversity loss can lead to drastic changes in ecosystem services and functions. Land managed using agroecological practices has a greater potential to maintain genetic, species and structural diversity as well as promote and preserve ecosystem services at different scales and levels. It can also enhance on-farm biodiversity and improve the connectivity of the fragmentation of agricultural lands. Agricultural intensification has been justified by the urgency to increase food production in the face of rapid human population growth, yet there is growing evidence that diverse agricultural landscapes are more productive than homogeneous landscapes, and that agroecological systems can help to achieve agricultural multi-functionality and to preserve biodiversity in agricultural landscapes.

Also, agroecology prioritizes the use of local resources including agrobiodiversity. Therefore, it strongly depends on the local context, and can play an essential role in the maintenance of local biodiversity. The local context, including soil, biodiversity, climate conditions, among other resources available, needs to be taken into consideration to design agroecological systems. For this reason, agroecology does not prescribe ready-to-use technical packages but seeks to meet farmers' needs and natural conditions to transform the way we are producing food. Additionally, it is anchored in traditional knowledge, known for its respect for and connection to nature and biodiversity. This is a crucial difference in approach from conventional intensification; models and solutions are built from a mingling of scientific and traditional knowledge and they strongly rely on learning and innovation processes with local stakeholders.

3.3 AGROECOLOGY AND GENDER

Women play a vital role in agriculture, including the maintenance of sustainable systems of production and consumption. Furthermore, they are often the guardians of biodiversity, as they are responsible for the maintenance of local seeds and local gardens and of the diversity within communities. They are also in charge of keeping traditional knowledge on local varieties and species, especially local herbs for nutrition and health. However, despite their essential role in agriculture, they face significant barriers to sustainable development in terms of lack of access to land, technical and financial assistance and other forms of support. Women and girls remain one of the most vulnerable groups in our societies.

Agroecological systems are anchored in fairness and aim to build more equalitarian communities and societies; therefore, agroecological approaches must include a gender perspective and should demonstrate

the particular importance of women in the food production process and the importance of keeping biodiversity and promoting nutrition within their communities. First, they have more limited access than men to land, productive and financial resources, education, health care, rural extension, markets, climate adaptation initiatives and employment opportunities. Second, they are subject to social exclusion from decision-making and labour markets. The recent increase in climate shocks, extreme weather events and climate-related disasters further worsens the status of women. Further still, as the main caregivers and providers of food, water and fuel, women must work even harder than men and are burdened with additional duties to feed and care for their families and communities. Without women being able to participate fully in relevant and desirable income-diversifying activities and learning skills that will help them build resilience, whole communities become less resilient to climate change.

Agroecology does create opportunities for women to increase their economic autonomy and, to some extent, influence power relations, especially within the household. While under conventional systems men control the inputs and outputs, with agroecological systems women have more decision-making control and income from an increased variety of crops and production methods. Also, as the holders of traditional knowledge and biodiversity, women have an important role to play in the transition process.

3.4 AGROECOLOGY AND ORGANIC AGRICULTURE

To implement agroecology, a farm does not necessarily have to be organic. Conversely, organic farms are not automatically agroecological. Both organic and conventional farms, however, can apply agroecological principles to manage their farmland and enhance the services provided by the ecosystem. Both organic and agroecological systems can also strive towards a common goal of maintaining the ecological, social and economic qualities of farms and farm communities. Whereas organic agriculture is often focused on the production practices of agriculture and input regulation, agroecology seeks to integrate diverse sustainable production system and has implications for the whole food system. The deliberate and explicit consideration of the social and economic dimensions of food systems is one of the specific characteristics of agroecology that makes it unique compared to organic agriculture. Additionally, whereas organic practices typically involve certification and restrictions, agroecology as of yet, lacks norms, regulations or certifications. Agroecology can be thought of as a larger, principles-based approach to transforming food systems in their complexities and multi-dimensionality, with a place for organic agriculture (and other sustainable production practices and approaches) under its umbrella so long as organic agriculture is striving to transform food systems in a particular ecological and cultural context.

The International Federation of Organic Agriculture Movements (IFOAM) sets standards for organic farming and defines organic agriculture as follows:

A production system that sustains the health of soils, ecosystems and people. It relies on ecological processes, biodiversity, and cycles adapted to local conditions, rather than the use of inputs with adverse effects. Organic Agriculture combines tradition, innovation and science to benefit the shared environment and promote fair relationships and a good quality of life for all involved. (IFOAM, 2005).

Even though most organic farms apply ecological principles to their production, not all of them necessarily manage their farmland as an ecosystem, but often focus on production intensification and input substitution (organic inputs for synthetic inputs). In doing so, they may still rely on a vast amount of off-farm inputs. In large-scale organic production systems, little attention may be paid to the erosion of soils, over-application of inputs, native wildlife habitat, local cultural heritage and transformative market economies. Organic agriculture often relies on external certification for input compliance.

3.5 AGROECOLOGY FOR ZERO HUNGER AND THE SDGS

FAO stands for the belief that Zero Hunger can be achieved if stakeholders and countries work jointly. Ending poverty and hunger by 2030 is feasible if the root causes can be tackled and the necessary transformative change on how food has been produced, distributed and consumed happens. The SDGs renew global commitments to tackle the big challenges of ending hunger, achieving food security and improving nutrition, and promoting sustainable agriculture. To achieve this by 2030, it is paramount to shift to sustainable food systems that produce more with less environmental costs. Agroecology offers a promising and innovative solution to this challenge. Also, it is necessary to recognize and respect the role of smallholder farmers in the process as they produce most of our food in the world. Developing and enhancing public policies tailored to them is vital.

Agroecology can contribute to accelerating the achievement of the 2030 Agenda and contributes to most of the SDGs. From tackling hunger, poverty and inequality to responding to climate change to safeguarding biodiversity and expanding nutritional choice, agroecology echoes the goals of the 2030 Agenda. Agroecology helps reduce hunger, inequalities and poverty, while respecting the environment. Agroecological systems focus at the same time on people and the planet, while strengthening the livelihoods of smallholder food producers, indigenous peoples, women and youth, promoting a fairer economy to all. Along with the SDGs, agroecology can also contribute to realizing the aims of the Paris Climate Agreement, the Convention on Biological Diversity and the United Nations Convention to Combat Desertification.

Transitioning towards agroecological systems is central to achieving the multiple, interlinked objectives of the SDGs. To unlock its potential and benefit from its transformative capacity, policymakers should start promoting policies and programmes that support agroecology and agroecological schemes as part of national strategy to implement the SDGs.



CHAPTER 4

CONCLUSIONS AND FINAL RECOMMENDATIONS

There is enough evidence that agroecology contributes to more sustainable food systems, in particular to delivering food production while respecting natural resources, ecosystem services and social processes. However, to assure agroecology can flourish, some barriers to transitions based on agroecological principles need to be removed. It is also important to highlight that agroecology has increasingly embraced social equity and political dimensions connecting consumption and production in the whole food system.

This overview shows that agroecology is also happening in European and Central Asian countries, and while there are various critically important examples, good cases and much potential in these regions, mainstreaming agroecology still faces many challenges. There is yet not enough agroecology-in-action to create and maintain a groundswell movement across the region and little in terms of ongoing commitments from government ministries. Across most of the countries, agricultural production and environmental protection are seen as separate domains; the policy dialogue between them is limited and in many cases perceived as opposite agendas.

Despite the national and local specificities, it is possible to identify common challenges faced by most of the farmers such as climate change, environmental degradation, soil and water pollution and/or scarcity and declining pollinator populations and ecosystem services at the environmental level. At the social level, the exodus of youth from agriculture, a lack of social organizations and gender-related issues can be also highlighted. The lack of income stability faced by most farmers as well climate change uncertainties and a lack of natural resource governance are a common ground throughout the region.

That said, agroecology could play an important role in the region supporting the integration of policies for sustainable agriculture while addressing social and economic issues. Agroecology aims to reconcile rural development and environmental production. For this to happen, social and political change are necessary.

With this in mind, some recommendation to keep strengthening the work in the region are as follows:

- » Continue to raise awareness on agroecology through consultations, discussions, meetings and inter-sectoral committees, thus enhancing the dialogue among different stakeholder and sectors.
- » Conduct baseline studies and situation analyses on agroecology, including data collection and data analyses in order to identify the strengths, weakness and gaps in the region.
- » Promote agroecology to extension services agents and include a curriculum on IPM, PGS and Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests, among others.
- » Promote policy dialogue and use agroecology as a bridge to enhance the dialogue among environmental and agricultural sectors.
- » Develop curricula for universities on agroecology and agroecology-related content to support the preparation of professional on this field in the regions.
- » Create an enabling environment for dialogue among policymakers and farmers/farmers' organizations encouraging the engagement of CSOs and farmers' organization in the decision-making process.
- » Align the activities on agroecology at regional level with the United Nations Decade of Family Farming (2019–2028) implementation

Agroecology is seen as a great opportunity to support the transformation that is needed in food systems at different levels and involve different stakeholders during the process. With this, FAO reassures its compromise in keep supporting countries to move towards sustainable food system leaving no one behind.

REFERENCES

- ADI.** 2017. Cemeha. In: ADI [online]. <http://adi.kg/soproizvoditel/semena.html>
- Agro-Eco-Culture.** 2019. Agroecology [online]. <http://agricultura.org/news/ekologicheskoe-selskoe-xozyajstvo-mozhet-udvoit-kolichestvo-prodovolstviya-agroekologiya/>
- Armenian National Agrarian University.** 2018. Chair of Forestry and Agroecology [online]. <https://anau.am/en/faculties/faculty-of-agronomy/forestry-and-agri-ecology/>
- Arneth, A., Barbosa, H., Benton, T., et al.** 2019. Climate change and land. In: IPCC [online]. https://www.ipcc.ch/site/assets/uploads/2019/08/Edited-SPM_Approved_Microsite_FINAL.pdf
- Azerbaijan State Agricultural University.** 2019. A scientific-practical conference on the theme "Development of organic agriculture in Azerbaijan" has been held at ASAU [online]. <http://adau.edu.az/news/adau-da-azerbaycanda-ekoloji-temiz-kend-teserrufatinin-inkisafi-movzusunda-elmi-praktik-konfrans-kecirilib>
- Basarisir Alamalari.** 2018. Organic Agriculture Department 2018 Base Scores. *Basarisir Alamalari* [online]. <https://www.basarisiralamalari.com/organik-tarim-bolumu-taban-puanlari?fbclid=IwAR3FakmXC4cea0xGG9S0mJ4WHzQYnPGcA34EvsomYs10QjQEW009yVchAUE>
- Ciglovska, B.** 2016. Environmental protection and sustainable development. Agroecology and agrotourism as a new cash cow for the farmers after the crisis: The case of FYROM. In: *Journal of Environmental Protection and Ecology*. 17(1): 276–283.
- Dört Mevsim Ekolojik Yaşam Derneği.** 2019a. Dört Mevsim Ekolojik Yaşam Derneği [online]. <https://www.dortmevsimekoloji.org/who-are-we/>
- Ecological Informational Service.** 2019a. And we will be branded garden! In: *Ecological Information Service* [online]. <http://ekois.net/i-u-nas-budet-brendovjy-sad/>
- Ecological Information Service.** 2019b. New course for the development of horticulture in the schoolyard Kyrgyzstan. In: *Ecological Information Service* [online]. <http://ekois.net/novjy-kurs-na-razvitie-prishkolnogo-sadovodstva-v-kyrgyzstane/>
- Ecological Informational Service.** 2019c. Is it safe to eat local fruits and vegetables? The bitter truth about pesticides. In: *Ecological Information Service* [online]. <http://ekois.net/bezopasno-li-est-mestnye-ovoshhi-i-frukty-gorkaya-pravda-o-pestitsidah/#more-32013>
- EcoStack.** 2019. EcoStack Partners. In: *EcoStack* [online]. <https://www.ecostack-h2020.eu/partners/>
- Equator Initiative.** 2017. Women and Earth. In: *Equator Initiative* [online]. <https://www.equatorinitiative.org/2017/05/30/zan-va-zamin-women-and-earth/>
- European CSA Research Group.** 2016. Overview of Community Supported Agriculture in Europe. <https://urgenci.net/wp-content/uploads/2016/05/Overview-of-Community-Supported-Agriculture-in-Europe.pdf>
- FAO.** 2017a. *Gender, Agriculture and Rural Development in Armenia* [online]. <http://www.fao.org/3/a-i6737e.pdf>
- FAO.** 2017b. *Report of the Regional Symposium on Agroecology for Sustainable Agriculture and Food Systems for Europe and Central Asia* [online]. <http://www.fao.org/3/a-i7604e.pdf>
- FAO.** 2018a. *Report of the Thirty-first Session of the FAO Regional Conference for Europe* [online]. <http://www.fao.org/3/mw908en/mw908en.pdf>
- FAO.** 2018b. *Sustainable Agriculture and Food Systems in Europe and Central Asia in a Changing Climate*. FAO Regional Conference for Europe. ERC/18/2. [online]. <http://www.fao.org/3/MW105EN/mw105en.pdf>
- FAO.** 2018. *The 10 Elements of Agroecology: Guiding the Transition to Sustainable Food and Agricultural Systems* [online]. <http://www.fao.org/3/i9037en/i9037EN.pdf>
- FAO.** 2019. Scaling up agroecology to achieve the sustainable development goals. Proceedings of the second FAO international symposium. Rome. 412 pp. <http://www.fao.org/3/ca3666en/ca3666en.pdf>
- Galstyan, M.H., Shirinian, A.V., Harutyunyan, S.S., Tamoyan, S.J., Sargsyan, K.Sh.** 2015. Assessment and remediation of soils previously buried under mine tailings and contaminated with heavy metals. In: *Annals of Agrarian Science*. 13(1). http://openjournals.gela.org.ge/index.php/AGR_SCI/article/view/1659
- Gliessman, S.R.** 2015. *Agroecology: the Ecology of Sustainable Food Systems*. 3rd Edition. Boca Raton, FL, USA, CRC Press, Taylor & Francis Group.
- IFOAM Organics International.** 2018. Directory of affiliates. In: *IFOAM Organics International* [online]. <https://directory.ifoam.bio/affiliates/316-federation-of-organic-development-bio-kg>
- IPCC.** 2014. *Climate Change 2014: Synthesis Report*. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland.
- Khamutovskaya, N.** 2019. Organic farming in Belarus today. In: *Center for Environmental Solutions* [online]. <https://ecoidea.by/en/article/3971>
- Lerman, Z. & Sedick, D.** 2017. Transition to smallholder agriculture in Central Asia. *Journal of Agrarian Change*. 17(4). DOI: 10.1111/joac.12282.
- MAFWE.** 2012. *National Program for Agriculture Development 2013–2017*. Ministry of Agriculture, Forestry and Water Economy, R. North Macedonia.
- Mlekara Petrov.** 2016. *Mlekara Petrov* [online]. <http://www.mlekarapetrov.rs/proizvodi?start=10>

Nurbekov, A., Aksoy, U., Muminjanov, H. & Shukurov, A. 2018. *Organic Agriculture in Uzbekistan: Status, practices and prospects*. FAO, Tashkent. <http://www.fao.org/3/i8398en/I8398EN.pdf>

The Tashkent Times. 2017. Uzbekistan's Development Strategy for 2017-2021 has been adopted following public consultation. *The Tashkent Times* [online]. <http://tashkenttimes.uz/national/541-uzbekistan-s-development-strategy-for-2017-2021-has-been-adopted-following->

UNDP. 2018. ENPAD-3: Sustainable Rural Development in Georgia. In: *UNDP Georgia* [online]. <https://www.ge.undp.org/content/georgia/en/home/projects/ENPAD-3.html>

University of Belgrade. 2019. In: Faculty of Agriculture [online]. <http://www.agrif.bg.ac.rs/Studije/140/190801>

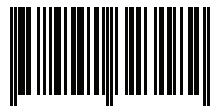
University of Novi Sad. 2019. Faculty of Agriculture. In: *University of Novi Sad* [online]. <http://polj.uns.ac.rs/en/node/1680#>

UTZ Certified. 2018. Your questions answered. In: *UTZ Certified* [online]. <https://utz.org/who-we-are/your-questions-answered/#what-does-the-name-utz-mean>

World Bank. 2017. Loans Helping Uzbek Farmers Sell More of "the Best Fruits and Vegetables in the World." In: *World Bank* [online]. <https://www.worldbank.org/en/news/feature/2017/11/14/loans-helping-uzbek-farmers-sell-more-of-the-best-fruits-and-vegetables-in-the-world>



ISBN 978-92-5-132318-2



9 789251 323182

CA8299EN/1/04.20