Promoting sustainable and circular bioeconomy through agriculture practice in Eastern Europe and Central Asia

2023
The term “bioeconomy” refers to the production and consumption of biomass-based goods, services and energy. It encompasses sectors such as forestry, pulp and paper production, agriculture, fisheries and the food industry. It also covers parts of the chemical, biotechnological and energy industries as well as the manufacturing of bio-based textiles. The vision for bioeconomy entails a system in which food, raw materials, chemicals and energy are based on renewable biological resources that allow economies to move away from fossil-based inputs (UNECE/FAO, 2022).

According to the Food and Agriculture Organization of the United Nations (FAO), a bioeconomy based on the sustainable and circular use of biological resources and processes to produce food, feed, bio-based products and services has major untapped potential to support both climate change mitigation and adaptation.

A sustainable and circular bioeconomy presents opportunities to improve climate change adaptation and resilience through promoting ecosystem restoration and nutrient and water retention in soils, supporting indigenous and local livelihoods based on biological products and services, and building the conditions for more sustainably managed forests, farmlands and fisheries.

Source: FAO/UNECE, 2022, adapted from Newton (2017)
Bioeconomy

The benefits

A sustainable and circular bioeconomy harnesses the use of biomass while respecting the natural cycle of forest regeneration to provide:

- food feed
- wood products for construction and furniture
- paper
- bio-based textiles
- biochemicals
- bioplastics
- biopharmaceuticals
- bioenergy
Bioeconomy initiatives

The benefits

- Reduced dependence on non-renewable materials such as fossil fuels, agrichemicals and plastics
- Mitigation of climate change and reduction of emissions
- Reduced waste generation
- Lower soil, air and water pollution
- Promotion of nature-based solutions (e.g. bioremediation) for ecosystem and land restoration
- Increased land management integration among agriculture, forestry, wildlife habitats and water resources
- Promotion of renewable and biodegradable materials
- Cascaded use of biomass leading and material efficiency
- Increased food safety through the reduced use of ingredients harmful to the environment and human health
- Circular and sustainable management of agricultural waste, contributing to increased recovery of materials for non-food applications (e.g. fertilizers, energy production, bioplastics and textiles)
- Reduced demand for new timber sourced directly from forests by reusing materials and improving product lifetimes
- Promotion of local supply chains
Sustainable agricultural systems

The implementation of bioeconomy in agriculture can be promoted by several sustainable agriculture approaches, as both sustainable agriculture and bioeconomy build on the principles of environmental protection, preservation and the optimal use of natural resources:

- **organic agriculture**
- **climate-smart agriculture**
- **circular agriculture**
- **integrated farming systems (agroforestry)**
- **pastoralism**
- **sustainable forest management**
- **bioenergy**
Organic agriculture

Organic agriculture is a holistic production management system that promotes and enhances agroecosystem health, including biodiversity, biological cycles and soil biological activity. It prefers management practices to the use of off-farm inputs, taking into account that regional conditions require locally adapted systems (FAO Codex Alimentarius).

Countries with the highest share of organic agricultural land

- Republic of Moldova: 1.3%
- Azerbaijan: 0.8%
- Serbia: 0.7%
- North Macedonia: 0.6%

Organic cereal production

- Ukraine: 160,194 ha
- Kazakhstan: 28,414 ha
- Republic of Moldova: 11,297 ha

Organic cotton production as a percentage of world production

- Kyrgyzstan: 9%
- Kazakhstan: 4%
- Tajikistan: 4%

Organic wild collection and beekeeping

- North Macedonia: 600,000 ha
- Albania: 500,000 ha
- Kosovo*: 400,000 ha
- Bosnia and Herzegovina: 200,000 ha

* References to Kosovo in this document shall be understood to be in the context of Security Council Resolution 1244 (1999).
Pastoralism

Pastoralism involves the management of different animal species and transhumant mobility between pasture sites, mostly associated with seasonal grazing. Pastoralism systems may vary considerably among countries, but transhumance, nomadic herding, common grazing and forest grazing are some of the common features.

The Western Balkans are particularly rich in local breeds, which are the result of centuries-old breeding practices. Serbia alone accounts for more than 30 breeds and landraces whose breeding lines are recorded by breeding associations. North Macedonia also supports its autochthonous (though low-productivity) breeds in its national strategy for rural development.

Pastoralism is an important agricultural activity in Central Asia and the Caucasus, with 22 percent of all global grasslands located in that subregion. Rangelands and pastures are the most relevant land uses there; they occupy 56 percent of the total land area and 78 percent of the agricultural land (FAOSTAT 2020 in Neudert 2021).
Sustainable forest management

Sustainable forest management, as defined by the United Nations General Assembly, is a dynamic and evolving concept that aims to maintain and enhance the economic, social and environmental values of all types of forests.

Despite the low forest cover, Central Asia is recognized as a global biodiversity hotspot and one of the major centres of crop origin and domestication, with more than 300 species of wild fruits and nuts. An estimated 10 million ha of walnut and fruit tree forests were lost in the past century alone.

The development of sustainable forest management in the region needs to be supported by national forestry strategies and data collection and monitoring systems.

<table>
<thead>
<tr>
<th>Forestland as a percentage of total land</th>
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<tbody>
<tr>
<td>Central Asia and South Caucasus</td>
</tr>
<tr>
<td>6.5%</td>
</tr>
<tr>
<td>Western Balkans</td>
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<tr>
<td>41%</td>
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</tbody>
</table>

- Georgia has developed a national set of sustainable forest management criteria and indicators
- Bosnia and Herzegovina has developed a national Forest Stewardship Council standard
- Kyrgyzstan is developing a national sustainable forest management concept of development with FAO
- Belarus is implementing a national sustainable forest management programme with FAO
Climate-smart agriculture

Climate-smart agriculture is an approach that helps guide actions to transform agrifood systems towards green and climate-resilient practices. Climate-smart agriculture supports reaching internationally agreed goals such as the Sustainable Development Goals and the Paris Agreement. It aims to tackle three main objectives: sustainably increasing agricultural productivity and incomes, adapting and building resilience to climate change, and reducing or removing greenhouse gas emissions.

The Western Balkans are particularly prone to drought, an issue that also is common in Central Asia and the South Caucasus. Most of the governments in the region have promulgated laws that identify and address the main threats posed by climate change. Although there aren’t dedicated strategies, all the countries have implemented specific climate-smart agriculture policies. The development or rehabilitation of irrigation systems is the most addressed area.

Republic of Moldova has a climate-smart agriculture component in its national agriculture strategy

Georgia has a climate-smart agriculture component in its national agriculture strategy

Kyrgyzstan has a climate-smart agriculture component in its national agriculture strategy
Bioenergy

Bioenergy, according to the International Energy Agency, is sourced from biomass, or the organic material that makes up plants.

The traditional form of producing bioenergy includes burning wood and charcoal, a practice still widely used in rural areas. Advanced bioenergy uses entail the processing of raw materials into solid, liquid or gassy energy matter.

The International Energy Agency and the Intergovernmental Panel on Climate Change consider bioenergy a central element for achieving zero net growth and fulfilling the Paris Agreement. Besides its key role in climate action, bioenergy also contributes to ensuring clean and universal energy access while enhancing food security and preserving biodiversity.

Bioenergy use as a percentage of total energy

- **Republic of Moldova**: 25%
- **Belarus, Georgia and Ukraine**: 5–10%

Republic of Moldova implemented national strategy

Ukraine drafted national strategy
Agroforestry

The term “agroforestry,” as defined by FAO, refers to land-use systems and technologies in which woody perennials (e.g. trees, shrubs, palms or bamboos) and agricultural crops or animals are used deliberately on the same parcel of land in some form of spatial and temporal arrangement.

A wide range of agroforestry systems are traditionally used in Central Asia and the Caucasus countries to reduce natural high exposure to soil degradation and dry spell phenomena.

The Republic of Moldova and Ukraine maintain windbreak shelterbelts.

Circular agriculture

Circular agriculture focuses on using minimal amounts of external inputs, closing nutrient loops, regenerating soils, and minimizing environmental impacts. In a circular economy, according to the United Nations Department of Economic and Social Affairs, the reuse and recycling of materials is an integrated part of the choices made during the production and use phase.

Achieving this kind of circular agriculture system will require smart integration between plant-based and animal-based supply chains.

The concept of circular agriculture is also used to address the integration of agricultural by-products and waste materials into value chains from a circular economy perspective.

Managed walnut woodlands for non-timber forest products (firewood, fruit, nuts, berries, mushrooms, etc.) are associated with hay harvesting in southern Kyrgyzstan.

Alley cropping with rainfed apple trees is used in the mountains of Tajikistan. Alley cropping with mulberry trees for silk production is associated with wheat crops in Uzbekistan.

Fruit trees associated with home gardens as a means of self-subsistence and income diversification are occasionally associated with wheat intercropping in Tajikistan.

Tree windbreaks to contain soil erosion, save water and improve yields are managed by public bodies in the Republic of Moldova and Ukraine. Tree windbreaks made of fruit trees such as apricots, apples and mulberries are used in Central Asian countries.

Bulgaria
- Circular economy strategy
- Agrifood sector prioritized

Kyrgyzstan
- Drafting circular economy national plan with an agrifood focus

Romania
- Circular economy strategy
- Agrifood sector prioritized
Conclusions

This report presents an overview of concepts related to bioeconomy and the benefits of their implementation in agriculture and shares agriculture production trends, bioeconomy initiatives and sustainable agriculture approaches from throughout the Eastern Europe and Central Asia region.

It provides a canvas for the consideration of potential policies and initiatives that can support the development of sustainable agriculture approaches, adapted to each country, and the promotion of bioeconomy in agriculture practice in the region.

Sustainable agriculture approaches – particularly organic production and climate-smart farming – are steadily gaining ground in the region. Bioenergy has significant untapped potential, and agroforestry and pastoralist activities also present important unused opportunities, given the low levels of investment needed for their implementation.

Policy recommendations

- Establish national and sectoral bioeconomy plans and dedicated institutional structures to support the agrifood sector.
- Improve country capacities to collect, monitor and utilize data related to bioeconomy.
- Build on existing international cooperation initiatives and the advantages of substantial regional integration.

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