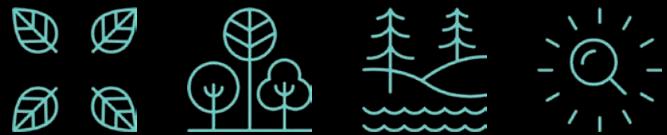




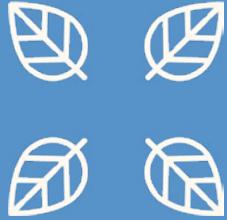
Food and Agriculture
Organization of the
United Nations



REPORT ON MONITORING
SCHEMES AND DATA
COLLECTION ON
**BIODIVERSITY FOR
FOOD AND AGRICULTURE**
IN EASTERN EUROPE AND
CENTRAL ASIA



**Schola
Campesina**
Sharing knowledge
for food sovereignty



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SCHEMES AND DATA COLLECTION ON
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AGRICULTURE
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Contents

Foreword	vi
Acknowledgements	vii
Acronyms and abbreviations	viii
Executive summary	x
.....	
  BACKGROUND INFORMATION	1
 	
1. CONTEXT	3
1.1 Institutional context	3
1.2 Global context: COVID-19 pandemic and biodiversity loss	4
2. OBJECTIVES	6
3. CONCEPTUAL FRAMEWORK	7
.....	
 PART I. THE COLLECTED DATA	10
	
1. AGRICULTURE IN THE REGIONS	11
1.1 Western Balkan countries and the Republic of Moldova	12
1.2 The South Caucasus countries, Turkey, Belarus and Ukraine	16
1.3 Central Asia	22
2. POLICIES AND LEGISLATION LINKED TO BFA	28
2.1 International conventions and instruments	30
2.2 The Western Balkan countries and the Republic of Moldova	32
2.2.1 International conventions and instruments	32
2.2.2 National policies and legislation	34
2.2.3 Key features	36
2.3 The South Caucasus countries, Turkey, Belarus and Ukraine	39
2.3.1 International legislation and instruments	39
2.3.2 National policies and legislation	40
2.4 Central Asia	44
2.4.1 International conventions and instruments	44
2.4.2 National policies and legislation	45
2.4.3 Key features of national legislation and policies	49

3. DATA COLLECTION AND MONITORING SCHEMES ON BIODIVERSITY FOR FOOD AND AGRICULTURE	51
3.1 International data collection and monitoring systems relevant for BFA	70
3.1.1 Focus on pollinators	72
3.2 The Western Balkan countries and the Republic of Moldova	73
3.2.1 General situation	73
3.2.2 Focus on pollinators	76
3.2.3 Data collection and monitoring systems: lack of coordination	77
3.3 The South Caucasus countries, Turkey, Belarus and Ukraine	78
3.3.1 General situation	78
3.3.2 Focus on pollinators	79
3.3.3 Focus on soils	80
3.4 Central Asia	81
3.4.1 Protected fruit forests	81
3.4.2 Pastoralism and biodiversity	83
3.4.3 Indigenous and local knowledge for biodiversity conservation	84
3.4.4 Focus on pollinators	85



PART II. IDENTIFICATION OF GAPS AT THE REGIONAL LEVEL 86

1. THE WESTERN BALKAN COUNTRIES AND THE REPUBLIC OF MOLDOVA	87
1.1 Legislative gaps	88
1.2 Gaps in monitoring systems and data collection	89
1.3 Focus on pollinators	90
2. THE SOUTH CAUCASUS COUNTRIES, TURKEY, BELARUS AND UKRAINE	92
2.1 Legislative gaps	93
2.2 Gaps in monitoring systems	93
2.3 Focus on pollinators	94
2.4 Focus on soils	95
3. CENTRAL ASIA	96
3.1 Legislative gaps	97
3.2 Gaps in monitoring systems and data collection	99



PART III. CONCLUSIONS 101

1. General observations	102
2. General recommendations	103

References	106
------------	-----

Boxes and tables

Table 1: Key information regarding agriculture for Western Balkan countries and the Republic of Moldova

Table 2: Key information regarding agriculture for South Caucasus countries, Turkey, Belarus and Ukraine

Table 3: Key information regarding agriculture for Central Asian countries

Table 4: Membership (+) of Western Balkan countries and the Republic of Moldova in international and regional legal instruments

Table 5: Description of existing policies and legislation in Western Balkan countries and the Republic of Moldova related to BFA

Table 6: Membership (+) of South Caucasus countries, Turkey, Belarus and Ukraine regarding international and regional legal instruments

Table 7: Description of existing policies and legislation in South Caucasus countries, Turkey, Belarus and Ukraine related to BFA

Table 8: Membership (+) of Central Asian countries regarding international and regional legal instruments

Table 9: Description of existing policies and legislation in Central Asian countries related to BFA

Table 10: Description of existing initiatives in Western Balkan countries and the Republic of Moldova related to BFA

Table 11: Description of existing initiatives in the South Caucasus countries, Turkey, Belarus and Ukraine related to BFA

Table 12: Description of existing initiatives in Central Asian countries related to BFA

Box 1: The biodiversity hold by smallholders

Box 2: Historical outlook of BFA conservation in the region

Box 3: National Programmes on Protection and Management of the Genetic Resources

Box 4: Rare fruit species protection in Kazakhstan

Foreword

Biodiversity for food and agriculture (BFA) protection and sustainable use encompass key aspects directly related to the *sustainability* of our food systems: biodiversity provides a diverse and heterogeneous biological basis for diverse and resilient production systems, for the pollination of cultures, for increased diversity of food, and is strongly linked to local and indigenous knowledge on local crops and breeds acknowledged as cultural heritage.

Food production systems, particularly in the case of the homogenised, high external input “industrial” production, have impacted biodiversity, promoting biodiversity loss and leading to a decline in the supply of important ecosystem services, both to the food and agriculture sector itself and to society. While drivers of biodiversity loss are well known, the legislative framework and subsequent policies are still not adequately addressing these issues.

The report on monitoring schemes and data collection on biodiversity for food and agriculture in Eastern Europe and Central Asia examines the existence of data collection, monitoring systems and conservation initiatives as well as legislation and policies related to BFA in the following three regions: Central Asia; the South Caucasus countries, Turkey, Belarus and Ukraine; and the Western Balkan countries and the Republic of Moldova.

The report brings light to the strong need to improve conservation and use of BFA in the region, including the establishment of solid monitoring schemes and a strong legal framework for its protection. Effective BFA conservation is directly linked to SDGs achievement and can play an important role in promoting zero hunger (SDG 2), life below water (SDG 14) and life on land (SDG 15).

Many needs and priorities have been identified. I would like to conclude by re-emphasising the significance of the challenges we face, the need for urgent action, and the FAO commitment to support countries in this process.

Vladimir Rakhmanin
FAO Assistant Director-General
Regional Representative for Europe and
Central Asia

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This publication is a result of a partnership with Schola Campesina Aps, to prepare a Report on Monitoring Schemes and Data Collection on Biodiversity for Food and Agriculture in Eastern Europe and Central Asia. It is also a regional result of the FAO regional office for Europe and Central Asia, which shows how important biodiversity is to the region.

BFA protection is directly related to the sustainability of our food systems, and it is paramount to raise awareness of its importance, identify gaps and promote actions to overcome them in order to achieve the SDGs.

With the coordination of Carolina Rizzi Starr and Caroline Ledant, the lead authors Agnieszka Makowska, Dr. Gordana Đurić and Elene Shatberashvili, and the other authors Dr. Atakan Büke, Fatih Tatari, Dr. Nelli Hovhannisyan, Dr. Mehman Rzayev, Dr. Svetlana Semenas, Sergii Borodin, Bogdana Mićić and Caroline Ledant collected and organised all the information here presented.

In addition, we would like to thank Patrick Mulvany and Guy Kastler for their very useful insights during the preparation of the publication; Andrea Ferrante for managing the process; Marta Arnes Garcia and Norbert Winkler for revising it; Sungyeon Park for reference verification and data checking; Tori Patterson for proofreading the document and for giving a unit to the report; and Nina Barrois for this amazing layout which gave a lot of life and colour to it.

Acronyms and abbreviations

AnGR

Animal genetic resources

ARIP

Agricultural Reform Implementation Project

BFA

Biodiversity for Food and Agriculture

BIMR

Biodiversity Information Management and Reporting

BIO_SOS

BIODiversity Multi-Source Monitoring System

CGIAR

Consultative Group on International Agricultural Research

CWR

crop wild relatives

DAD-IS

Domestic Animal Diversity Information System

DATAR

Diversity Assessment Tool for Agrobiodiversity and Resilience

ECPGR

European Cooperative Programme for Plant Genetic Resources

ERFP

European Regional Focal Point

FAO

Food and Agriculture Organization of the United Nations

GDP

gross domestic product

GIZ

Gesellschaft für Technische Zusammenarbeit
(German Agency for International Cooperation)

GPA

Global Plan of Action

IPBES

Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services

ITPGRFA

International Treaty on Plant Genetic Resources for Food and Agriculture

IUCN

International Union for Conservation of Nature

NBMS

National Biodiversity Monitoring System

NBSAP

National Biodiversity Strategies & Action Plans

NDS

National Development Strategy

NGO

non-governmental organisation

ORF BD

Open Regional Fund for Biodiversity

PGRFA

plant genetic resources for food and agriculture

RS

Republika Srpska (entity)

SPNA

specially protected natural area

TEEB

The Economics of Ecosystems and Biodiversity

UNCBD

United Nations Convention on Biological Diversity

UNDROP

United Nations Declaration on the Rights of Peasants and Other People Working in Rural Areas

UNEP

United Nations Environment Programme

UNESCO

United Nations Educational, Scientific and Cultural Organization

UPOV

International Union for the Protection of New Varieties of Plants

WHO

World Health Organization

WIEWS

World Information and Early Warning System on Plant Genetic Resources for Food and Agriculture

WWF

World Wildlife Fund

Executive summary

Biodiversity protection encompasses key aspects directly related to the *sustainability* of our food systems: BFA provides a diverse and heterogenous biological basis for diverse and resilient production systems, for the pollination of cultures, for an increased diversity of food, and is strongly linked to local and indigenous knowledge on local crops and breeds acknowledged as cultural heritage.

This study examines the existence of data collection, monitoring systems and conservation initiatives as well as legislations and policies related to biodiversity for food and agriculture in the three following regions: (1) Central Asia, (2) the South Caucasus countries, Turkey, Belarus and Ukraine and (3) the Western Balkan countries and the Republic of Moldova.

From this study, it appears that none of the three studied regions currently have any solid monitoring schemes for agricultural biodiversity, nor do they have a strong legal framework for protecting farmers' rights to seeds that would allow them, amongst other things, to maintain biodiversity. Conservation actions, policies, and legislation generally concern wild biodiversity conservation (through habitat protection) and crop genetic resources conservation but rarely address biodiversity for food and agriculture or wild biodiversity loss caused by food systems.

The three regional reports conducted in the framework of this study reported a

general lack of capacities and a particularly low level of involvement of farmers and other food producers in monitoring, data collection and conservation activities. The combination of these two major observations leads us to the conclusion that the governance of BFA should be transformed to put food producers at the centre of biodiversity monitoring and conservation, in dialogue with scientists and institutional actors. Their specific expertise must be acknowledged and valued in the efforts of preserving the biodiversity that they cultivate and sustain.

Beyond this needed shift in the governance of monitoring activities, we highlight the necessity of a regional articulation of monitoring efforts and a specific focus on local threatened varieties and breeds (beyond habitat conservation), while very comprehensively considering BFA and wild biodiversity impacted by food systems.

Regarding biodiversity protection, we recommend – in addition to farmer-centred data collection and monitoring system implementation – addressing the root causes of biodiversity loss, adopting a systematic approach in legislations, policies and actions while supporting agroecology, and fulfilling international instruments that guarantee the rights of producers to grow and raise local varieties and breeds.

While drivers of biodiversity loss are well known, the legislative framework ➤

and subsequent policies are still not adequately addressing these issues. While conservation initiatives are useful to protect biodiversity, we still need an enormous effort to sustainably halt and reverse biodiversity degradation. Implementing people's rights to food, to land, to seed, and to access natural resources, in conjunction with developing agroecology, will enable farming communities to feed their populations while protecting the basis of their livelihood in the long term: *biodiversity*.



BACKGROUND INFORMATION



1. Context

1.1 INSTITUTIONAL CONTEXT

This study has been conducted within the framework of a Letter of Agreement between the Food and Agriculture Organization of the United Nations (FAO) and Schola Campesina, with a specified mandate to “support evidence-based collection and analysis on biodiversity and agroecology in the Europe and Central Asia region.” This study has been conducted with the invaluable support of Schola Campesina’s partners in the three regions:

- **The Western Balkan countries and the Republic of Moldova:**
Albania, North Macedonia, Montenegro, Serbia, Bosnia and Herzegovina
Partner and lead author: Dr. Gordana Đurić¹
- **The South Caucasus countries, Turkey, Belarus and Ukraine:**
Armenia, Azerbaijan, Belarus, Georgia, Ukraine, Turkey
Partner: *Biological Farming Association ELKANA*
Lead author/coordinator: Elene Shatberashvili²
- **Central Asia:**
Kazakhstan, Kyrgyzstan, Uzbekistan, Turkmenistan, and Tajikistan
Partner and lead author: Agnieszka Makowska³

¹ Dr. Gordana Đurić is a full professor at the University of Banja Luka in two scientific fields: horticulture, and protection and sustainable use of genetic resources. She has worked extensively with NGOs in the fields of agriculture and rural development through various projects which have focused on establishing sustainable forms of production - both integrated and organic. In recent years, she has worked to promote the concept the concepts of agricultural biodiversity protection and agroecology. Having garnered extensive experience in the fields of agriculture, forestry, and water management, as well as European integration and regional development, she has worked to raise public awareness of the need for real and functional national legislation, and to bring it into line with European legislation in these fields.

² Country data provided by:
Armenia: Dr. Nelli Hovhannisyan, PhD, Associate Professor, Head of Department of Ecology and Nature Protection of Yerevan State University
Azerbaijan: Dr. Mehman Rzayev, Councillor for Agro-Research Centre, Azerbaijan
Belarus: Dr. Svetlana Semenovs, NGO 'Agro-Eco-Culture'
Georgia: Elene Shatberashvili, Biological Farming Association "Elkana"
Ukraine: Sergii Borodin, Head of Innovations Department, Kyiv National Science Agriculture Library
Turkey: Dr. Atakan Büke, Fatih Ttatari, Yerküre Local Studies Scientific Research & Development Cooperative

³ Agnieszka Makowska has gained considerable experience within the region of Central Asia. In 2005–2015, she coordinated development projects in Kyrgyzstan and Tajikistan related to access to drinking water in rural areas. Previously, in the years 2001–2005, she conducted research on local communities in Uzbekistan (mainly in the field of local culture and the so-called "folk" Islam). Since 2016, she has been working as a farmer running her own farm. Since 2018, she has been the coordinator of the Polish Living Earth Coalition, working for systemic changes in agri-food policy in Poland and the European Union. She is co-founder of the Food Sovereignty Movement Nyeleni Poland.

1.2 GLOBAL CONTEXT: COVID-19 PANDEMIC AND BIODIVERSITY LOSS

This study was conducted in 2020 in a context of continuous loss of biodiversity across the world and in an extraordinary health crisis which impacted all sectors of societies. This introduction aims to briefly explore some aspects linking biodiversity loss with (1) food and agriculture and (2) the resilience to shocks such as a global pandemic (e.g. COVID-19) or climate disasters.

Biodiversity loss and food systems

The rate of biodiversity loss (i.e. species and their habitats) is increasing (IPBES, 2018a). The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) (2018a) states that, consequently, the contributions of nature to people's lives (water, forest products, land for agriculture, cultural aspects relying on nature, livelihoods, etc.) are decreasing. Local economies, culture, and food are directly or indirectly impacted by the loss of biodiversity in Europe and Central Asia.

The main driver of the loss of biodiversity and ecosystem services in Europe and Central Asia is land-use change. Intensification in agriculture and forestry caused by production-based subsidies as well urbanisation have led to biodiversity decline. At the same time, changes and reduction of "traditional land use has reduced semi-natural habitats of high conservation value and associated indigenous and local knowledge, practices and culture across the region" (IPBES, 2018a, p. 11).

Beyond the impacts of industrial food

systems on the loss of wild biodiversity, it is essential to examine its impacts on the degradation of BFA. Many underlying pressures within societies have a negative impact on it. We present three of them here.

1. There is poor valuation, in societies and policies, of local and indigenous knowledge regarding food production, cooking, breeding, seed saving, processing, conservation, etc. This leads to a higher dependence on industrially produced and commercialised food. This results in a loss of genetic diversity of cultivated food and a loss of diversity in consumed food, with consequent negative impacts on health. In 2016, FAO estimated that 42.5 percent of the world's food caloric supply was provided by only 3 principal cereals: maize, wheat and rice (FAO, 2016). In 2014, only 9 plant species accounted for 66 percent of total production of crop (FAO, 2019a).
2. The disappearance of local markets also has an impact on BFA and low diversity in consumed food. Short food value chains allow for the commercialisation of a wider variety of products than long food value chains that, for evident logistic reasons, are not able to include (fresh fruits and vegetables having a low resistance to transportation and/or storage).
3. Legal barriers, induced by seed companies, on the possibility to exchange and sell seeds are directly preventing farmers from maintaining and developing diversity at species and genetic levels. This invaluable heritage handed down by previous generations is a major component of biodiversity ➤

and is poorly supported and too often threatened by public policies and private actors. The same kind of pressures occur with fisherfolks attempting to preserve fish variety (and stocks) while having to contend with the highly damaging fishing activities carried out by large companies, whose operations are technically legal and so are permitted to continue unabated and poorly regulated.

Biodiversity loss causes new shocks (e.g. COVID-19 pandemic) and diminishes resilience

In the same way that land use change is expediting biodiversity loss and a diminution of nature's contributions to people (as previously explained), it is also driving the emergence of new diseases, which pose a threat to human health (IPBES, 2020).⁴ This is further asserted by FAO (2020a), as well as representatives from the World Wildlife Fund (WWF), the United Nations Convention on Biological Diversity (CBD) and the World Health Organization (WHO).⁵

It is evident today that the capacity to adapt to new stresses at farm and society levels, beyond food production and environmental resilience, highly depends on BFA. Many scientific publications refer to the strong link between biodiversity and resilience to shocks in food production systems. We will look here at the less visible role of biodiversity in the resilient character of localised food systems.

The current COVID-19 crisis showed the importance of **reliable local food sources**, relying on biodiversity. The prevailing long food value chains are highly vulnerable to unpredictable perturbations, and global food security has been ensured thanks in large part to existing territorial food systems, based on family farming, agroecology (Leippert *et al.*, 2020; Schola Campesina, 2020) and biodiversity, which are able to provide food to the vast majority of the world's population (family farming is estimated to provide 80 percent of all food consumed [FAO, 2020b]). **Biodiversity for food and agriculture, as well as wild biodiversity, and the activity of pollinators are the foundational resources utilised by small-scale farmers to produce the vast majority of the food sold in local markets all over the world.** This localised and sustainable economy could prevent the global population from experiencing food shortages during the crisis (Schola Campesina, 2020).

⁴IPBES (2020, p. 2) states that "pandemics have their origins in diverse microbes carried by animal reservoirs, but their emergence is entirely driven by human activities. The underlying causes of pandemics are the same global environmental changes that drive biodiversity loss and climate change. These include land-use change, agricultural expansion and intensification, and wildlife trade and consumption."

⁵Lambertini, M., Maruma Mrema, E. & Neira, M. 2020. Coronavirus is a warning to us to mend our broken relationship with nature. *The Guardian* [online]. [Cited 10 November 2020]. <https://www.theguardian.com/commentisfree/2020/jun/17/coronavirus-warning-broken-relationship-nature>

2. Objectives

The study is expected to contribute to FAO Strategic Objective 2: increase and improve the provision of goods and services from agriculture, forestry and fisheries in a sustainable manner.

The overall research objective is to support policy implementation at all levels to better address the loss of BFA and to mainstream biodiversity across agricultural sectors at national and regional levels, in alignment with the FAO strategy (FAO, 2020a). The specific objectives are:

- To enhance the knowledge of existing systems (of BFA data collection and monitoring schemes) developed at national and regional levels in Central Asia and Eastern Europe
- To identify potential gaps to be addressed
- To suggest recommendations to solve these gaps

3. Conceptual framework

The objective of this study is to summarise the state of the knowledge from monitoring and data collection efforts on biodiversity for food and agriculture. For the purposes of this report, BFA corresponds to “the variety and variability of animals, plants and micro-organisms at the genetic, species and ecosystem levels that sustain the ecosystem structures, functions and processes in and around production systems, and that provide food and non-food agricultural products” (FAO, 2013b). BFA includes plant, animal and aquatic genetic resources for food and agriculture, forest genetic resources, associated biodiversity and wild foods. It also includes micro-organisms used for food processing and in agro-industrial processes. Agriculture is taken here to include crop and livestock production, forestry, fisheries and aquaculture (FAO, 2019a).

BFA also includes the “*associated biodiversity*” which refers to “the myriad components of biodiversity that support food and agricultural production by providing services such as pollination, pest control, soil formation and maintenance, carbon sequestration, purification and regulation of water supplies, reduction of disaster threats, and the provision of habitat for other beneficial species”⁶ (FAO, 2019a, p. xix). ➤



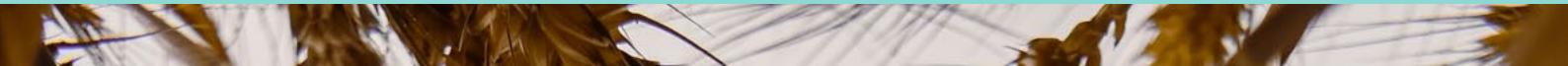
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⁶ “Examples [of associated biodiversity] include pollinators, the predators of crop pests, the vegetation found in hedgerows and at field margins, and the invertebrates and micro-organisms that help to create and maintain the soil and its fertility. In addition to beneficial species such as pollinators, crop associated biodiversity includes the various species that inhibit crop production by acting as weeds or pests” (FAO, 2019a, p.12).

BACKGROUND INFORMATION

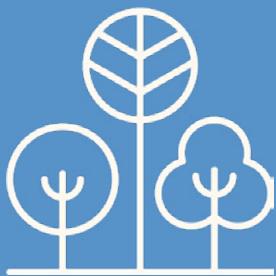
Of specific importance to this study are the *wild relatives* of cultivated crops (Crop Wild Relatives [CWR]) in high concentration in the region of interest that secure a precious reservoir of genetic diversity and pollinators.

In the framework of this study, no monitoring or data collection action dedicated specifically to the biodiversity impacted by food systems – for instance, wild species threatened by land-use change – has been reported. Nevertheless, it is well acknowledged by the scientific community that industrial agriculture is a major driver of land-use change which is the largest direct driver of biodiversity loss (IPBES, 2019).



BOX 1: The biodiversity hold by smallholders

"Seeds hold a special place in the struggle for food sovereignty. These small grains are the basis for the future. They shape, at each life cycle, the type of food people eat, how it is grown, and who grows it. Seeds are also a vessel that carries the past, the accumulated vision, and knowledge and practices of peasant and farming communities worldwide" (La Via Campesina, 2013, p. iii).



PART I

THE
COLLECTED
DATA

AGRICULTURE IN THE REGIONS

“ Over millennia, agricultural biodiversity has co-evolved with, and has been selected and dynamically managed by, peasants, Indigenous Peoples and other knowledgeable small-scale food providers – pastoralists, fishers, forest dwellers, gardeners, etc. – using their knowledge, innovations and practices. Their biodiverse production provides food for more than 70 percent of the world’s peoples ”

Mulvany, 2020, para. 11



1.1 Western Balkan countries and the Republic of Moldova

This group of countries is considered to be: Albania, Bosnia and Herzegovina, Montenegro, North Macedonia, Serbia, and the Republic of Moldova.

The Balkan Peninsula is a hotspot of biodiversity at the species and genetic level as well as at the ecosystem level. The geomorphological and climatic diversity of the area has promoted and nurtured a high diversity of flora and fauna (Cvijić, 1922; GIZ, 2018). The movement of people and the mixing of civilisations has also contributed to a high level of diversity in cultivated plants and animals (Đurić *et al.*, 2009).

Agriculture and the food industry in the region still comprise a large share of the gross domestic product (GDP) compared to European Union (EU) countries. The importance of small-scale agriculture in the region facilitates the continued production of many old indigenous plant populations and varieties and breeds of domestic animals. These agricultural practices have contributed to mitigating soil contamination by pesticides and chemicals, thereby maintaining fertility and microbiological activity (Rivera *et al.*, 2018; Bosnia and Herzegovina Country VI reports to CBD). The BFA relies on traditional knowledge and is, therefore, at risk in view of the aging rural population (Thorn, 2012).

Agriculture is still a major source of employment, especially in the area of so-called informal employment (Volk, 2010;

Cukaliev *et al.*, 2018; Rivera *et al.*, 2018). Family members are still the main workers in small and family farms in most countries of the region. These small agricultural holdings play a key role in the preservation and sustainable use of BFA. These farms are specifically adequate places to involve in on-farm conservation programmes for food and agriculture and related subsidies. Projects and incentives represent a promising way for better use and marketing of traditional agricultural products and cooperation between farmers, processors, local government structure and consumers.

Throughout the region, there is still a clear link between BFA and traditional knowledge typified by the traditional use of a variety of plants and animals. However, compared to developed countries, Balkan countries do not have strong legislation and policies for the conservation, sustainable use, and promotion of BFA. Awareness of the importance of conservation and the key role of BFA for food security is generally lacking, which results in weak legal and financial support for these activities.

This treasure of world importance is under threat as agriculture becomes more industrialised, pushing local landraces out of the farmers' fields. There is higher pressure on crop wild relatives as they:

- a) mostly grow near (along the ridges of) traditional cropland and where a farm completely uses land, without leaving ➤

Table 1: Key information regarding agriculture for Western Balkan countries and the Republic of Moldova (official statistical data provided for VI national reports 2019 to the CBD)

Country	Albania	Bosnia and Herzegovina	Montenegro	North Macedonia	Republic of Moldova	Serbia*
Agriculture share of GDP in %	20	6.24	10.5	10	11.5	10
Employment, share of agriculture in %	44.6	19	24.4	17.9	36.1	15.9
The average size of farms (ha)	3.65	2.86	5.88	1.37	2.49	5.47

*without the territory of Kosovo and Metohija

Source: Republic of Albania Ministry of Tourism and Environment, 2019; Ministry of Foreign Trade and Economic Relations of Bosnia and Herzegovina, 2019; Montenegro Ministry of Sustainable Development and Tourism, 2018; Republic of North Macedonia Ministry of Environment and Physical Planning, 2019; Lozan et al., 2019; Ministry of Environmental Protection of the Republic of Serbia, 2019.

buffer zones, or uses vast areas of traditional cropland for non-agricultural purposes, the vulnerability level of these crops also increases

b) wild forms of fruit and berry crops belong to the plants growing in the forests and are collected for food. As a result, if wild collection is not effectively regulated by law, the vulnerability level of these crops increases as well.

The most important field crops in the region, except in Montenegro, are cereals, comprising between 40 percent to 65 percent of the arable land. Oilseeds and sugar beet are produced on a larger scale only in Serbia and the Republic of Moldova, while tobacco is important in North Macedonia, Bosnia and Herzegovina, and Montenegro. Fruits and vegetables are amongst the leading crop sectors in all countries (Volk, 2010; Cukaliev et al., 2018; Rivera et al., 2018).

Main productions in the region

The Balkan countries have mountainous areas, hilly zones, and lowlands. Cereals and vegetables are mostly cultivated in lowland areas, whereas fruit trees and grapes are more dominant in hilly zones. Land fragmentation is common in all countries, with a low average farm size (Đurić and Golub, 2018; Ivanovska and Andonov, 2018; Jovović and Marković, 2018; Dajić and Đorđević Milošević, 2018; Drkenda and Zečević, 2018).

Livestock production is important as well. In most countries, beef or milk production comprises the dominant value chains (Volk, 2010). The pig and poultry sectors are also very important and amongst the leading livestock production sectors. In addition, the sheep and goat sector is quite important in all countries (Cukaliev et al., 2018; Rivera et al., 2018).

The region is characterised by a low competitiveness on the global market. ➤

Amongst all the Western Balkan countries and the Republic of Moldova, only Serbia, which is also the only net exporter of agricultural and food products, shows significant price competitiveness.

Forest areas cover all regions, with single-species forest being the most common (62.3 percent of forest area) and the highest share of broadleaved stands in Europe (FOREST EUROPE, 2020). Montenegro (the only one with over 60 percent), Serbia and Bosnia and Herzegovina have the largest shares of forest. The Republic of Moldova, with only 12.7 percent of forest cover, has the highest percentage of broadleaved trees (100 percent). The majority of forests are not intensively managed and not well protected for biodiversity. The stability and resilience of forest ecosystems in the region is also compromised by the risk of fires (Dimic and Pavlovic, 2016).

In all Balkan countries and the Republic of Moldova, aquaculture is practised predominantly with one carp species (common carp); other carp species (silver carp, bighead carp, grass carp) are present to a much lesser extent. In cold-water farms, rainbow trout is prevailing. Mariculture production consists of gilthead seabream, European seabass, oyster and mussel (FAO, 2021a). With 18 freshwater Key Biodiversity Areas (Darwall *et al.*, 2014), the Balkans represent an immeasurable wealth of freshwater fish diversity, especially in the areas characterised by high levels of endemism and vulnerability, like the Attikobeotia region, Ionian Sea and Prespa Lakes (Oikonomou *et al.*, 2014). The major threats to freshwater ecosystems come from hydropower developments, water intake for agriculture, land use in upper catchments, and coastal tourism. A large presence of alien fish species with major

corridors for their spread being the transboundary rivers and lakes, such as the Ohrid-Drin-Skadar river system, also poses a serious threat for the stability of freshwater ecosystems and the survival of aquatic biodiversity in general (Piria *et al.*, 2017).



1.2 The South Caucasus countries, Turkey, Belarus and Ukraine

The studied region includes Armenia, Azerbaijan, Belarus, Georgia, Ukraine, and Turkey.

The region is home to diverse ecosystems, diversity of soils, and the wild relatives of many domesticated key crops and animal species. It hosts many local varieties and breeds (landraces) of cultivated plants and domesticated animals, especially of grain crops, vegetables, fruits and livestock. The region is also well known for the richness of soils.

Agriculture of the region, being the main source of economic activity in rural areas, is predominantly based on smallholder and family farming (except in Belarus, where big state-owned farms dominate) and is highly important in the economy of the countries of the region, both in terms of share of the GDP and employment in rural areas.

In terms of both land resources and production, the region is extremely diverse.

Together with well-developed livestock production, the fertile soils of Ukraine and Belarus provide grains, potatoes, root vegetables, fruits and barriers. At the same time, while the agriculture of the South Caucasus and Turkey has greater scarcity of land and water resources due to mountainous landscapes and dryer climates, it also provides higher diversity of production, including a wide range of grains, legumes, fruits and vegetables, grapes, citruses, tea, greens, spices, etc. It must be mentioned that Turkey and Ukraine are amongst the major agricultural countries in the world in terms of production, land area and population employed in agriculture.⁷ ►

⁷ According to FAOSTAT data from 2018, Turkey was in 12th place with the Value of Agricultural Production (in 1 000 USD) and Ukraine in 21st place in the world (<http://www.fao.org/faostat/en/#data/QV>); at the same time Ukraine was in 10th and Turkey in 15th place in the world by cropland area (<http://www.fao.org/faostat/en/#data/RL/visualize>). As for rural population, Turkey has the 2nd largest rural population in Europe and Ukraine the 6th largest (in the world, they have more modest 25th and 39th places) (<http://www.fao.org/faostat/en/#data/OA>) (remark by the author).

Table 2: Key information regarding agriculture for South Caucasus countries, Turkey, Belarus and Ukraine

Country	Armenia (FAO, 2020c)	Azerbaijan (IFAD, 2018)	Belarus (World Bank, 2021)	Georgia (World Bank, 2021)	Ukraine (State Statistics Service of Ukraine, 2017)	Turkey (World Bank, 2021)
Agriculture share of GDP in %	13.7	5.3	6.4	7.2	10.14	6
Employment, share of agriculture in %	25	36	7.6	41.3	14.2	18.9
The average size of farms (ha)	1.4	1 to 3	72	1.4	100	6.63

BFA of the South Caucasus countries and Turkey

Scientists believe that one of the most ancient and important centres of the domestication of plants and animals and the origin of agriculture is in the territory of Western Asia, where agriculture started in a “fertile crescent” about 12 000 years ago. Turkey is also a major part of another centre – Mediterranean Centre of Cultivated Plants.

The Middle Eastern and Mediterranean Centres of Cultivated Plants are believed to be the centres of domestication of about 164 crops, including wheat, rye, oats, barley, grass pea, lentil, olive, grape, fig, pomegranates, kale, beet, turnip, lettuce, asparagus, apricots, garlic, onion and many others. It is also believed that cattle, pig, goat and sheep, as well as of the Caucasian Honeybee (*Apis mellifera caucasica*), were domesticated around these territories. Therefore, hundreds of wild relatives and landrace varieties and breeds of these crops and animals are now widely spread across forests, pastures and croplands of Caucasus and Turkey.⁸

Besides this, as Turkey and the South Caucasus are located at a crossroads of Europe and Asia, many cultivated

plants that make up our diet today were introduced from different parts of the world at different times. Some plants and trees that were domesticated in other parts of Central and Eastern Asia and in the Mediterranean region have been grown in these countries for many centuries. Other crops were introduced relatively later and have become very popular. Cucumber (Chomicki, Schaefer and Renner, 2020), eggplant (Daunay and Janick, 2007), and black pepper (Katzer, 2015)⁹ were introduced from India; watermelon came from West Africa (Chomicki and Renner, 2015); maize, sunflower, tomato, common bean, chili pepper, tobacco, and potato were brought from the Americas (Pickersgill, 2007) and introduced in Western Europe; tea (Meegahakumbura *et al.*, 2018) and citruses (Langgut, 2017) were introduced from Western Asia, etc. Over time, many different local varieties of these crops have been developed.

Forest unevenly covers the territory of the Caucasian countries and Turkey, including two of the world’s biodiversity hotspots (the Caucasus and the Irano-Anatolian) — from around 11 percent in Armenia to almost 40 percent in Georgia. The majority is mountain forest with a broad range of tree species, including Oriental beech (*Fagus orientalis*), Georgian oak (*Quercus iberica*), chestnut oak (*Quercus castaneifolia*) and ➤

⁸ Wild relatives of field crops are, for example, the wild einkorn (*Triticum boeoticum*), wild emmer (*Triticum dicoccoides*, *Triticum araraticum*), wild wheat (*Triticum urartu*), goat grass (*T. Aegilops tauschii*), wild barley (*Hordeum spontaneum*, *Hordeum leporinum*, *Hordeum bulbosum*), oat (*Avena strigosa* subsp. *Barbata*), rye (*Secale anatomicum*), peavine (*Lathyrus tuberosus*), vetch (*Vicia johannis*), fax (*Linum humile*), onion (*Allium cardiostemon*), asparagus (*Asparagus caspius*), the wild and weedy forms of *Pisum* (*P. humile*; *P. elatius*), wild progenitors of cicer (*C. pinnatifidum*, *C. echinospermum*, *C. bijugum*, *C. reticulatum*), brassica (*B. cretica*), radish (*Raphanus raphanistrum*), celery (*Apium graveolens*), beet (*B. maritima* and *Beta* spp.), carrots (*Daucus* spp.), rockets (*Eruca* spp.), wild lettuce (*Lactuca* spp.), mustard (*Sinapis* spp.), etc. The fruit and berry species growing in the wild that are worthy of mention are: the wild vine (*Vitis vinifera* subsp. *Sylvestris*), wild pear (*Pyrus communis*, *P. Caucasicus*), wild apple (*Malus domestica*, *M. Orientalis*), quince (*Cydonia oblonga*), blackthorn (*Prunus spinosa*), sour cherry-plum (*Prunus vachushti*), cherry plum (*Prunus cerasifera* var. *divaricata*), wild cherry (*Cerasus avium*, *C. vulgaris*), kernel (*Cornus mas*), meddler (*Mespilus germanica*), pomegranate (*Punica granatum*), raspberry (*Rubus idaeus*), currants (*Ribes rubrum*, *R. nigra*, *R. alpinum*, *R. Biebersteinii*), figs (*Ficus carica*), bladdernuts (*Staphylea colchica*), hazelnut (*Corylus avellana*), almond (*Amygdalus communis*), walnut (*Juglans regia*), chestnut (*Castanea sativa*), olive (*Olea europaea*), pistachios (*P. terebinthus*, *P. lentiscus*), cornel cherry (*Cornus sanguinea*) and others (FAO, 2018a; Biological Farming Association Elkana, 2019; Ministry of Agriculture, 1995; Foster-Turley *et al.*, 2020).

⁹ *Piper nigrum* L.

hornbeam (*Carpinus betulus*). The forest is rich in biodiversity with a high level of endemism; about 11 percent of forests in the Caucasus and Turkey is devoted to conservation of biodiversity (FAO and UNECE, 2019; Kandemir, 2013; Küçük and Ertürk, 2013).

The region is rich in marine and inland water resources, and both fishing and fish farming are practiced. Anchovies dominate Black Sea marine fishing, with much smaller portions distributed amongst four other fish species of commercial value. In the Caspian Sea where catches are decreasing, stocks of all 27 sturgeon species, 90 percent of the world's stock, remain on the edge of extinction (Salmanov *et al.*, 2013).

Regional aquaculture production relies on very few species of carp and trout. In Armenia and Turkey, where the dramatic growth in freshwater aquaculture is observed, trout species (golden trout and rainbow trout) dominate, while two carp species (common carp and grass carp) prevail in Georgian and Azerbaijani aquaculture. Another two species (European seabass and gilthead seabream) represent the main marine fish culture species in Turkey, while efforts have been made for the commercial production of alternative fish species (FAO, 2021a).

BFA of Ukraine and Belarus

Both countries are well known for rich soils adapted to agriculture. The region belongs to the Euro-Siberian Centre of Cultivated Plants, where the domestication of horses has also occurred, and is a home to many local varieties/breeds (landraces) of cultivated plants and domesticated animals adapted to northern climates,

especially grain crops, vegetables, berries and livestock.

Agriculture is greatly important to people's livelihoods in rural areas and is largely composed of family farms in Ukraine, while large state-supported agro-industrial holdings dominate in Belarus. The region produces a variety of crops for local consumption and exportation.

The forest with diverse composition (over 30 forest-forming tree species) covers 17 percent of Ukraine, with the major concentration in the Ukrainian Carpathians, and around 40 percent of Belarus with the leading forest regions of Gomel, Minsk and Vitebsk. Forests are predominantly state-owned in Ukraine and exclusively state-owned in Belarus; eleven percent and 16 percent of forests, respectively, are found in protected areas.

With the wide surface of medium and large rivers, fishpond farming is the leading production method in Belarus. The state-owned pond farms (88 percent of fish production) prevail in the sector. The most common farmed fish species is the carp (*Cyprinus carpio*). A positive trend in the development of aquaculture – an increase in the numbers of small fish farms – is also observed in Ukraine.

At the same time, the aquatic species diversity is rapidly decreasing in Ukraine. The fish stocks of the Dnieper estuary and the lower reaches, which traditionally consisted of 66 species of fish from 12 families (the main commercial species were bream, pike perch, carp, tench, pike, catfish, and perch), suffered the most. In the Azov-Black Sea basin, the volume of commercially valuable fish catch (like sprat, flounder kalkan, atherina in the Black Sea and tulka in the Azov Sea) has ➤

sharply reduced, along with decreased bioproductivity of marine ecosystems. About 30 endemic fish species have disappeared or are on the verge of extinction - thorn, beluga, stellate sturgeon, Russian sturgeon, sterlet, Black Sea herring, Black Sea salmon, golden carp, river eel, burbot, and others (Kireeva, 2017).

BOX 2: Historical outlook of BFA conservation in the region

In terms of the historical outlook of the BFA conservation policies, the region can be divided into two main parts: Post Soviet countries (Armenia, Azerbaijan, Belarus, Georgia and Ukraine) and Turkey.

Since the 1930s, rapid industrialisation of agriculture in the region has had significant effects on soil health and agricultural ecosystem balance, including the dispersion of pollinator species and impacts on the diversity of crop and animal species and varieties/breeds applied in agriculture.

In the Soviet epoch, a policy of specialisation that was characteristic of a rigidly planned economy led, especially from the 1950s, to a dramatic reduction in the local plant and animal genetic resources important for food and agriculture in fields and farms. Cultivation of local landraces was sometimes even criminalised as sabotage to the economic development and food security of the Soviet State. By the 1990s, most of the local species and landrace varieties of agricultural crops could be found only in research institute collections, and in very rare cases in peasant farms. In addition to the Soviet policies, even greater reductions in BFA occurred after the breakdown of the Soviet Union. Poor financial conditions and permanent reforms in agricultural, as well as science and education, sectors meant that the preservation of plant and domestic animal collections in research institutes and breeding stations became highly problematic. In recent years, several BFA conservation programmes have been implemented, thanks to the efforts of individual organisations and governments. However, these attempts are still insufficient for conserving the region's BFA, especially when it comes to on farm (*in situ*) conservation.

Turkey's industrial production started to encroach upon agroecological family farming from the 1950s but gained more influence from the 1980s. After the Agricultural Reform Implementation Project (ARIP) in the 2000s, neoliberal agricultural policies have been actively mainstreamed, resulting in the reduction of local landrace and breed diversity (Soysal Al, 2020).

Despite this, a family farming-based profile of agriculture in the region is still a principal driver in supporting diversity of ecosystems and varieties/breeds, and traditional knowledge is still maintained in the remote rural areas, albeit remaining very marginalised and often associated with connotations of outdated modes of living and economic systems.

Since the 1990s, with the rise of ecological and agroecological movements (including organic, permaculture movements, etc.), issues related to the importance of BFA conservation started to generate interest amongst farmers and the broader public. Different initiatives for conserving local seeds and breeds have emerged, and consumer demand for local, agroecological and traditional products has started to increase (including Geographic Designations and Indications labelling). Producers and consumers cooperatives, NGOs, and other non-governmental initiatives have had a leading role in this process. On the other hand, due to the influence of international instruments, such as the CBD and the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA), and the work of intergovernmental bodies such as the Commission on Genetic Resources for Food and Agriculture, the states started to pay more attention to the collection of BFA-related information and also to the monitoring of existing prevalent trends.



1.3 Central Asia

The Central Asia region includes:
Kazakhstan, Kyrgyzstan, Uzbekistan, Turkmenistan, and Tajikistan.

In the region, 60 percent of the people live in rural areas. Agriculture provides employment for most of the population.

The main agricultural commodities are wheat and cotton. Much of the region

is covered by an extensive pastures area, most of which is used for livestock production. Arable land is quite limited – mainly in Kyrgyzstan and Tajikistan, where most of the territory is mountains, and also in Uzbekistan due to its high population.

Table 3: Key information regarding agriculture for Central Asian countries

Country	Kyrgyzstan (FAO, 2020d)	Kazakhstan (World Bank, 2021)	Uzbekistan (World Bank, 2021)	Turkmenistan (FAO and EBRD, 2012)	Tajikistan (FAO, 2018b)
Agriculture share of GDP in %	12.1 (2019)	4.5 (2019)	25.5 (2019)	9.3 (2015)	19.2 (2018)
Employment, share of agriculture in %	29 (2016)	15.45	25	48	53
The average size of farms (ha)	2.9 (Average size of peasant farms by region, 2015)	95% are smaller than 1ha (USDA, 2010)	N/A	N/A	1.95 (for other farms) 0.2 (for small farms)

Due to its importance, agriculture is a major user of the region's natural resources. The most important challenges for local agriculture are the issue of water and soil resources. The problem of sufficient water in the region, mainly caused by large waste during irrigation, has an impact on production, in particular, affecting the genetic diversity of cultivated plants (Lapeña *et al.*, 2014).

The Central Asia region is very diverse; there are different ecoregions in the territory, represented by: steppes, riparian forests, boreal forests,

wetlands, snow fields and deserts. This heterogeneity contributes to the very valuable diversity of local crops, especially fruit and nut forests. The territory of Central Asia is largely covered with vast forests in which there are wild relatives of many species of fruit, mainly including apple, pear, plum, almond, pomegranate and grape, as well as walnut forests.

Thanks to traditional agriculture, dozens of genetically different varieties of these species have been created over hundreds of years. Therefore, the Central Asian region is of great ➤

importance for the preservation of the gene pool of crop wild relatives – both varieties created by farmers and their wild relatives act as global extenders of the genetic diversity of fruit trees and an essential source of genes. This also applies to many vegetables, such as onions, carrots, radishes, turnips, herbs and many more, whose origin is considered to be Central Asia (Turdieva *et al.*, 2012).

A characteristic feature of the region is that, as the centres of origin for the great variety of middle latitude fruit species, there is no strict distinction between wild and cultivated species. For example, in Tajikistan, most of the cultivated forms and varieties of fruit trees come from around 30 percent of wild species, e.g. walnut, pistachio or wild pear cultivation in the Pamirs.¹⁰

Another feature of Central Asia is the noticeable decline in the number of pedigree gene pools. Unfortunately, in Kyrgyzstan, a comprehensive study of the gene pool and phenotypic characteristics of livestock breeds is currently not fully completed. Effective methods of protecting small animal populations over the long term have not been developed. The process of displacing local animal breeds into more economically viable factory breeds is currently underway. There is an unsystematic crossing of farm animals with various genetic materials of imported breeds. A small number of livestock remain, such as Almatinskaya cattle, Alai sheep, Tien Shan sheep, while many of the original mountain livestock breeds are disappearing.

Reported forest cover for the countries in the region is relatively low, from as little as 3 percent in Tajikistan to 8.7 percent in Turkmenistan. Nevertheless, a diverse range of forest and woodland types is present — mountainous forests, often situated in vulnerable ecosystems, drought and salt resistant forests in the desert and semi-desert (saxaul) regions, tugai forests along riverbeds, badly damaged by irrigation projects for cotton and the resulting salinity, thorn forests, and steppe/forest steppe. All forest land in the countries is publicly owned. The region is classified as the biodiversity hotspot “Mountains of Central Asia” and has a system of forest protected areas, which constitute about 11 percent of the region’s forests (FAO and UNECE, 2019).

With major water runoff used for irrigated agriculture and limited natural resources, aquaculture and culture-based fisheries dominate the national fish production in Kyrgyzstan, Tajikistan, and Uzbekistan. The mainstay in captures fisheries and aquaculture production is carp species (common carp, silver carp, grass carp, crucian carp), followed by trout farms (rainbow trout, steelhead trout, amber trout), and some intensive rearing systems for African catfish are present in Uzbekistan (Khaitov *et al.*, 2013). Sturgeons and roach are two prevailing commercial species caught in the Ural-Caspian basin of Kazakhstan. As sturgeon fishing in the Caspian Sea is prohibited and Turkmenistan does not have rivers flowing into the Caspian Sea, its sea fishery resources consist mainly of one species – Caspian tyulka (*Clupeonella Delicatula*). In general, as a ➤

¹⁰ Lapeña, I., Turdieva, M., López Noriega, I. & Ayad, W.G., eds. 2014. *Conservation of fruit tree diversity in Central Asia: policy options and challenges*. Rome, Bioversity International. (also available at https://www.bioversityinternational.org/fileadmin/_migrated/uploads/tx_news/Conservation_of_fruit_tree_diversity_in_Central_Asia_1734.pdf).

result of changes in aquatic ecosystems caused by the water regime regulation and introduction of new species, essential changes in the indigenous fish composition occurred in all countries of the regions, with some endemic species becoming rare (FAO, 2021a).



FOCUS ON POLLINATORS

Central Asia is one of the three regions in the world most at risk of loss of pollination services, closely linked to land degradation (IPBES, 2016). The main factors of soil degradation in Central Asia are soil salinity caused by irrigation of crops, wear of irrigation and drainage systems accompanied by deterioration of land reclamation, cultivation of monoculture, and excessive grazing in pastures (Samakov, 2019).

The endemic honeybee from the Tien Shan Mountains in Central Asia has

recently been registered as a new subspecies (*Apis mellifera pomonella*) of the European honeybee (*Apis mellifera*). It turned out to be significantly different from the European and West Asian subspecies introduced into agricultural regions in Uzbekistan and Kazakhstan for industrial beekeeping. This is an important discovery that could overcome "population bottleneck" in bee populations in different regions (Samakov, 2019).



THE IMPORTANCE OF WILD FRUIT FORESTS

Central Asia is one of the five most important centres of plant origin and has a very rich resource of many crops important for the whole world. There are about 8 100 plant species in the region, 890 of which are endemic and about 400 are already listed in the International Union for Conservation of Nature (IUCN) Red List as endangered. Fruit crops from the temperate climate zone are particularly important (Turdieva *et al.*, 2012).

Many species have been cultivated in the region for centuries – the diversity of natural and climatic conditions leads to a swarm of varieties adapted to drought and responsive to adverse environmental factors. These local traditional varieties are very important from the point of view of agricultural production under difficult environmental conditions. In addition, the region is rich in species of wild fruit that can serve as rootstocks. Their resistance to biotic stresses, such as pests and diseases, makes them a valuable genetic resource (Turdieva *et al.*, 2012).

Unfortunately, these species are threatened with extinction due to damage caused by overgrazing and forest degradation, as well as land use change. A wide introduction of homogeneous, highly productive varieties on a larger scale, using mineral fertilisers and pesticides, reduces the area of agricultural land available for small-scale food producers to grow local varieties. Research shows that over the past few decades the area of fruit and nut forests has decreased by as much as half (Lapeña *et al.*, 2014). The list of tree species threatened in Central Asia includes 44 species, many of them wild relatives of cultivated fruit trees important all over the world (Turdieva *et al.*, 2012).

The situation is exacerbated by the lack of institutional abilities – many national lists of valuable species do not include wild fruit species that require special protection. Lack of information and databases, poor support from scientific institutions, and little financial support for the protection of forests, pastures and other areas important for agricultural biodiversity translates into poor protection of plant genetic resources.

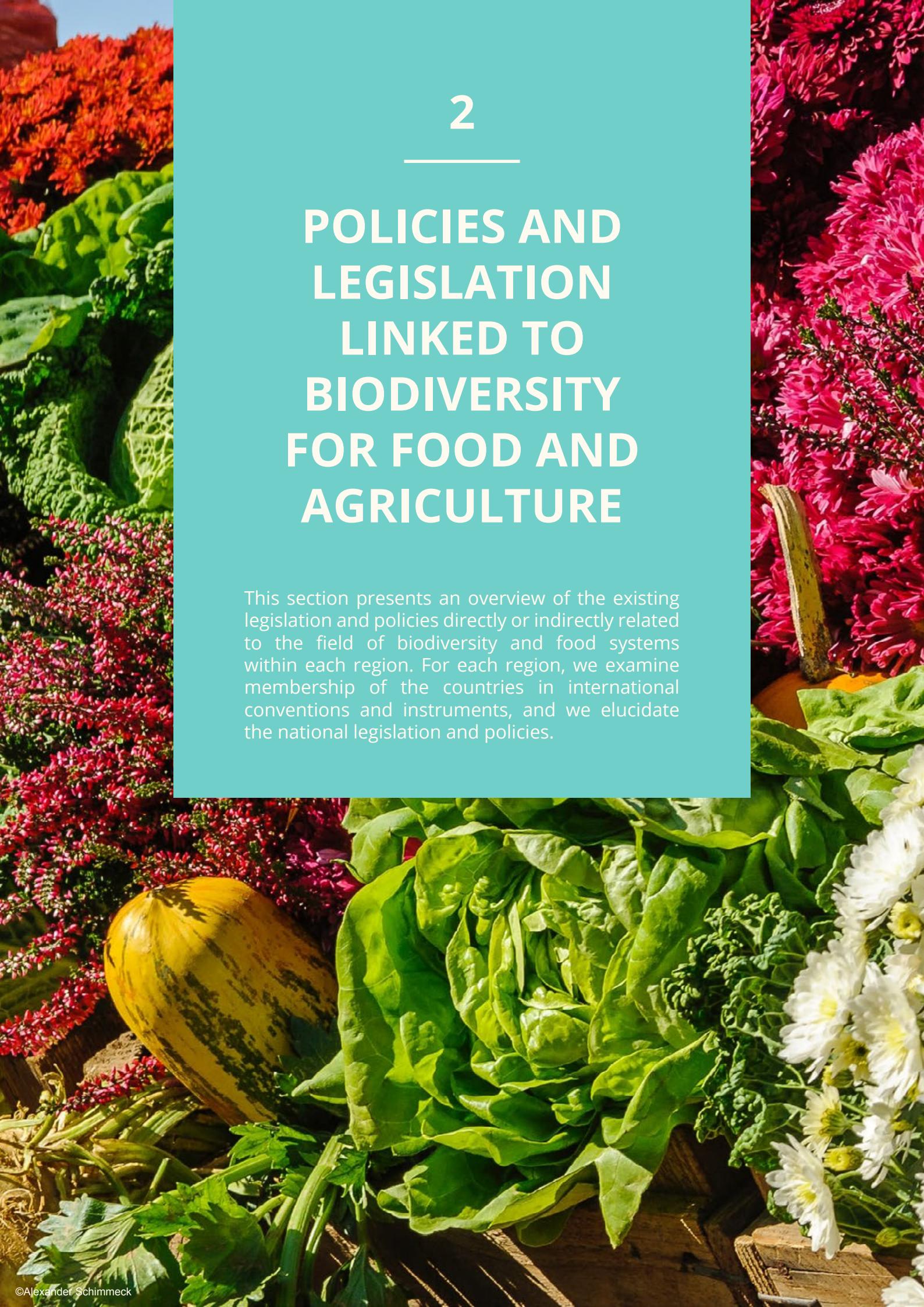
Nevertheless, important efforts of wild fruits and nuts habitat conservation have been implemented in the region, such as specially protected natural areas (SPNAs) and United Nations Educational, Scientific and Cultural Organization (UNESCO) biosphere reserves (see section 3.4.1 on actions).



Vaccinium myrtillus
©Tyler Finck

POLICIES AND LEGISLATION LINKED TO BIODIVERSITY FOR FOOD AND AGRICULTURE

This section presents an overview of the existing legislation and policies directly or indirectly related to the field of biodiversity and food systems within each region. For each region, we examine membership of the countries in international conventions and instruments, and we elucidate the national legislation and policies.





2.1 International conventions and instruments

Amongst the multiple existing conventions and instruments related to BFA agreed upon at the international level, we identified five major documents particularly important in this regard.

1. The United Nations Convention on Biological Diversity (CBD)

The CBD (adopted in 1992) is acknowledging the importance of biodiversity and preventing natural elements from patenting. The CBD has three main objectives: conservation of biological diversity, sustainable use of its component, and access and benefit sharing of biological resources arising out of their utilisation.

More specifically, it has a dedicated programme of work on BFA which includes – as a major element – the assessment of its status and trends.¹¹ Each country develops National Biodiversity Strategies & Action Plans (NBSAP) that include BFA related targets and actions.

2. The Nagoya Protocol

The Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising (adopted in 2010) is guiding the implementation of the third objective of the CBD, imposing the consent of indigenous and local communities to the use of their knowledge. Indigenous and local communities can oppose any potential patent that use their knowledge (including genetic material coming from their environment).

3. The International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA)

International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) (FAO, entered into force in 2004) recognises farmers' rights to access, save and exchange seeds (FAO, 2019b). This international instrument is key for BFA protection, conservation and development.

¹¹ In addition, there are three cross-cutting initiatives of the CBD addressing specific issues:

- the International Initiative for the Conservation and Sustainable Use of Pollinators (decision V/5, section II) and its action plan (decision VI/5, annex II),
- the International Initiative for the Conservation and Sustainable Use of Soil Biodiversity (decision VI/5, para 13) and its framework for action (decision VIII/23 B), and
- the International Initiative on Biodiversity for Food and Nutrition (decision VIII/23 A) and its framework (decision VIII/23, annex).



The **CBD**, **Nagoya Protocol** and the **ITPGRFA** are fundamental instruments to protect BFA, highlighting also the extremely relevant role of the relation of indigenous and local communities to their environment (co-evolution). The extraordinary diversity of cultivated plants on earth – on which the breeder companies depend for their businesses – is based on ancestral, progressive and dynamic breeding activities executed by the people of all countries for millenia.

The increasing economic activity based on genetic material – that these instruments mean to regulate – is bringing dangerous threats to biodiversity. Amongst others, the large-scale commercialisation of a set of super genes risk (i) to damage local ecosystems and (ii) to lead to the generalisation of these genes in many parts of the world, at the expense of local biodiversity.

4. The Convention on Protection of the World Natural and Cultural Heritage

The Convention on Protection of the World Natural and Cultural Heritage (1972) is acknowledging the particular natural importance of determined natural sites enhancing the development of biodiversity by habitat protection.

5. The Commission on Genetic Resources for Food and Agriculture

The Commission on Genetic Resources for Food and Agriculture is the only intergovernmental forum dedicated specifically to BFA. It has negotiated Global Plans of Action for Plant, Animal, Forest and Aquatic Genetic Resources for Food and Agriculture (FAO 2007; 2010; 2011; 2014) and several other policy and technical instruments.¹²

¹² <http://www.fao.org/cgrfa/en/>

2.2 The Western Balkan countries and the Republic of Moldova

2.2.1 INTERNATIONAL CONVENTIONS AND INSTRUMENTS

In the field of BFA, there are several international agreements and protocols that are not signed by all Balkan countries and – when signed – their implementation is either at a low or very low level in all countries (ITPGRFA, Nagoya protocol).

Table 4 provides an overview of the membership (signified by a +) of countries in the region in international and regional

agreements and conventions in the field of biodiversity, including BFA. All countries in the region are members of the CBD, but only three countries are members of the Nagoya Protocol under this Convention (Albania, the Republic of Moldova, and Serbia). Only Bosnia and Herzegovina is not a member of the ITPGRFA.



Horses in Trebinje field, Bosnia and Herzegovina
©FAO/Gordana Đurić

Table 4: Membership (+) of Western Balkan countries and the Republic of Moldova in international and regional legal instruments

		The Western Balkan countries and the Republic of Moldova								
		Convention/Treaty	Under the auspices of	Region	Albania	Bosnia and Herzegovina	Republic of Moldova	Montenegro	North Macedonia	Serbia
International legislation & instruments	Convention on Biological Diversity (CBD), (1992)	UN			+	+	+	+	+	+
	Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization to the CBD, 2014	UN			+		+			+
	Convention for the Protection of the World Natural and Cultural Heritage, 1972	UNESCO			+	+	+	+	+	+
	The International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA), 2001	ITPGRFA Secretariat			+	+	+	+	+	+
Regional legislation & instruments	Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention), 1979	Council of Europe	Europe		+	+	+	+	+	+
	European Landscape Convention, 2000	Council of Europe	Europe			+	+	+	+	+
	European Cooperative Programme for Plant Genetic Resources (ECPGR), 1980	CGIAR	Europe		+			+		+
	Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean (Barcelona Convention), 1978	UNEP	Mediterranean		+	+		+		
	Protocol Concerning Specially Protected Areas and Biological Diversity in the Mediterranean of the Barcelona Convention (SPA/BD Protocol), 1995	UNEP	Mediterranean		+	+		+		
	Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area (ACCOBAMS), 2001	UNEP	Black Sea, Mediterranean Sea and Contiguous Atlantic Area		+			+		
	CIS Agreement on Legal Protection of Plant Varieties, 2001	Commonwealth of Independent States	Eastern Europe and Central Asia				+			

2.2.2 NATIONAL POLICIES AND LEGISLATION

This section represents an overview of the existing policy framework and national legislation on four areas that are connected to the focus of this report. More details on national legislation can be found in an [online annex](#).

Table 5: Description of existing policies and legislation in Western Balkan countries and the Republic of Moldova related to BFA (Part 1/2)

Areas of legislation				
	Environment or nature protection	Agriculture and Rural Development	Plant, Animal, Forest and Aquatic Genetic Resources (seed, seedling, breeding)	Pollinators
Albania	<ul style="list-style-type: none"> • The Document of Strategic Policies of Biodiversity Protectionⁱ <ul style="list-style-type: none"> • Law on Biodiversity Protection (2006)ⁱⁱ • Law on Environmental Protection (2011)ⁱⁱⁱ • Law on Protected Areas (2017)^{iv} • Law on Wild Fauna Protection (2008)^v 	<ul style="list-style-type: none"> • The Intersectoral Strategy for the Rural and Agricultural Development 2014–2020^{vi} • National Strategy of Land Consolidation (2016)^{vii} • Law on Agriculture and Rural Development (2007)^{viii} <ul style="list-style-type: none"> • Law on Organic Production, Labelling, and Inspection Of Organic Products (2016)^x 	<ul style="list-style-type: none"> • Law on the Plant Genetic Material (2011)^x <ul style="list-style-type: none"> • Law on Livestock Breeding (2005)^{xi} <ul style="list-style-type: none"> • Law on Fisheries (2012)^{xii} • Law on Aquaculture (2016)^{xiii} • Law on Forests and the Forestry Service (2005)^{xiv} <ul style="list-style-type: none"> • Law on Hunting (2010)^{xv} 	<ul style="list-style-type: none"> • Law on Livestock Breeding (2005)^{xvi}
Bosnia and Herzegovina	<ul style="list-style-type: none"> • Strategy and Action Plan for Protection of Biological Diversity of Bosnia and Herzegovina (2015–2020)^{xvii} <ul style="list-style-type: none"> • Law on Environment Protection of Federation of Bosnia and Herzegovina (FBiH) (2003)^{xviii} • Law on Nature Protection of Federation Bosnia and Herzegovina (2013)^{xix} • Law on Environmental Protection of Republika Srpska (RS) (2012)^{xx} • Law on Nature Protection of Republika Srpska (2014)^{xi} • Law on Nature Protection of Brčko District (BD) (2004)^{xvii} 	<ul style="list-style-type: none"> • Strategic Plan for Rural Development of Bosnia and Herzegovina (2018–2021)^{xvii} <ul style="list-style-type: none"> • Law on Agriculture, Food and Rural Development of Bosnia and Herzegovina (2008)^{xxiv} <ul style="list-style-type: none"> • Law on Agriculture of Republika Srpska (2006)^{xxv} • Law on Agriculture of Federation Bosnia and Herzegovina (2007)^{xxvi} • Law on Agricultural Land of Federation Bosnia and Herzegovina (2009)^{xxvii} 	<ul style="list-style-type: none"> • Law on Seeds and Planting Material of Agricultural Plants of Bosnia and Herzegovina (2005)^{xxviii} • Law on the Protection of New Varieties of Plants in Bosnia and Herzegovina (2010)^{xxix} • Law on the Protection and Welfare of Animals of Bosnia and Herzegovina (2009)^{xxx} • Law on Protection of Geographic Origin of Bosnia and Herzegovina (2010)^{xxxi} • Law on Wine, Brandy and Other Grape Products of Bosnia and Herzegovina (2008)^{xxxi} • Law on Genetically Modified Organisms (2009)^{xxxiii} <ul style="list-style-type: none"> • Law on Planting Material of Republika Srpska (2009)^{xxxiv} • Law on Seeds of Agricultural Plants of Republika Srpska (2009)^{xxxv} • Law on Livestock of Republika Srpska (2009)^{xxxvi} <ul style="list-style-type: none"> • Law on Fishery of Republika Srpska (2012)^{xxxvii} • Law on Forestry of Republika Srpska (2008)^{xxxviii} • Law on Reproductive Material of Forest Trees of Republika Srpska (2009)^{xxxix} <ul style="list-style-type: none"> • Federal Bosnian Forestry Programme (2014)^{xl} • Forest Regulations of Federation Bosnia and Herzegovina (2009)^{xdii} • Law on Seeds and Planting Material of Forest and Horticultural Species of Trees and Shrubs of Federation Bosnia and Herzegovina (2005)^{xi} <ul style="list-style-type: none"> • Law on Livestock of Federation Bosnia and Herzegovina (2013)^{xdiii} • Law on Freshwater Fisheries of Federation Bosnia and Herzegovina (2004)^{xdv} • Law on Hunting of Federation Bosnia and Herzegovina (2006) • Law on Forests of BD (2010) 	<ul style="list-style-type: none"> • Law on Beekeeping of RS (2010)^{xdv} • Law on Livestock of Federation Bosnia and Herzegovina (2013)^{xdvi} • Regulation on Beekeeping of Federation Bosnia and Herzegovina (2018)^{xdvii}

Table 5: Description of existing policies and legislation in Western Balkan countries and the Republic of Moldova related to BFA (Part 2/2)

Areas of legislation				
	Environment or nature protection	Agriculture and Rural Development	Plant, Animal, Forest and Aquatic Genetic Resources (seed, seedling, breeding)	Pollinators
Montenegro	<ul style="list-style-type: none"> • National Biodiversity Strategy with Action Plan for the period 2016–2020^{xviii} <ul style="list-style-type: none"> • Law on Nature Protection (2008)^{xlix} • Law on National Parks (2014) 	<ul style="list-style-type: none"> • Strategy for the Development of Agriculture and Rural Areas 2015–2020 (2015)^{li} <ul style="list-style-type: none"> • Law on Agriculture and Rural Development (2009)^{lii} • Law on Organic Production (2013)^{liii} 	<ul style="list-style-type: none"> • Law on Agricultural Plant Seeds (2006)^{lv} • Law on Planting Material (2006)^{lv} <ul style="list-style-type: none"> • Law on Livestock (2010)^{vi} • Law on Animal Welfare (2008)^{vii} • Law on Game and Hunting (2008)^{viii} <ul style="list-style-type: none"> • Law on Forests (2010)^{ix} • Law on Freshwater Fisheries and Aquaculture (2018)^{lx} <ul style="list-style-type: none"> • Law on Marine Fisheries and Mariculture^{ki} 	<ul style="list-style-type: none"> • Breeding and Selection Programme of Queen Bees (<i>apis mellifera carnica</i>) 2019–2024 (2019)^{lxi} • Law on Livestock (2010)^{lxii} • Regulation on the Manner of Keeping and Content of the Register of Legal Entities for Breeding, Selection, Production and Trade of Queen Bees (2017)^{lxiv} • Regulation on Close Content, Method of Determining and Keeping of the Cadastre of Bee Pasture and the Beekeeper's Grazing Order (2016)^{lxv}
North Macedonia	<ul style="list-style-type: none"> • National Biodiversity Strategy and Action Plan for the period 2018–2023 (2018)^{xvi} • National Strategy for Nature Protection 2017–2027 (2018)^{xvii} • Law on Environment (2005)^{xviii} <ul style="list-style-type: none"> • Law on Nature Protection (2004)^{bxix} 	<ul style="list-style-type: none"> • National Strategy for Agriculture and Rural Development for the period 2014–2020 (2014)^{lxv} <ul style="list-style-type: none"> • Law on Agriculture and Rural Development (2010)^{lxvi} • Law on Agricultural Land (2007)^{lxvii} <ul style="list-style-type: none"> • Law Stimulating the Agriculture Development (1992)^{lxviii} • Law on Organic Farming (2009)^{lxix} 	<ul style="list-style-type: none"> • Law on Seeds and Seedlings of Agricultural Plants (2011)^{lxv} <ul style="list-style-type: none"> • Law on Livestock (2008)^{lxvi} • Law on Forests (2009)^{lxvii} • Law on Forest Tree Species Reproductive Material (2007)^{lxviii} • Law on Fisheries and Aquaculture (2008)^{lxix} <ul style="list-style-type: none"> • Law of Hunting (2009)^{lxxx} 	<ul style="list-style-type: none"> • Law on Organic Farming (2009)^{lxxi} • Regulation on Rules and Procedures in Beekeeping (2010)^{lxxxii}
Republic of Moldova	<ul style="list-style-type: none"> • Strategy on Biological Diversity of the Republic of Moldova for 2015–2020 and the Action Plan (2015)^{bxiii} • National Environmental Strategy for 2014–2023 (2014)^{xxxiv} • Law on Environmental Protection (1993)^{bxov} <ul style="list-style-type: none"> • Law on Natural Resources (1997)^{bxvvi} • Wildlife Law (1995)^{bxvii} 	<ul style="list-style-type: none"> • Strategy for Agriculture and Rural Development in Moldova 2014–2020 (2014)^{bxviii} • National Programme for Integrated Plant Protection for the period 2018–2027 and Action Plan for its Implementation (2018)^{xxxix} <ul style="list-style-type: none"> • Land Code (1991)^{xc} • Law on Ecological Agricultural Production (2005)^{xi} 	<ul style="list-style-type: none"> • Law on Seeds (2013)^{cii} • Law on the Protection of Plant Varieties (1996)^{ciii} • Law on Fruit Growing (1996)^{civ} • Law on Botanic Gardens (2005)^{cv} • Law on Stockbreeding (1999)^{cvi} • Law on Pedigree Stockbreeding (1995)^{cvi} <ul style="list-style-type: none"> • Forest Code (1996)^{cix} • Law on Fish Stock, Fisheries and Fish Farming (2006)^{cxix} 	<ul style="list-style-type: none"> • National Beekeeping Development Programme for the period 2021–2025 (2020)^c • Law on Apiculture (2006)^{ci} • Law on Stockbreeding (1999)^{cii} <ul style="list-style-type: none"> • Law on Pedigree Stockbreeding (1995)^{ciii} • Zootechnical Norm for the Grading of Bee Colonies, the Cultivation and Certification of Genetic Bee Material (2011)^{civ} <ul style="list-style-type: none"> • Wildlife Law (1995)^{cvi}
Serbia	<ul style="list-style-type: none"> • Biodiversity Strategy of the Republic of Serbia for the period 2011–2018 (2011)^{cvii} <ul style="list-style-type: none"> • Environmental Protection Law (2004)^{cvi} • Nature Protection Law (2009)^{cvi} • Law on National Parks (2015)^{cx} 	<ul style="list-style-type: none"> • National Agriculture and Rural Development Strategy for 2014–2020 (2014)^{cx} • National Programme for Agriculture for the period 2018–2020 (2017)^{cxii} <ul style="list-style-type: none"> • Law on Agriculture and Rural Development (2009)^{cxii} • Law on Agricultural Land (2006)^{cxiii} <ul style="list-style-type: none"> • Law on Soil Protection (2015)^{cxiv} • Law on Organic Production (2010)^{cxv} 	<ul style="list-style-type: none"> • Law on Seeds (2005)^{cvi} • Law on Protection of Plant Breeders' Rights (2009)^{cvi} • Law on the Recognition of Varieties of Agricultural Plants (2010)^{cix} • Law on Planting Material of Fruit Trees, Vines and Hops (2005)^{cxix} <ul style="list-style-type: none"> • Law on Livestock (2009)^{cx} • Animal Welfare Law (2009)^{cxi} <ul style="list-style-type: none"> • Forest Law (2010)^{cxi} • Law on Forest Reproductive Material (2004)^{cixii} • Law on Protection and Sustainable Use of Fish Stocks (2014)^{cixiv} • Law on Wild Animals and Hunting (2010)^{cixv} 	<ul style="list-style-type: none"> • Law on Livestock (2009)^{cxxvi} • Veterinary Law (2009)^{cxxvii} • Regulation on the List of genetic reserves of domestic animals, the manner of preserving the genetic reserves of domestic animals, as well as on the List of autochthonous breeds of domestic animals and endangered autochthonous breeds (2017)^{cxxviii} • Regulation on the procedure of marking and registration of bee colonies and apiaries (2013)^{cxxix}



NOTES: General environmental protection laws exist in all Balkan countries. In North Macedonia, it foresees the establishment of a monitoring network and environmental information system, which is a prerequisite for the successful management of genetic resources in general. The same applies to Albania, Bosnia and Herzegovina (Republic Srpska [RS]), and Serbia, where the conservation of biological diversity is considered a key element in the law on environmental protection. However, BFA is not mentioned in any of these legislations.

In general, BFA conservation and its sustainable use have not yet been fully integrated into the most pertinent laws in all Balkan countries.

The Law on Livestock in Montenegro declares the preservation of genetic variability and genetic resources of domestic animals as in the public interest. Funds for the preservation of the genetic resources of domestic animals are provided in the budget of Montenegro. The preservation of biological diversity in livestock farming as well as the conservation of autochthonous breeds (the protection of the breed and its name) is governed by several articles.

In general, more efforts are visible for the inclusion of BFA considerations in the laws on livestock production and animal husbandry than in their respective laws on seeds and seedling material, although there is still a long way to go to ensure that the issue is comprehensively regulated.

2.2.3 KEY FEATURES

Lack of capacities and institutional frameworks

Much information is available pertaining to adopted documents (strategies, programmes, laws, bylaws), but there is a paucity of information about the actual application and problems in implementation and about the amount and regularity of allocations for this purpose. There is a particularly low awareness amongst domestic institutions and decision-makers about the need to improve the institutional and legal framework in this area, and urgent measures are needed to stop the

rapid loss of biodiversity expedited by industrial food production, as well as the loss of genetic resources for food and agriculture. In particular, there is also the need for greater awareness related to the preservation of traditional knowledge and practices, which in most cases are still only orally transmitted and retained within communities. This has been particularly noticeable in the last few decades due to the extremely rapid depopulation of rural areas and the aging of the rural population.

Furthermore, countries of the region are generally small and do not have sufficient capacity to improve and develop systems ➤

or infrastructure for the conservation and sustainable use of this BFA. In this regard, regional campaigns, regional networking, and the development of transnational programmes and projects for cross-border cooperation, along with defining common brands of local products, are needed.

Within the region, there is great potential and a solid existing foundational basis for improvement in terms of biodiversity monitoring schemes linked to food systems. Indeed, awareness of the importance of sustainable use of BFA and its role in diversifying activities in rural and semi-urban areas is recognised.¹³ Preserved and usable diverse genetic material is present. The more important policies have already been adopted and the region is generally following international development recommendations in this area.

Biodiversity conservation to comply with obligations

Existing regulations generally relate to the monitoring of biodiversity but not to BFA. We can note here that biodiversity monitoring is understood more as an obligation of the state according to the signed international convention on biological diversity, rather than being necessarily representative of a manifested moral obligation of current generations to provide future generations with a preserved, pristine natural world and all its associated benefits, to ensure the survival and prosperity of the human species.

Analysis of the legal framework in the Balkan countries in the broad areas of nature and environmental protection, agriculture and rural development, forestry, hunting, fishing, seed and nursery production, plant and livestock production, animal welfare protection, etc. indicates that all countries have included terms related to sustainable development, protection, and sustainable use of natural resource within specific laws. The issue of biodiversity is generally well covered (nature protection, environmental protection), and all countries regularly report to the CBD. However, only since the sixth national reports the emphasis on BFA is visible and in all reports the relevant data references which exist in other documents (programmes, reports, inventories, gene banks, etc.).

National measures for BFA conservation promote ex situ conservation

All countries are characterised by similar processes when it comes to the conservation and use of BFA. Old varieties, local populations and local races are still preserved. Most countries have plant gene banks, although under different levels of burden regarding the number of stored offspring. However, in situ on farm conservation, which is the basis for the sustainable use of these genetic resources, is very rare. When it comes to animal genetic resources, there are significant differences between countries, and in that sense, North Macedonia and Albania have done the most, while in other countries there is a noticeable pronounced threat to these genetic ➤

¹³ See, for example, the European Union funded project (2016–2019) “Sustainable agriculture for sustainable Balkans: Strengthening advocacy capacities of CSOs and developing policies in the Western Balkans” that involves Ministries and local authorities from 5 Western Balkan countries, or the Sida financed project (2004–2011) “SEEDNet – South East European Development Network on Plant Genetic Resources”.

resources. The reasons for this can be derived from the fact that there is no strict monitoring and reporting structure for BFA as there is for biodiversity.

Short-term and assisted policies

Due to the institutional structure that determines the assistance granted in the adoption of strategic documents (strategies, programmes, laws) in this area, monitoring systems are often unsustainable because they are funded by short-term international aid and donations. Upon expiration of these revenue streams, the underfunded administration mainly contends with problems such as a lack of trained staff for system maintenance, obsolescence of information technology (IT) equipment, lack of regular support mechanisms and monitoring systems, and software mismatches even within the responsible ministries (e.g. agriculture, forestry, water management). Monitoring is, therefore, reduced mainly to individual research projects, primarily carried out by faculties and universities, and to a lesser degree by institutes and natural history museums (which were generally very impoverished in the entire region during the transition period).

Lack of pollinators-related regulations

The Biodiversity and Ecosystem Services Network (BES-Net) Trialogue on Pollinators, Food Security and Rural Development that gathered policy makers, scientists and practitioners in Sarajevo (Pataridze, Heylings and Proaño-Castro, 2017) highlighted in 2017 the lack of legislation and regulation to protect wild and domesticated pollinators in the

region. Except some actions undertaken as the impetus of the Trialogue, no major policy or legislation has been created to protect pollinators in the region.

The Trialogue highlighted the absence of mainstreaming pollinators protection within agricultural and environmental policies. Pollinators are simply not acknowledged as vital for food security, for which the lack of data is a cause as well as an effect. The drivers of pollinator decline have not been examined yet. Another important element reported by the Trialogue is the general political context that tends to align with European Union standards and trade agreements without considering the local needs for rural development and biodiversity protection.

2.3 The South Caucasus countries, Turkey, Belarus and Ukraine

2.3.1 INTERNATIONAL LEGISLATION AND INSTRUMENTS

Table 6 provides an overview of the membership (signified by a +) of countries in the region in international and regional agreements and conventions in the field of biodiversity, including BFA. All countries in the region are members of the CBD, but only two countries are members of the Nagoya Protocol under this Convention (Belarus and Ukraine). Only Armenia, Georgia and Turkey are members of the ITPGRFA.

Table 6: Membership (+) of South Caucasus countries, Turkey, Belarus and Ukraine regarding international and regional legal instruments

The South Caucasus countries, Turkey, Belarus and Ukraine								
	Convention/Treaty	Under the auspices of	Armenia	Azerbaijan	Belarus	Georgia	Ukraine	Turkey
International legislation & instruments	Convention on Biological Diversity (CBD),1992	UN	+	+	+	+	+	+
	Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization to the CBD, 2014	UN			+		+	
	Convention for the Protection of the World Natural and Cultural Heritage, 1972	UNESCO	+	+	+	+	+	+
	The International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA), 2001	ITPGRFA Secretariat	+			+		+
Regional legislation & instruments	Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention), 1979	Council of Europe	+	+	+	+	+	+
	European Landscape Convention, 2000	Council of Europe	+	+		+	+	+
	European Cooperative Programme for Plant Genetic Resources (ECPGR), 1980	CGIAR			+	+		+
	Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean (Barcelona Convention), 1978	UNEP						+
	Protocol Concerning Specially Protected Areas and Biological Diversity in the Mediterranean of the Barcelona Convention (SPA/BD Protocol), 1995	UNEP						+
	Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and contiguous Atlantic area (ACCOBAMS), 2001	UNEP				+	+	+
	Agreement on Legal Protection of Plant Varieties, 2001	Commonwealth of Independent States	+	+	+	**	+	
	Agreement on the circulation of seeds of agricultural crops within the Eurasian Economic Union, 2017	Eurasian Economic Union	+		+			

*Georgia left the CIS in 2009.

2.3.2 NATIONAL POLICIES AND LEGISLATION

This section represents an overview of the existing policy framework and national legislation on four areas that are connected to the focus of this report.

Table 7: Description of existing policies and legislation in South Caucasus countries, Turkey, Belarus and Ukraine related to BFA (Part 1/2: Armenia, Azerbaijan and Belarus)

Areas of legislation				
	Environment or nature protection	Agriculture and Rural Development	Plant, Animal, Forest and Aquatic Genetic Resources (seed, seedling, breeding)	Pollinators
Armenia	<ul style="list-style-type: none"> • Strategy of the Republic of Armenia on Conservation, Protection, Reproduction and Use of Biological Diversity and National Action Plan for 2016–2020 (2015)^{cxxx} <ul style="list-style-type: none"> • Law on Flora (1999)^{cxxxii} • Law on Fauna (2000)^{cxxxiii} • Law on Nature Reserves (1991)^{cxxxiii} <ul style="list-style-type: none"> • Law on Lake Sevan (2001)^{cxxxiv} • Law on Specially Protected Natural Areas (2006)^{cxxxv} 	<ul style="list-style-type: none"> • Armenia Development Strategy for 2014–2025 (2014)^{cxxxvi} <ul style="list-style-type: none"> • The Strategy of the Main Directions Ensuring Economic Development in Agricultural Sector of the Republic of Armenia for 2020–2030 (2020)^{cxxxvii} <ul style="list-style-type: none"> • Sustainable Agricultural Development Strategy of the Republic of Armenia 2010–2020 (2010)^{cxxxviii} • Concept and the programme of arrangements for increasing the efficiency of the use of agricultural land (2020)^{cxxxix} <ul style="list-style-type: none"> • Land Code (2001)^{cxd} • Law on Organic Agriculture (2008)^{cxi} 	<ul style="list-style-type: none"> • Law on Seeds (2005)^{cxdii} • Law on Protection of Selection Achievements (1999)^{cxdiii} <ul style="list-style-type: none"> • Law on Viticulture and Oenological Practices (2008)^{cxdv} <ul style="list-style-type: none"> • National Strategy for Sustainable Use and Development of Farm Animal Genetic Resources (2010)^{cxdv} • Law on Pedigree Livestock Breeding (2005)^{cxdvi} <ul style="list-style-type: none"> • Forest Code (2005)^{cxdvii} • Law on Geographic Indications (2010)^{cxdviii} 	<ul style="list-style-type: none"> • Law on Beekeeping (2009)^{cxdix} • Law on Flora (1999)^{cld} • Forest Code (2005)^{cldi} • Law on Veterinary Medicine (2014)^{cldii}
Azerbaijan	<ul style="list-style-type: none"> • National Strategy of the Republic of Azerbaijan on Conservation and Sustainable Use of Biodiversity for 2017–2020 (2016)^{cldii} <ul style="list-style-type: none"> • Law on Wildlife (1999)^{cldv} • Environmental Protection Law (1999)^{cldv} • Law on Environmental Protection and Nature Management (1999)^{cldvi} <ul style="list-style-type: none"> • Law on Protected Areas (2000)^{cldvii} • Law on Protection of Green Areas (2014)^{cldviii} 	<ul style="list-style-type: none"> • “Azerbaijan 2020: Look into the Future” Development Concept (2015)^{cldx} • Strategic Vision and Roadmap for Azerbaijan: Agriculture (2016)^{cldx} • Law on Family Farming (2005)^{cldxi} <ul style="list-style-type: none"> • Land Code (1999)^{cldxii} • Law on Land Fertility (1999)^{cldxiii} <ul style="list-style-type: none"> • Law on Organic Agriculture (2008)^{cldxiv} 	<ul style="list-style-type: none"> • Law on Conservation and Sustainable Use of Genetic Resources of Cultivated Plants (2011)^{cldv} <ul style="list-style-type: none"> • Seed Act (1997)^{cldvi} • Law on Viticulture and Wine-Making (2001)^{cldvii} • Law on Animal Breeding (2007)^{cldviii} • Law on Horse Breeding (2007)^{cldix} <ul style="list-style-type: none"> • Law on Selection Achievements (1996)^{cldx} • Law on Trademarks and Geographic Denomination (1998)^{cldxi} • Law on Hunting (2004)^{cldxii} <ul style="list-style-type: none"> • Forest Code (1997)^{cldxiii} • Fisheries Law (1998)^{cldxiv} 	<ul style="list-style-type: none"> • Law on Apiculture (2009)^{cldv} • Ministerial Decree on Approval of the Procedure of State Control in the Field of Apiculture (2010)^{cldviii}
Belarus	<ul style="list-style-type: none"> • Strategy on Conservation and Sustainable Utilisation of Biological Diversity for 2011–2020 (2010)^{cldvii} • National Strategy for Sustainable Development of the Republic of Belarus for the period up to 2035 (2018)^{cldviii} • State Programme “Environmental Protection and Sustainable Use of Natural Resources” for 2021–2025 (2021)^{cldix} <ul style="list-style-type: none"> • State Programme “Belarusian Forest” for 2021–2025 (2021)^{cldxix} <ul style="list-style-type: none"> • Law on Protection of the Environment (1992)^{cldxxi} • Law on Protected Areas (2018)^{cldxii} <ul style="list-style-type: none"> • Wildlife Law (2007)^{cldxiii} • Law on the Protection and Use of Peatlands (2019)^{cldxiv} 	<ul style="list-style-type: none"> • State programme “Agrarian Business” for 2021–2025 (2021)^{cldxv} <ul style="list-style-type: none"> • Land Code (2008)^{cldxvi} • Law on Production and Circulation of Organic Products (2018)^{cldxvii} 	<ul style="list-style-type: none"> • Law on Selection and Seed Production of Agricultural Plants (2021)^{cldxviii} • Plant Variety Patent Law (1995)^{cldxix} <ul style="list-style-type: none"> • Law on Pedigree Stockbreeding (2013)^{cldc} • Forest Code (2015)^{cldci} • Rules on Fishing and Aquaculture (2005)^{cldci} • Presidential Decree on Hunting and Hunting Management (2018)^{cldcii} 	<ul style="list-style-type: none"> • Veterinary and Sanitary Rules for Beekeeping (2012)^{cldciv} • Plant Protection Law (2005)^{cldcv} • Sanitary requirements for application, transportation and storage of pesticides (plant protection means), agrochemicals and fertilisers, and MRL in environment, alimentary raw materials and foodstuffs (2012)^{cldcvi}

Table 7: Description of existing policies and legislation in South Caucasus countries, Turkey, Belarus and Ukraine related to BFA (Part 2/2: Georgia, Turkey and Ukraine)

Areas of legislation				
	Environment or nature protection	Agriculture and Rural Development	Plant, Animal, Forest and Aquatic Genetic Resources (seed, seedling, breeding)	Pollinators
Georgia	<ul style="list-style-type: none"> • National Biodiversity Strategy and Action Plan of Georgia 2014–2020 (2014)^{cxxvii} <ul style="list-style-type: none"> ◦ Third National Environmental Action Programme of Georgia 2017–2021 (2017)^{cxxviii} • Law on Environmental Protection (1996)^{cxxix} • Law on Wildlife (1996)^{cc} • Law on "Red List" and "Red Book" (2003)^{ccl} • Law on the System of Protected Areas (1996)^{cci} 	<ul style="list-style-type: none"> • Agriculture and Rural Development Strategy of Georgia 2021–2027 (2019)^{cclii} • Strategy for Development of High Mountain Settlements of Georgia 2019–2023 (2019)^{cclv} <ul style="list-style-type: none"> ◦ Law on Development of High Mountainous Regions (2015)^{cclv} • Regional Development Programme of Georgia 2018–2021 (2018) • Law on Agricultural Cooperatives (2013)^{cclvi} • Organic Law on Agricultural Land Ownership (2019)^{cclvii} <ul style="list-style-type: none"> ◦ Law on Soil Conservation and Restoration-Improvement of Soil Fertility (2003)^{cclviii} • Law on Determination of the Designated Purpose of Land and on Sustainable Management of Agricultural Land (2019)^{cclix} 	<ul style="list-style-type: none"> • Law on Permission for the Distribution of Agricultural Plant Species Subject to Mandatory Certification and in Seed Production (2017)^{cclx} • Law on New Breeds of Animals and Varieties of Plants (2010)^{cclxi} <ul style="list-style-type: none"> ◦ Law on Vines and Wine (1998)^{cclxii} • Law on New Breeds of Animals and Varieties of Plants (2010)^{cclxiii} • Law on Appellations of Origin and Geographical Indications of Goods (1999)^{cclxv} • National Forest Concept for Georgia (2014)^{cclv} • Forest Code of Georgia (2020)^{cclvi} <ul style="list-style-type: none"> ◦ Law on Aquaculture (2020)^{cclvii} 	<ul style="list-style-type: none"> • Law on Apiculture (2002)^{cclviii} • Technical Regulation on Diversity, Uniformity and Stability of Georgian Honeybee (<i>APIS MELLIFERA L.</i>) • New Requirements and Test Methods (2014)^{cclxix} • Food Products/Animal Feed Safety, Veterinary and Plant Protection Code of Georgia (2012)^{cclx} • Law on Pesticides and Agrochemicals (1998)^{cclxi}
Turkey	<ul style="list-style-type: none"> • National Biological Diversity Strategy and Action Plan (2007)^{cxxxii} <ul style="list-style-type: none"> ◦ Environment Law (1983)^{cxxxiii} • Law on the Protection of Cultural and Natural Assets (1983)^{cxxxiv} • Law on National Parks (1983)^{cxxxv} • Law on Protection of Animals (2004)^{cxxxvi} • Coastal Law (1990)^{cxxxvii} 	<ul style="list-style-type: none"> • Strategic Plan of the Ministry of Agriculture and Forestry 2019–2023 (2019)^{cxxxviii} • Strategic Plan 2018–2022 of the Ministry of Food, Agriculture and Livestock (2018)^{cxxxix} <ul style="list-style-type: none"> ◦ Agriculture Law (2006)^{cxxxix} • Law on Soil Preservation and Land Utilisation (2005)^{cxxxx} <ul style="list-style-type: none"> ◦ Law on Pastures (1998)^{cxxxxii} • Law on Organic Farming (2004)^{cxxxxiii} 	<ul style="list-style-type: none"> • Sectoral Policy on Seeds 2018–2022 (2018)^{cxxxxiv} <ul style="list-style-type: none"> ◦ Seed Act (2006)^{cxxxxv} • Law on the Protection of Breeders' Rights for New Plant Species (2004)^{cxxxxvi} <ul style="list-style-type: none"> ◦ Law on Veterinary Services, Plant Health, Food and Fee (2010)^{cxxxxvii} <ul style="list-style-type: none"> ◦ Hunting Law (2003)^{cxxxxviii} ◦ Forest Law No. 6831 (1956)^{cxxxxix} <ul style="list-style-type: none"> ◦ Fisheries Law (1971)^{cclx} • Regulation on Sustainable Use and Protection of Aquatic Genetic Resources (2012)^{cclxi} 	<ul style="list-style-type: none"> • Regulation on Apiculture (2011)^{cclli} • Regulation on Bumble Bee (2011)^{ccliii} <ul style="list-style-type: none"> ◦ Law on Veterinary Services, Plant Health, Food and Feed (2010)^{cclxiv} • Notification on State Support in the Field of Organic Beekeeping (2018)^{cclv}
Ukraine	<ul style="list-style-type: none"> • Concept of the Conservation of Biological Diversity for the period of 2005–2025 (2005)^{cclvi} <ul style="list-style-type: none"> ◦ Basic principles (strategy) of the state ecological policy of Ukraine for the period up to 2030 (2019)^{cclvi} • Law on Environmental Protection (1991)^{cclviii} <ul style="list-style-type: none"> ◦ Law on Wildlife (2001)^{cclix} • Law on Natural Reserves (1992)^{ccl} • National Programme of Protection and Rehabilitation of the Areas of the Sea of Azov and the Black Sea (2001)^{ccl} <ul style="list-style-type: none"> ◦ Law on Red Book (2002)^{ccli} • Law on Flora (1999)^{ccliii} 	<ul style="list-style-type: none"> • Concept of the State Target Programme for the Development of the Agricultural Sector for the period until 2022 (2015)^{cclv} • Single and Comprehensive Strategy and Action Plan for Agriculture and Rural Development in Ukraine for 2015–2020 (2015)^{cclv} <ul style="list-style-type: none"> ◦ Law on Farming (2003)^{cclvi} ◦ Law on Basic Principles and Requirements for Organic Production, Turnover and Labelling of Organic Products (2018)^{cclvii} ◦ Law on Smallholding (2003)^{cclviii} ◦ Law on Land Protection (2003)^{cclix} <ul style="list-style-type: none"> ◦ Land Code (2001)^{cclx} ◦ Law on Basic Principles and Requirements for Organic Production, Turnover and Labelling of Organic Products (2018)^{cclxi} 	<ul style="list-style-type: none"> • Law on the Protection of Plant Variety Rights (1993)^{cclii} • Law on Seeds and Planting Material (2002)^{cclxiii} <ul style="list-style-type: none"> ◦ Law on Grain and Grain Market (2002)^{cclxiv} ◦ Law on Grape and Grape Wine (2005)^{cclv} ◦ Law on Pedigree Stockbreeding (1993)^{cclvi} • Law on Hunting Economy and Hunting (2000)^{cclvii} <ul style="list-style-type: none"> ◦ Forest Code (1994)^{cclviii} ◦ Law on Aquaculture (2012)^{cclix} • Law on Fishery, Industrial Fisheries and Protection of Fishing Resources (2011)^{cclx} • Law on Fish, Aquatic Biodiversity and Fish Products (2003)^{cclxi} 	<ul style="list-style-type: none"> • Law on Apiculture (2000)^{cclxii} • Law on Veterinary Medicine (2021)^{cclxii} • Law on Pesticides and Agrochemicals (1995)^{cclxix} <ul style="list-style-type: none"> ◦ Law on Basic Principles and Requirements for Organic Production, Turnover and Labelling of Organic Products (2018)^{cclxv} • Law on Pedigree Stockbreeding (1993)^{cclxi}

NOTES: With few exceptions,¹⁴ the laws governing BFA can be rather diverse and cover a whole range of issues, and they generally regulate environmental protection and biodiversity conservation, production and distribution of the seed, and planting and/or breeding material. Most of this legislation does not address specific problems related to BFA but has an indirect impact on the 'agricultural' component of biodiversity. There is a lack of regulation specifically dedicated to critical cross-cutting points between biodiversity and food systems (see Recommendations).

Nevertheless, the existing regulatory framework encompasses a rather wide range of legislation which could exert a direct or indirect influence on different elements of BFA, in particular:

The legislation related to environmental protection and biological diversity (including conservation of species) protection and management of landscapes, grass lands, atmospheric air, soil and water, as well as legislation pertaining to fishing, phytosanitary/zoo veterinary regulations and their enforcement, exerts influence on the stability of agricultural ecosystems and, accordingly, on all the components of BFA.

Regarding pollinators, there are some basic legislation and statistical data available in the target countries on honeybees and some legislation related either to beekeeping or to protection of bees from poisoning with agrochemicals. These legislations and statistics are, however, mainly used to estimate the sector of honey and other beekeeping production and are not usually used to assess the condition of agricultural ecosystems and their ability to ensure pollination.

Despite the specific mention of issues related to BFA in national, regional or international biodiversity and agricultural action plans and reports, there is a general regulatory gap in the region to specifically address the following components of BFA in the national laws:

- The definition and status of crop wild relatives and the issues associated to their in situ and ex situ conservation;
- The definition and status of endemic species and landrace/local varieties of cultivated plants, as well as of the local varieties of farm/domesticated animals and other endemic species of socio-economic value (e.g. honeybee, silkworm and microbial flora of traditional products), the issues associated with their in situ and ex situ conservation and production/distribution of the reproductive material;
- The definition, status of pollinator species and the issues associated with their conservation;
- The conservation status and management of agricultural soils, especially the edaphon or microbial, plant and animal diversity within it; and
- In some countries (e.g. Georgia), there is no legal framework for protecting pastureland ecosystems, and in general, there is a lack of legislation which underlines and supports agroecosystem maintenance in agriculture.

¹⁴ For example, Armenian National Strategy for Sustainable Use and Development of Farm Animal Genetic Resources (2010) or Law on Conservation and sustainable use of genetic resources of cultivated plants of the Republic of Azerbaijan (2011), etc.



2.4 Central Asia

2.4.1 INTERNATIONAL CONVENTIONS AND INSTRUMENTS

Table 8 provides an overview of the membership (signified by a +) of countries in the region in international and regional agreements and conventions in the field of biodiversity, including BFA. All countries in the region are members of the CBD, but only one (Tajikistan) is a member of the Nagoya Protocol under this Convention. Only Kyrgyzstan is a member of the ITPGRFA.

Table 8: Membership (+) of Central Asian countries regarding international and regional legal instruments

Central Asia countries							
	Convention/Treaty	Under the auspices of	Kazakhstan	Kyrgyzstan	Tajikistan	Turkmenistan	Uzbekistan
International legislation & instruments	Convention on Biological Diversity (CBD), 1992	UN	+	+	+	+	+
	Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization to the CBD, 2014	UN			+		
	Convention for the Protection of the World Natural and Cultural Heritage, 1972	UNESCO	+	+	+	+	+
	The International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA), 2001	ITPGRFA Secretariat		+			
Regional legislation & instruments	Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention), 1979	Council of Europe	+	+	+	+	+
	CIS Agreement on Legal Protection of Plant Varieties, 2001	Commonwealth of Independent States	+	+	+		+
	Agreement on the circulation of seeds of agricultural crops within the Eurasian Economic Union	Eurasian Economic Union	+	+			
	Framework Convention on Environmental Protection for Sustainable Development in Central Asia, 2006		+	+	+	+	+

2.4.2 NATIONAL POLICIES AND LEGISLATION

This section represents an overview of the existing policy framework and national legislation on four areas that are connected to the focus of this report.

*Table 9: Description of existing policies and legislation in Central Asian countries related to BFA
(Part 1/2: Kazakhstan, Kyrgyzstan and Tajikistan)*

Areas of legislation				
	Environment or nature protection	Agriculture and Rural Development	Plant, Animal, Forest and Aquatic Genetic Resources (seed, seedling, breeding)	Pollinators
Kazakhstan	<ul style="list-style-type: none"> • Ecological Code (2021)^{cblxxvii} • Law on Protection, Reproduction and Management of Wildlife (2004)^{cblxxviii} • Law on Protected Areas (2006)^{cblxxix} 	<ul style="list-style-type: none"> • Kazakhstan-2050 Strategy (2012)^{cblxx} • Strategic Plan of the Ministry of Agriculture for the period of 2020–2024 (2020)^{cblxxi} • Law on State Regulation of the Development of Agro-Industrial Complex and Rural Areas (2005)^{cblxxii} <ul style="list-style-type: none"> • Land Code (2003)^{cblxxiii} • Law on Land (2001)^{cblxxiv} • Law on Plant Protection (2002)^{cblxxv} • Law on Pastoralism (2017)^{cblxxvi} • Law on Production of Organic Goods (2015)^{cblxxvii} 	<ul style="list-style-type: none"> • Law on Seed Growing (2003)^{cblxxviii} • Law on Protection of Selection Achievements (1999)^{cblxxix} • Law on Pedigree Stockbreeding (1998)^{cclx} <ul style="list-style-type: none"> • Forest Code (2003)^{cclxi} • Law on Veterinary (2002)^{cclxii} 	<ul style="list-style-type: none"> • Law on Apiculture (2002)^{cclxiii} • Law on Pedigree Stockbreeding (1998)^{cclxiv} • Law on Production of Organic Goods (2015)^{cclxv} • Law on Protection of Selection Achievements (1999)^{cclxvi} • Law on Veterinary (2002)^{cclxvii}
Kyrgyzstan	<ul style="list-style-type: none"> • Biodiversity Conservation Priorities of the Kyrgyz Republic until 2024 and Action Plan for the Implementation of the Biodiversity Protection Priorities of the Kyrgyz Republic for 2014–2020 (2014)^{ccxcviii} • Law on Environmental Protection (1999)^{cxcix} <ul style="list-style-type: none"> • Law on Fauna (2002)^{cc} • Law on Flora Protection and Use (2001)^{ccci} <ul style="list-style-type: none"> • Law on Wild Fauna (1999)^{ccii} • Law on Protected Areas (2011)^{cciii} • Law on Prohibition of Fisheries, Transportation, Storage and Export of Precious and Endemic Fish Species Populated in the Issyk-Kul and Son-Kul Lakes (2008)^{cciv} 	<ul style="list-style-type: none"> • Fisheries and Aquaculture Development Programme in the Kyrgyz Republic for 2019–2023 (2019)^{cccv} • Concept of Development of the Forest Sector in the Kyrgyz Republic until 2040 (2019)^{ccvi} • Concept of the Development of Organic Agricultural Production in the Kyrgyz Republic for 2017–2022 (2017)^{ccvii} <ul style="list-style-type: none"> • Law on Agricultural Development (2009)^{ccviii} • Land Code of the Kyrgyz Republic (1999)^{cclx} • Law on Pastures (2009)^{ccix} • Law on Protection of Fertile Soil Layer of Agricultural Land (2012)^{ccx} • Law on Organic Agricultural Production (2019)^{ccxii} • Law on Use of Chemicals and Plant Protection (1999)^{ccxiii} 	<ul style="list-style-type: none"> • Seed Law (2007)^{cclxiv} • Law on Cultivation of Nut Plantations (2020)^{cclxv} • Law on Pedigree Stockbreeding (2009)^{cclxi} <ul style="list-style-type: none"> • Law on Legal Protection of Breeding Achievements (1998)^{cclxvi} • Law on Protection of Traditional Knowledge (2007)^{cclxviii} <ul style="list-style-type: none"> • Forest Code (1999)^{cccxix} 	<ul style="list-style-type: none"> • Regulation on Measures for the Beekeeping Development in the Kyrgyz Republic (1997)^{cclx} • Law on Flora Protection and Use (2001)^{ccxxi} • Law on Pastures (2009)^{ccxii}
Tajikistan	<ul style="list-style-type: none"> • National Strategy and Action Plan for Conservation of Biodiversity for the period until 2020 (2016)^{cclxiii} • Law on Environmental Protection (2011)^{cclxiv} <ul style="list-style-type: none"> • Law on Protected Areas (2011)^{cclxv} • Law on Protection and Use of Flora (2004)^{cclxvi} <ul style="list-style-type: none"> • Law on Wildlife (2008)^{cclxvii} 	<ul style="list-style-type: none"> • National Development Strategy of the Republic of Tajikistan until 2030 (2016)^{cclxviii} <ul style="list-style-type: none"> • Land Code (1996)^{cclxix} • Law on Soil Protection (2006)^{cclxx} • Law on State Regulation of Agricultural Land Fertility (2004)^{cclxxi} <ul style="list-style-type: none"> • Law on Pastoralism (2019)^{cclxxii} • Law on Organic Agriculture and Organic Production (2013)^{cclxxiii} 	<ul style="list-style-type: none"> • Law on Seed-Growing (2008)^{cclxxiv} • Law on Collection, Conservation and Rational Management of Genetic Resources of Cultivated Plants (2012)^{cclxxxv} • Law on Protection of Plant Varieties (2010)^{cclxxxvi} • Law on Pedigree Stockbreeding (2013)^{cclxxxvii} <ul style="list-style-type: none"> • Forest Code (2011)^{cclxxxviii} • Law on Fishfarming, Fisheries and Protection of Fish Stocks (2013)^{cclxxxix} • Law on Fishfarming (2006)^{cclx} • Law on Hunting and Hunting Management (2014)^{cclxi} 	<ul style="list-style-type: none"> • Law on Apiculture (2012)^{cclxiii} • Law on Veterinary Medicine (2010)^{cclxlii} • Law on Wildlife (2008)^{cclxlv}

Table 9: Description of existing policies and legislation in Central Asian countries related to BFA (Part 2/2: Turkmenistan and Uzbekistan)

Areas of legislation			
	Environment or nature protection	Agriculture and Rural Development	Plant, Animal, Forest and Aquatic Genetic Resources (seed, seedling, breeding) Pollinators
Turkmenistan	<ul style="list-style-type: none"> • National Strategy of Turkmenistan on Preservation Biodiversity 2018–2023 (2018)^{ccxdv} <ul style="list-style-type: none"> • Law on Environmental Protection (2014)^{ccxdvi} • Law on Plant Kingdom (2012)^{ccxlvii} <ul style="list-style-type: none"> • Law on Wildlife (2013)^{ccxlviii} • Law on Protected Areas (2012)^{ccxlix} 	<ul style="list-style-type: none"> • Law on State Regulation of Agricultural Development (2018)^{cccl} <ul style="list-style-type: none"> • Land Code (2004)^{cccli} • Law on Pastures and Grazing (2015)^{cccli} 	<ul style="list-style-type: none"> • Law on Seed Growing (2010)^{ccclii} • Law on the Collection, Conservation and Sustainable Use of Cultural Plant Genetic Resources (2017)^{ccclv} <ul style="list-style-type: none"> • Law on Legal Protection of Selection Achievements (2011)^{ccclv} • Law on Horse Breeding and Horse-Racing (2015)^{ccclvi} • Law on Hunting and Hunting Management (1998)^{ccclvii} <ul style="list-style-type: none"> • Forest Code (2011)^{ccclviii} • Law on Fisheries and Conservation of Aquatic Biological Resources (2011)^{ccclix}
Uzbekistan	<ul style="list-style-type: none"> • Strategy for Biodiversity Conservation in the Republic of Uzbekistan for the period of 2019–2028 (2019)^{ccbxii} • Concept of Environmental Protection in the Republic of Uzbekistan until 2030 (2019)^{ccbxiii} <ul style="list-style-type: none"> • Law on Nature Protection (1992)^{cccxiv} • Law on the Protection and Use of the Animal World (1997)^{cccxv} • Law on Protection and Use of Flora (1997)^{cccxvi} • Law on Protected Natural Territories (2004)^{cccxvii} • Law on Especially Protected Natural Territories (1993)^{cccxviii} 	<ul style="list-style-type: none"> • Agriculture Development Strategy of Uzbekistan for 2020–2030 (2019)^{ccbxix} • Concept of Development of the Forestry System of the Republic of Uzbekistan until 2030 (2020)^{ccbx} <ul style="list-style-type: none"> • Concept for the Development of Production of Organic Agricultural and Organic Food Products in the Republic of Uzbekistan (2020)^{cccxxi} <ul style="list-style-type: none"> • Land Code (1998)^{cccxii} • Law on Pastures (2019)^{cccxiii} 	<ul style="list-style-type: none"> • Law on Seed Growing (2018)^{ccclxiv} <ul style="list-style-type: none"> • Law on Pedigree Stockbreeding (1995)^{ccclxxv} <ul style="list-style-type: none"> • Law on Selection Achievements (1996)^{ccclxxvi} • Law on Hunting and Hunting Management (2020)^{cclxvii} <ul style="list-style-type: none"> • Law on Forest (1999)^{cclxviii}





NOTES: The legislative framework related to BFA is mainly translated into specially protected natural areas (SPNAs), preserving the natural habitats of fruit and nut forests, especially those at risk.¹⁵ The countries of the region also have UNESCO biosphere reserves, the purpose of which is to preserve cultural values and traditional agricultural systems and to provide further cultivation of local species and varieties.

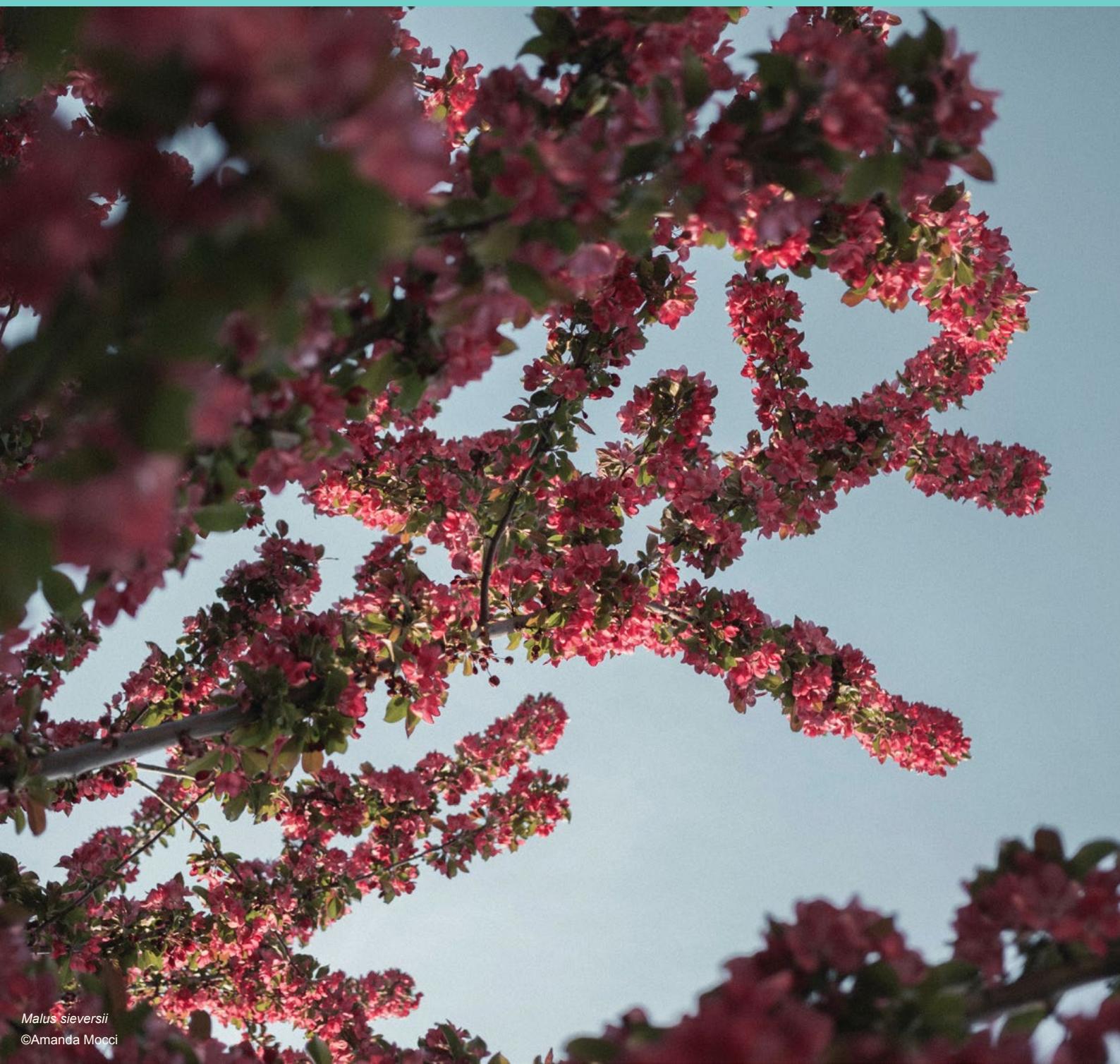
In parallel, some countries of the region are promoting agriculture policies that could jeopardise efforts of biodiversity conservation.

- The “Kazakhstan-2050” strategy set the task of developing the agricultural sector in the coming years to become a global and regional food supplier, which is possible with sufficient production of cheap, high-quality and competitive agricultural products and can produce competitive animal products for domestic and foreign markets. This policy is impacting family farming activities including the maintenance of agricultural biodiversity. Furthermore, despite the huge number of diverse forms and areas of agricultural support, any kind of subsidy is intended to develop and maintain biodiversity in the country. The forms and types of support do not target agri-environmental incentives and the sustainable use of natural resources.
- National Development Strategy (NDS) of the Republic of Tajikistan until 2030 defines the main priorities of the country's development after 2016. Strategic development goals are food security, safety and access to high-quality food. To address food security and environmental degradation, NDS proposes reform of the agricultural sector, innovation with reduced environmental and soil impacts, and access to quality agricultural seeds and fertilisers. In addition, it is about improving research on biodiversity, adapting to climate change and increasing the stability of mountain ecosystems. These measures do not necessarily guarantee BFA conservation while fostering an export-orientated agriculture.

Some topics in the area of BFA are not sufficiently addressed by national policies, such as unsustainable use of pastures, desertification, degradation of vegetation and soil cover, fragmentation of meadows, depleted irrigation systems, pests, diseases of plants and farm animals, climatic conditions, and non-compliance with crop rotation programmes.

¹⁵ More in: Lapeña, I., Turdieva, M., López Noriega, I. & Ayad, W.G., eds. 2014. *Conservation of fruit tree diversity in Central Asia: policy options and challenges*. Rome, Bioversity International; Turdieva, M.K., Kayimov, A.K., Baymetov, K.I., Mustafina, F.U. & Butkov, E.A., eds. 2012. *Conservation and sustainable use of biodiversity of fruit crops and wild fruit species*. Proceedings of International Scientific And Practical Conference, 23–26 August 2011, Tashkent, Uzbekistan.

In **Turkmenistan**, many wild relatives of over 170 arable crops of the Central Asian region have been preserved, including over 40 species from the group of shrubs and fruit trees, amongst others: the endemic subspecies of the Sievers apple tree, Turkmen apple (*Malus sieversii* ssp. *Turkmenorum*), a very old grape variety derived from the wild forest vine *Vitis sylvestris*, which today still grows wild in the Kopet Dag mountain region, or wild pomegranate (*Punica granatum* L.) (Lapeña *et al.*, 2014). These unique genetic resources require special protection, research and collection of genetic material. However, there is still no policy that would ensure optimal conditions for their protection and development, both in situ and ex situ. Many of the local varieties of fruit crops are primarily grown in home gardens by small farmers (Rustamov and Kepbanov, 2011) and their wild relatives are not protected.



2.4.3 KEY FEATURES OF NATIONAL LEGISLATION AND POLICIES

A progressive orientation towards industrial agriculture

In Soviet times, a large part of the area devoted to fruit growing was turned over to cotton. With the system changes after 1991, a large part of the orchards and vineyards was significantly degraded due to the poor sustainability of individual farmers. The new market economy conditions have also influenced and continue to affect the replacement of traditional and diverse crops by modern varieties and hybrids, in part due to national policies that prioritise the modernisation of agriculture and favour the cultivation of only a few crops needed for the market.

Policies do not serve BFA while marginalising smallholders

The primary place for the protection of genetic resources of cultivated plants is private farms – mainly the areas of home gardens. They are reservoirs of genetic diversity in fruits, nuts and horticultural crops, cultivated and preserved by traditional methods. They are also an important element of maintaining BFA in the region. However, the ubiquitous system of government intervention in the countries of the region – e.g. plans for cultivation and supply of cotton, production prices – very often prevents the freedom of running a farm (Turdieva *et al.*, 2012). The subsidy systems also promote large products of cereals and cotton and are practically unavailable to small farmers. In many cases, support for fruit plantations and vineyards is granted only to varieties registered in the National

Register of Breeding Achievements and under strict conditions, excluding small farms where old local varieties are grown using traditional low-input practices. The subsidy policy also does not cover the renewal of old orchards and vineyards inherited by farmers from the Soviet collective farms (kolkhoz).

Poorly implemented conservation laws

Since the collapse of the Soviet Union in 1991, Central Asian countries have been trying to consolidate their national legal framework by adjusting the laws adopted under the Union of Soviet Socialist Republics (USSR), developing new strategies for the conservation and use of BFA, and ratifying multilateral environmental agreements. However, there is still a large gap between the creation of the law and its enforcement due to the lack of regulations that translate the law into actions and take into account their implementation in many sectors. This is accompanied by a lack of monitoring as well as contradictions and gaps in the existing rules and a lack of institutional coordination. Lack of funding remains a major obstacle to more effective implementation of environmental, gene pool, biodiversity and BFA strategies.

The countries of the region have not adopted significant measures to protect traditional agricultural knowledge and practices. The regulations that make it difficult for farmers to preserve and create crop diversity have not been changed – there are no regulations that would recognise their contribution to the genetic heritage of crops and facilitate ➤

the legal exchange of seeds and planting material. For plant varieties to qualify for registration and sale, the countries of the region have established a certification system – the requirements of indifference, uniformity and stability.

Seed legislation is not suitable for biodiversity conservation

Kyrgyzstan, Tajikistan and Uzbekistan have been members of the International Union for the Protection of New Varieties of Plants (UPOV) Convention since 1991. Kazakhstan and Turkmenistan are not UPOV members, but their legislation follows a similar model that corresponds to the interests of industrial agriculture and recognises distinctness, uniformity,

stability and novelty as the criteria for the protection of varieties of plants. The varieties of fruit and vegetables grown in home gardens do not always meet these legal requirements, in particular the requirements of stability and uniformity. Thus, the seed regulations are not adapted to local varieties produced by farmers, and, therefore, the seeds of these varieties operate outside formal distribution channels. Failure to enforce these rules in practice allows farmers to sell and exchange unregistered seeds and planting material. This situation works against farmers – as seed producers, they cannot benefit from official recognition of their varieties, and as seed consumers, they cannot obtain certified seed.



DATA COLLECTION AND MONITORING SCHEMES ON BIODIVERSITY FOR FOOD AND AGRICULTURE



Data collection is lacking or conducted in a way that impedes proper monitoring on some specific components of BFA and species (soil micro-organisms, insects for pest control, micro-organisms, wild foods, etc.) and for some countries of the regions of interest for this report.

Plant Genetic Resources: the majority of countries in the regions submitted country reports for the Second Report on the State of the World's Plant Genetic Resources for Food and Agriculture (FAO, 2010): Albania, Armenia, Azerbaijan, Bosnia and Herzegovina, Georgia, Kazakhstan, Kyrgyzstan, North Macedonia, Serbia, Tajikistan, Turkey, Ukraine, and Uzbekistan.¹⁶

Animal Genetic Resources: nine countries (Albania, Azerbaijan, Kazakhstan, Kyrgyzstan, Montenegro, Serbia, Tajikistan, Turkey, and Ukraine)¹⁷ submitted country reports for the Second Report on the State of the World's Animal Genetic Resources for Food and Agriculture (FAO, 2015).

Forest Genetic Resources: country reports of only seven countries (Azerbaijan, Kazakhstan, Kyrgyzstan, Tajikistan, Turkey, Ukraine, Uzbekistan)¹⁸ were submitted to become part of the State of the World's Forest Genetic Resources (FAO, 2014a).

Aquatic Genetic Resources: just five countries (Armenia, Georgia, Kazakhstan, Turkey, Ukraine) from the focused regions¹⁹ contributed their country reports to the State of the World's Aquatic Genetic Resources for Food and Agriculture (FAO, 2019c; FAO, 2019d).

At the same time, only one country (Turkey) amongst those in this report's focus presented a country report for the State of the World's Biodiversity for Food and Agriculture, which gathers data from 91 countries on all BFA, including on assessment and monitoring of their status and trends (FAO, 2019a; FAO, 2019c).

This study contributes to filling these gaps.

The conducted research provides a large desk review of actions of (i) data collection, (ii) monitoring systems and (iii) conservation related to BFA in the three regions of interest for this report.

We present the most relevant actions for BFA per region and per country. A more extensive list of actions is available online.²⁰

General observation

The reported actions are largely about data collection and conservation and are rarely dedicated to the monitoring of diversity in cultivated crops and raised animals, nor about wild biodiversity loss (including on pollinators) caused by food production activities.

¹⁶ <http://www.fao.org/agriculture/crops/thematic-sitemap/theme/seeds-pgr/sow/sow2/country-reports/en/>

¹⁷ <http://www.fao.org/3/i4787e/i4787e01.htm>

¹⁸ <http://www.fao.org/forest-genetic-resources/assessments/first-report/country-reports/en/>

¹⁹ <http://www.fao.org/aquatic-genetic-resources/activities/sow/countryreports/en/>

²⁰ <https://lite.framacalc.org/9o11-uteepgc6zk.html>

Table 10: Description of existing initiatives in Western Balkan countries and the Republic of Moldova related to BFA (Part 1/5)

Western Balkan countries and the Republic of Moldova				
Name of the initiative	Main actors involved	Data collection (DC), monitoring (M) system or conservation initiative (C)	Scope of the action	Geographical scope
Regional initiatives				
SEEDNet (South East European Development Network on Plant Genetic Resource)	SIDA (Swedish International Development Cooperation Agency) and CBM (Centrum for biologisk mangfold). In Albania: Agricultural University of Tirana. In Bosnia and Herzegovina: Ministry of Agriculture, Water Management and Forestry, Faculty of Agriculture Banja Luka, Faculty of Agriculture Sarajevo, NGO Pomology society and Society for Fruit Growing of Republika Srpska. In North Macedonia: Agricultural Institute Skopje. In Serbia: Ministry of Agriculture, Forestry, and Water Management, Department of Genetic Resources and GMO. In Republic of Moldova: Centre for Plant Genetic Resources, Academy of Sciences of Moldova.	DC/C	Secure the conservation of plant genetic resources.	Balkan region: Albania, Serbia, North Macedonia, Bosnia and Herzegovina, Republic of Moldova
Albania				
Biodiversity National Network of Albania (BIONNA) database (Natura2000)	The EU, the Albanian Ministry of Environment, Forest and Water Administration	M/DC	Data collection and monitoring on wild flora and fauna.	National
National Gene Bank and Albanian National Inventory of ex situ base collections	Institute of Plant Genetic Resources, Agricultural University of Tirana (IPGR)	C	Conservation of plant genetic resources for food and agriculture (PGRFA).	National
On-farm conservation of plant genetic resources		C	On-farm conservation of local vegetables for self-consumption and local markets.	Korcha region, Albanian Alps
Albanian strategy for conservation and sustainable use of farm animal genetic resources	The Ministry of Agriculture and Rural Development	C	In situ conservation programmes for animals.	National
Registration of livestock breed	National Agency of Payments (Law on Agriculture and Rural Development 2007)	DC	Data collection of breeds of domesticated animals.	National

Table 10: Description of existing initiatives in Western Balkan countries and the Republic of Moldova related to BFA (Part 2/5)

Name of the initiative	Main actors involved	Data collection (DC), monitoring (M) system or conservation initiative (C)	Scope of the action	Geographical scope
Bosnia and Herzegovina				
Regional Network for Biodiversity Information Management and Reporting (BIMR)	GIZ German Federal Ministry for Economic Cooperation and Development. The project is part of the GIZ Open Regional Fund for South-East Europe-Biodiversity (ORF-BD).	DC	Data collection on species, ecosystems and genetic diversity.	South East Europe
National programme on plant genetic resources	Faculty of Agriculture Banja Luka, Agricultural Institute, Institute of Genetic Resources	C	Seed collection of cereals, vegetables, fodder, industrial as well as medicinal and aromatic plants.	Republika Srpska
Operative programme for plant genetic resources in agriculture	Faculty of Agriculture and Food Sciences, University of Sarajevo	C	Gene bank of plants including old cultivars.	Federation of Bosnia and Herzegovina
Sustainable pollination service of horticulture plants		DC	Data collection on sustainable pollination service, species inventorisation and management of biological threats (including regarding Osmia cornuta and Osmia bicornis).	Republika Srpska
Enabling on-farm conservation and farmer-based seed systems	Institute of genetic resources University of Banja Luka, Community Seed Bank and Agroecology Initiatives in Bosnia and Herzegovina	C	Projects that aims to enable on-farm conservation and farmer-based seed systems, with a special focus on lettuce, tomato and pepper.	National
Montenegro				
National Assessment of Biodiversity Information Management and Reporting (BIMR) baseline	GIZ ORF Biodiversity Programme – Biodiversity Information Management and Reporting System (BIMR)	M	Assessment of biodiversity information management and reporting.	National
List of South East Europe endemic species in the Nature Conservation Information System database	Public Enterprise for National Parks	DC	Inventory of species of vascular plants, transect surveys and mapping of internationally or nationally important, endangered and endemic species, regular monitoring of birds, and large mammals.	National
Fishing Information System	Directorate of Fisheries	DC	Data collection on marine fisheries and harmonising the strategies in the field of fisheries.	National
Expeditions to collect wild wheat relatives from the Aegilops genus and local wheat populations	Federal Institute for Plant and Genetic Resources the Faculty of Agriculture Novi Sad	DC/C	Collection for conservation purpose of wild wheat relatives from the Aegilops genus and local wheat populations.	National

Table 10: Description of existing initiatives in Western Balkan countries and the Republic of Moldova related to BFA (Part 3/5)

Name of the initiative	Main actors involved	Data collection (DC), monitoring (M) system or conservation initiative (C)	Scope of the action	Geographical scope
North Macedonia				
National biodiversity information system (NBIS)	UNDP/GEF/MoEPP Project	DC	The establishment or improvement of biodiversity information systems concerning specifically protected areas and areas proposed for protection.	National
Primary biodiversity data collecting	Institute of Biology at the Faculty of Natural Sciences and Mathematics, Ss. Cyril and Methodius University	DC	Data collection on fungi vascular plants, aquatic invertebrates, selected groups of land invertebrates, algae (mainly diatoms), fish, amphibians and reptiles, birds and mammals as well as plant communities and habitats.	National
Plant genetic resources conservation and utilisation	Faculty of Agriculture and Food Science and Agricultural Institute, Institute of Southern Crops, Scientific Institute of Tobacco	C	Conservation of plant genetic resources (with a focus on landraces).	National
National Gene Bank	Institute of Agriculture in Skopje	DC	Data collection on plant genetic resources (PGR).	Data collection on plant genetic resources
National Gene Bank of medicinal and aromatic plants	Faculty of Natural Sciences and Mathematics	DC	Data collection on medicinal and aromatic plants.	Data collection on medicinal and aromatic plants
Initial activities for conservation of agrobiodiversity in the Republic of Macedonia	GIZ	DC/C	Data collection for conservation purpose on plant genetic resources (PGR) and animal genetic resources (AnGR).	National
Preservation of rare pear varieties	Business Club from Kriva Palanka	C	Conservation initiative targeting eight pear varieties.	National
"Let's bring back the old types of apples and pears to our tables"	Association Aronija	C	Conservation of old and autochthonous varieties of pears and apples.	Region of Pijanec and Malesevija
Preservation of autochthonous varieties of apricot and pear	Association for environmental protection EKO GOL DRVO	C	Conservation of autochthonous varieties of apricot (<i>Krupna Skopjanka</i>) and pear (<i>Karamanka ssp.</i>).	Krivo Palanecki region
Plant genetic resources in situ conservation	Projects supported by GEF	C	Conservation initiative targeting 12 pear landraces.	National
Protection of the autochthonous breed	Farmers	C	Conservation initiative targeting Busha cattle, Ovchepolian sheep, and Srebra chickens.	National

Table 10: Description of existing initiatives in Western Balkan countries and the Republic of Moldova related to BFA (Part 4/5)

Name of the initiative	Main actors involved	Data collection (DC), monitoring (M) system or conservation initiative (C)	Scope of the action	Geographical scope
Republic of Moldova				
National Programme for Plant Genetic Resources for Food and Agriculture	State agency - FAO	DC	Project of developing a national programme on plant genetic resources for food and agriculture, and strengthening the institutional capacity of the Ministry of Agriculture for the conservation and sustainable use of these resources.	National
Research on vegetable agrobiodiversity	Institute of Genetics, Physiology and Plant Protection, the Scientific-Practical Institute of Horticulture and Food Technologies, Institute of Practical Science Phytotechny "Selectia", Institute of Phytotechnology "Porumbeni".	DC	Research and data collection on plant agrobiodiversity.	National
Catalogue of Plant Varieties of the Republic of Moldova	State Commission for Crops Variety Testing of Republic of Moldova	DC	Collection of 3 016 plant varieties and hybrids of cultivated plants.	National
Genetic fund of farming animals	Animal Breeding Farm Bardar Zooclub	DC	Collection of animal genetic resources, including ostrich, horses, pony, goats, sheep, alpaca, kangaroo, pigs, pheasant, swans, quail, and rabbits.	Local
Monitoring of the diversity of plant and animal species	The Institute of Zoology, Botanical Garden (Institute) Alexandru Ciubotaru, Institute of Geography and Ecology, State Ecological Inspectorate, Moldsilva Agency, Institute for Forest Management, scientific reserves Plaiul Fagului, Codrii, Iagorlic, Prutul de Jos	M	Monitoring of endangered (or potentially endangered) plant and animal species.	National

Table 10: Description of existing initiatives in Western Balkan countries and the Republic of Moldova related to BFA (Part 5/5)

Name of the initiative	Main actors involved	Data collection (DC), monitoring (M) system or conservation initiative (C)	Scope of the action	Geographical scope
Serbia				
National information system for biodiversity	Biodiversity Information Centre, located in the Faculty of Biology of the University of Belgrade	DC	General data collection system for biodiversity monitoring, conserving and sustainable use.	National
Monitoring of selected birds and butterfly species	Research institutions, NGOs	M	Monitoring of changes in the population of selected birds and butterfly species.	National
Crop conservation	National Institute of the Republic of Serbia	C	Conservation of spring wheat (collected from all over the world), barley, sunflower (genotypes of various origins), soybean, rapeseed, sorghum and hemp.	National
Fruit collection	Fruit research institute Čačak, Faculty of Agriculture Novi Sad (Experimental station in Sremski Karlovci), Faculty of Agriculture Belgrade (Experimental School Station Radmilovac)	C	Biological and ecological studies of fruit trees, collection and research of domestic and introduced fruit cultivars for the purpose of conservation in the gene bank.	National
Vitis collection	Center for Fruit Production and Viticulture, Niš	C	Research on the value for cultivation of varieties, clones and rootstocks of vine and preservation of the genetic resources of the vine.	National
Soybean collection	Institute for Field and Vegetables, Novi Sad	C	Basic and applied research, aiming at the development of cultivars and hybrids of field and vegetable crops (soybean), forage and industrial crops, medicinal plants, and spices.	National
Animal breeds conservation	Ministry of Agriculture	C	List of genetic reserves of domestic animals and study on conservation methods of genetic resources of domestic animals. The initiative includes a list of indigenous breeds of domestic animals and endangered indigenous breeds.	National

Table 11: Description of existing initiatives in the South Caucasus countries, Turkey, Belarus and Ukraine related to BFA (Part 1/6)

South Caucasus countries, Turkey, Belarus and Ukraine				
Name of the initiative	Main actors involved	Data collection (DC), monitoring (M) system or conservation initiative (C)	Scope of the action	Geographical scope
Regional initiatives				
Regional Strategy for the Conservation, replenishment and use of plant genetic resources for food and agriculture (PGRFA) in Central Asia and the Caucasus	Central Asian and Transcaucasia Network on PGRs (CATCN-PGR), Global Crop Diversity Trust	C	Strategy at the regional level for the conservation and sustainable use of cultivated plants and their wild relatives.	Central Asia and Caucasus
Saving the Flora of the Caucasus	Millennium Seed Bank Partnership (Anush Nersesyan) in collaboration with national partners including National Botanic Garden and Institute of Botany of Georgia, Institute of Botany of Armenia and Institute of Botany and Institute of Genetic Resources of Azerbaijan	C	Ex situ conservation (regenerating and multiplying ex situ accessions) for research and conservation use. The project includes training and facilities for conserving seed of wild species.	Georgia, Armenia, Azerbaijan
Surveys and status assessment of potentially threatened <i>Pyrus spp.</i> in Caucasus (Azerbaijan, Armenia, Georgia)	Scientific institutes from the three countries. Contact person: Merabi Machavariani	DC	Assessment of the conservation status of nine potentially endangered <i>Pyrus spp.</i> and identification of actions for their conservation.	Georgia, Azerbaijan, Armenia
Emerald Network of Nature Protection Sites, phase II	European Union – Council of Europe Joint Programme for the preparation of the Emerald Network of Nature Protection Sites, phase II. Seven target countries: Armenia, Azerbaijan, Belarus, Georgia, Republic of Moldova, the Russian Federation and Ukraine	DC	Promotion of in situ conservation of crop wild relatives and wild food plants. It supports countries in assessing natural resources, in identifying species and habitats to protect and in selecting the potential sites suitable for ensuring the long-term survival of the species protected by the Bern Convention.	Republic of Moldova, Armenia, Azerbaijan, Belarus, Georgia, Russian Federation, Ukraine
Nursery of Facultative and Winter Wheat	I.Lomouri Institute of Farming	C	Conservation through programme (nursery) of facultative and winter wheat.	Turkey, Georgia, Azerbaijan, Armenia
Genetic diversity of single and double wheat samples	Azerbaijan National Academy of Sciences	DC	Evaluation of genetic diversity of single and double wheat samples of Turkish and Azerbaijani origin and selection of high quality samples.	Azerbaijan, Turkey
Integrated Biodiversity Management, South Caucasus (IBiS)	GIZ / ADA Ministry of Territorial Administration and Infrastructure of Armenia, Ministry of Ecology and Natural Resources of Azerbaijan, Ministry of Environment Protection and Agriculture of Georgia	DC	Data collection to improve the management of biodiversity and ecosystem services.	South Caucasus: Armenia, Azerbaijan, Georgia

Table 11: Description of existing initiatives in the South Caucasus countries, Turkey, Belarus and Ukraine related to BFA (Part 2/6)

Name of the initiative	Main actors involved	Data collection (DC), monitoring (M) system or conservation initiative (C)	Scope of the action	Geographical scope
Armenia				
Red list assessment of nine Aegilops species in Armenia (study)	Armenian Agrarian University, Ministry of Natural Protection	DC	Study on wheat wild relatives (nine Aegilops species).	National
Plant gene pool and breeding	Armenian National Agrarian University	C	Seed collection composed of 80% of crop wild relatives. (Long term storage is not guaranteed due to the lack of storage availabilities.)	National
Agrobiodiversity conservation and value chain creation for sustainable use in rural communities of Armenia	Ministry of Environment of the Republic of Armenia	C	Project aiming at conserving agrobiodiversity while enhancing value chains of rural communities.	National
Wild berries conservation	Green Lane NGO, Fund for Armenian Relief, in collaboration with local communities (women). Funded by GEF SGP.	C	Cultivation and production of wild berries in high-mountainous communities in the context of conservation of local agro-ecological systems.	Tavush region
Enhancing livelihoods in rural communities through mainstreaming and strengthening agricultural biodiversity conservation and utilisation	Ministry of Environment of the Republic of Armenia	C	Project aiming at conserving agrobiodiversity while improving livelihoods of rural communities.	National
Seed bank	Ministry of Economy of the Republic of Armenia / Scientific Centre of Vegetable and Industrial Crops	C	National seed bank that collected accessions of vegetable crops, cereals and grain-legume.	National
Project of onion varieties conservation	Armenian National Agrarian University	C	Propagation of local varieties of onion and provision of seed material to farmers.	National
Monitoring and conservation of plant genetic resources	Armenian National Agrarian University	M/C	Monitoring (using GIS system), conservation, and utilisation of plant genetic resources, including the restoration of farmers' varieties and breeding of new varieties.	National
Creation of community-managed protected landscape "Gnishik"	WWF Armenia	DC	Habitat protection through the active commitment of local populations.	Local
Ancient tomato varieties of Armenian breeding	Scientific Centre of Vegetable and Industrial Crops	C	Restoration of old tomato varieties of Armenian breeding and development of methods of their cultivation through application of modern technologies.	National

Table 11: Description of existing initiatives in the South Caucasus countries, Turkey, Belarus and Ukraine related to BFA (Part 3/6)

Name of the initiative	Main actors involved	Data collection (DC), monitoring (M) system or conservation initiative (C)	Scope of the action	Geographical scope
Azerbaijan				
Expedition mission for collecting lettuce species	Genetic Resources Institute, Azerbaijan National Academy of Sciences	DC	Collection of lettuce species.	National
Genetic resources of wild spinach, vegetable and cucurbit crops and their wild relatives	Rijk Zwaan Seed Company B.V.	DC	Collection of genetic resources of wild spinach, vegetable and cucurbit crops and their wild relatives.	National
Genetic resources and breeding of grapes	Viticulture and Wine-making Research Institute	DC	Collection, study, evaluation of genetic resources of grapes, selection and breeding of economically important varieties, forms and promotion of sustainable use of these varieties.	Institutional
Azerbaijani wheat, barley and their wild relatives	Scientific Affairs of Institute of Genetic Resources of Azerbaijan National Academy of Sciences (Dr Mehraj Abbasov) and North Dakota State University (USA)	DC	Evaluation of the genetic diversity of Azerbaijani wheat, barley and their wild relatives.	National
Collection of wild ancestors of cultivated plants		C	Ex situ collection of a diversity of wild ancestors of cultivated plants.	National
Plant genetic resources and wild relatives	Genetic Resources Institute	DC	Collection, ex situ and in situ conservation, research on crop genetic resources and their wild relatives.	National
Fruit plants genetic resources	Genetic Resources Institute	DC	Collection, evaluation, protection, research and efficient use of genetic resources of fruit plants.	National
Cereals, food legumes and industrial crops genetic resources	Nakhichevan Bioresources Institute	DC	Collection, study and use of breeding of the gene pool of cereals, food legumes and industrial crops grown in the Nakhchivan Autonomous Republic.	Nakhchivan Autonomous Republic
Monitoring of seeds variability	Genetic Resources Institute	M	Monitoring of seeds collected in the gene bank and study of their physiological and genetic variability.	National
Conservation and sustainable use of globally important agrobiodiversity	UNDP and Ministry of Agriculture	DC	Recovery, long-term protection and sustainable use of native genetic resources and promotion of traditional crop material.	Three districts - Shaki, Goranboy and Goychay

Table 11: Description of existing initiatives in the South Caucasus countries, Turkey, Belarus and Ukraine related to BFA (Part 4/6)

Name of the initiative	Main actors involved	Data collection (DC), monitoring (M) system or conservation initiative (C)	Scope of the action	Geographical scope
Belarus				
National gene bank	State (in the framework of the Second GPA for PGRFA)	DC	Creation of a national bank of plant genetic resources for breeding new varieties and hybrids of agricultural crops.	National
Collection of plant genetic resources for food and agriculture	Republican Unitary Enterprise 'Institute for Fruit Growing' (in the framework of the Second GPA for PGRFA)	DC	Collection of plant genetic resources for food and agriculture, including apples, pears, cherries, plums, etc.	Brest, Grodno, Minsk, Gomel, Mogilev, Vitebsk regions
Collection of soil micro-organisms	Belarus Institute of Microbiology under the National Academy of Sciences	DC	Collection of soil micro-organisms, specifically strains of interest for the industry.	National
Georgia				
Supporting organic farming, rural development and agricultural biodiversity conservation	Elkana	DC/C	Project on the sustainable use of natural resources and improvement of livelihoods in rural areas. The project includes on-farm research and data recording.	National
Development of the electronic catalogue of Georgia's agricultural biodiversity	Elkana, financed by GIZ/MoE	DC	Electronic catalogue of Georgia's agricultural biodiversity in Georgia with a participatory approach.	National
Conservation and sustainable utilisation of endangered domestic animal breeds	Elkana	DC	The project contributes to the conservation of agricultural biodiversity of Georgia, particularly the conservation of local breeds of domestic animals, including a survey on the current state of local animal breeds and pedigree samples for selected local breeds.	National
Recovery, conservation and sustainable use of Georgia's agricultural biodiversity	Elkana, financed by GEF/UNDP	C/DC	Reintroduction of local landraces on farm, recovery and distribution of seed material and support to marketing of the products. The project seeks to address the scarcity of seeds and planting materials, the unfamiliarity of the farmers with the importance of agricultural biodiversity, the lack of access to markets, the poor information on production technologies for indigenous crops, and wants to favor dialogue between farmers and researchers.	National

Table 11: Description of existing initiatives in the South Caucasus countries, Turkey, Belarus and Ukraine related to BFA (Part 5/6)

Name of the initiative	Main actors involved	Data collection (DC), monitoring (M) system or conservation initiative (C)	Scope of the action	Geographical scope
Georgia				
Conservation farm "Seed Ark"	Elkana	C	Conservation initiatives focusing on cereals, pulses and local fruit varieties. Seed Ark in Tsnisi offers farmers seed and seedling material of on-farm conserved landraces and encourages their participation in agricultural biodiversity conservation.	Local – villages Tsnisi, Samtskhe-Javakheti
Conservation breeding farm of landraces of domesticated animals "Khodasheni farm"	Elkana	C	Participatory on-farm local livestock breeds conservation. Two local breeds of livestock (Georgian Mountain Cow and Caucasian Brown), one local breed of pig (Kakhetian Pig) and five local populations of hen (Megrula, Chalisperi, Shavi, Natsara, Keltitvela) are bred on the Khodasheni farm. Local farmers are actively involved in the conservation programme of Kakhetian Pig, which was almost extinct when the programme started.	Local – villages Zemo Khodasheni, Kakheti
Soil atlas		DC	Soil atlas in 2018, including soil types, morphology, microbiology, texture, chemical properties, macronutrients, physical properties and iron content	National
Saving the Flora of the Caucasus	Millennium Seed Bank Partnership, Royal Botanic Gardens Kew/ Anush Nersesyan. In Georgia: National Botanic Garden of Georgia and Institute of Botany, in Armenia: Institute of Botany and in Azerbaijan: Institute of Botany and Institute of Genetic Resources	C	Collection of plants for research and conservation. The programme conserves over 1 100 plant species and provides a range of training opportunities to local scientists and improved facilities for conserving seed of wild species.	Georgia, Armenia, Azerbaijan
Agrobiodiversity adaptation to climate change	The Regional Environmental Centre for the Caucasus (REC Caucasus)	C	Identification and implementation of adaptation response to climate change impacts for conservation and sustainable use of agrobiodiversity in arid and semi-arid ecosystems of South Caucasus.	Arid and semi-arid ecosystems of South Caucasus

Table 11: Description of existing initiatives in the South Caucasus countries, Turkey, Belarus and Ukraine related to BFA (Part 6/6)

Name of the initiative	Main actors involved	Data collection (DC), monitoring (M) system or conservation initiative (C)	Scope of the action	Geographical scope
Turkey				
Biodiversity conservation of Çoruh Valley	Aegean Agricultural Research Institute	C	Project aiming at enhancing the sustainable use of plant genetic resources for food and agriculture in the Çoruh Valley. The project aims at addressing: surveying and inventorying PGRFA, promoting in situ conservation of crop wild relatives and wild food plants, regenerating and multiplying ex situ accessions, supporting plant breeding, genetic enhancement and base-broadening effort.	Çoruh Valley
Ex situ conservation of plant genetic resources		C	Conservation through ex situ conservation programme of plant genetic resources (in the frame of the second GPA).	National
In situ conservation of land races from the transitional zone	Aegean Agricultural Research Institute	C	Conservation through in situ conservation programme of land races from the transitional zone.	National
Conservation of Cucumis melo and wild relatives genetic resources		C	Management, conservation and valorisation of genetic resources of Cucumis melo and wild relatives.	Turkey, Spain, Portugal, Germany
Wild plant species used as vegetable in Aegean Region	Aegean Agricultural Research Institute	C	Conservation of wild plant species used as vegetable.	Aegean Region
Ukraine				
Sustainable agriculture and conservation of steppe biodiversity in Ukraine and Russia (INECO)	IUCN project in collaboration with National Ecological Centre of Ukraine (NECU)	C	Initiative aiming at the conservation of steppe biodiversity.	Ukraine, Russia
The Dnieper Ecological Corridor, in the framework of the Emerald Network of Nature Protection Sites, phase II	European Union – Council of Europe Joint Programme for the preparation of the Emerald Network of Nature Protection Sites, phase II.	DC/C	Landscape and biodiversity conservation, including habitats of rare and endangered species of animals and plants in Ukrainian forest steppe. At the regional level, the programme promotes in situ conservation of crop wild relatives and wild food plants.	Dnieper River basin

*Table 12: Description of existing initiatives in Central Asian countries related to BFA
(Part 1/5)*

Central Asia				
Name of the initiative	Main actors involved	Data collection (DC), monitoring (M) system or conservation initiative (C)	Scope of the action	Geographical scope
Regional initiatives				
In situ conservation and use of agricultural biodiversity in Central Asia	State agencies, scientific institutes, farmers, NGOs	C	The project includes the objectives of ensuring on farm conservation and utilisation of horticultural crops and wild fruit species.	Central Asia region: Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan
Environmental Monitoring in Central Asia (MONECA), in the framework of the forest and biodiversity management, including environmental monitoring (FLERMONECA)	GIZ, Austrian Environment Agency (UBA) and Regional Environmental Centre for Central Asia (CAREC)	DC/M	Environmental monitoring, reporting and data collection. Data sharing and closer collaboration amongst Central Asian countries is a major aspect of the project. One of the project's outputs is a "Catalogue of Pasture Plants of Kyrgyzstan" (developed in collaboration with Camp Alatoo).	Regional
Regional Program for Sustainable Agricultural Development in Central Asia and Caucasus	ICARDA, national research institutes	DC/M	The project includes the development of crops resistant to drought, heat, pests and disease and pasture lands degradation.	Central Asia and Caucasus countries
Kazakhstan				
Strengthening the plant biotechnology capacity for sustainable utilisation of plant genetic resources for food and agriculture in Kazakhstan	FAO, National Center for Biotechnology of the Republic of Kazakhstan, "KazAgroInnovation" JSC, and CIMMYT-Kazakhstan	DC/M	The project aims at strengthening the plant biotechnology capacity for sustainable utilisation of plant genetic resources for food and agriculture.	National
Research institute for seed selection for food production	Kazakh Research Institute of Agriculture and Plant growing	DC/M	Selection and seed growing of grain, leguminous, oil and industrial crops.	Southeast of Kazakhstan
Wild fruit trees protection	National Nature Park Zhongar Alatau	C	Protection of wild fruit trees including the Sievers apple, apricots, barberry, cherries, and currants.	Nature Park Zhongar Alatau

Table 12: Description of existing initiatives in Central Asian countries related to BFA (Part 2/5)

Name of the initiative	Main actors involved	Data collection (DC), monitoring (M) system or conservation initiative (C)	Scope of the action	Geographical scope
Kyrgyzstan				
Monitoring of pastures degradation	NGO Camp Alatoo in close collaboration with local communities	DC/M	Community-led pastures monitoring working with demonstration sites and monitoring points to monitor land erosion and degradation in all pastoral sites.	Kyrgyzstan, Tajikistan
Conserving biodiversity and reducing poverty through the management of walnut forests and pastures	NGO Camp Alatoo in close collaboration with local communities.	C/DC	Walnut forests and pasture plants participatory conservation. The project includes a catalogue of dominant pasture plants.	the South region of Kyrgyzstan
Traditional agricultural and pastoral knowledge recovery	NGO Rural Development Fund (RDF)	DC	The project aims at recovering traditional agricultural and pastoral knowledge.	Kyrgyzstan, Tajikistan
Protected areas management to increase local biodiversity	NGO Rural Development Fund (RDF)	DC	Assessment of land degradation in the framework of management of protected areas to increase local biodiversity.	Northern Tien Shan
Reviving local breeds of animals "Altyn Tuyak"	NGO Rural Development Fund (RDF)	DC/C	Restoration of the gene pool of the Kyrgyz horse and the Buryat cow.	Kyrgyzstan, Buryatia (Russian Federation)
Revival of nomadic culture, including traditional yak breeding in the highlands of Central and Inner Asia	NGO Rural Development Fund (RDF)	C	Revival of nomadic culture, including traditional yak breeding in the highlands of Central and Inner Asia and manifestation of solidarity and interactions between indigenous peoples of Asia.	Kyrgyzstan, Murgab (Tajikistan), Buryatia (Russian Federation)
Breeding station "Elita"	Kyrgyz Institute of Breeding and Pasture	C	In 2014, the state-owned breeding station "Elita" (established during the Union of Soviet Socialist Republics) was restored and work began on organising a bank of genetic material for farm animals. (These efforts are aimed primarily at preserving the gene pool of highly productive animals, including animals from outside of Kyrgyzstan).	National
Walnut diversity and breeding (study)	Jalal-Abad Scientific Center, National Academy Sciences of the Kyrgyz Republic	DC	Study on the methods and criteria of selection of the best forms of walnuts for production in the wild walnut forest.	South of Kyrgyzstan

*Table 12: Description of existing initiatives in Central Asian countries related to BFA
(Part 3/5)*

Name of the initiative	Main actors involved	Data collection (DC), monitoring (M) system or conservation initiative (C)	Scope of the action	Geographical scope
Kyrgyzstan				
Medical ethnobotany of herbal practitioners in the Turkestan Range, southwestern Kyrgyzstan (study)	Scientific institute	DC	Collection of traditional knowledge related to medicinal plants.	Turkestan Range in southwestern Kyrgyzstan
Botanical garden	Gareev Botanical Garden of the National Academy of Sciences of the Kyrgyz Republic	DC	Introduction, selection and genetic research of fruit plants.	Botanical garden in Bishkek, collecting plants at the country level
Catalogue of breeds of farm animals	State agency Ministry of Agriculture, Food Industry and Land Reclamation of the Kyrgyz Republic	DC	National catalogue of breeds of domesticated animals (including sheep, goats, livestock, and yaks).	National
Seed Guardians Network "Dyikan Muras"	Agency of Development Initiatives (ADI)	DC/C	Dyikan Muras project aims at multiplying locally adapted vegetable seeds with the general objective of recovering and maintaining agricultural biodiversity and knowledge.	Chui, Issyk-Kul, Jalal-Abad, Talas and Batken regions
Biodiversity conservation and poverty reduction through community-based management of walnut forests and pastures	State Agency for Environment Protection and Forestry of the Kyrgyz Republic, financed by GIZ	C	Walnut forests sustainable management based on the communities' needs.	Bazar-Korgon, a district of the Jalal-Abad region
Varieties and genetic resources conservation	State Research Center for Varieties and Genetic Resources	C	Protection of plant genetic resources. Catalogue of varieties and hybrids of agricultural crops and cultivar experiments.	National
Community Conservation Resilience Initiative in Kyrgyzstan	NGO, food producers	C	Fruit trees conservation (including wild apple nursery). The project includes an ethnobotanical garden in a school.	Chuy region, Jalal-Abad region, three villages (central Tian-Shan area)

Table 12: Description of existing initiatives in Central Asian countries related to BFA (Part 4/5)

Name of the initiative	Main actors involved	Data collection (DC), monitoring (M) system or conservation initiative (C)	Scope of the action	Geographical scope
Tajikistan				
Preservation and dissemination of local agrobiodiversity and traditional knowledge in Tajikistan	NGO, scientific institutes, food producers	DC	Recovery of local endemic traditional fruit varieties and elders' knowledge on old varieties (e.g. grafting trees). Outputs of the project include a book "Local Agrobiodiversity and Traditional Knowledge Need to be Preserved" and an atlas "Agrobiodiversity – Food, Recourse and Wealth".	Gissar, Rasht, Zarafshan, Istaravshan and Vakhsh valleys of Tajikistan
Community Conservation Resilience Initiative in Tajikistan	Global forest coalition	C	The initiative consists of discussions around sustainable and peaceful management of land, forests and fruits with the communities.	Mountainous regions of central Tajikistan including local communities: Sarihasor, Dektur, Dashtijum, Obigarm, Jonbakht, Mulokoni
Sustainable agrobiodiversity in a changing climate	In partnership with the National Biodiversity and Biosafety Centre (NBBC), UNDP Communities Programme and the GEF Small Grants Programme (SGP)	C	The project aims at conserving cultivated plants, particularly wild fruit trees.	Baldzhuvan, Rasht, Zeravshan, Shubadan
Local plant catalogue	Institute of Botany, Physiology and Plant Genetics of the Academy of Sciences of the Republic of Tajikistan	DC	Identification and description of families, genus and species (including more than 600 endemic species).	National
Local varieties collection and restoration	National Center for Genetic Resources of the Tajik Academy of Agricultural Sciences (NCGR)	DC/C	The project documents endangered local varieties of cereals, legumes, fruits, and forage plants and introduces new varieties from abroad.	National

Table 12: Description of existing initiatives in Central Asian countries related to BFA (Part 5/5)

Name of the initiative	Main actors involved	Data collection (DC), monitoring (M) system or conservation initiative (C)	Scope of the action	Geographical scope
Turkmenistan				
Let's save the gene pool of wild relatives of fruit crops in south-west Kopetdag	Scientific institution	C	Project of conservation of wild relatives of fruit trees. The project resulted in a booklet (in Russian) developed in the framework of the regional project "In situ/on farm conservation and use of agricultural biodiversity (horticultural crops and wild fruit species) in Central Asia"	South-west Kopetdag
Wild fruit tree gene bank	Makhtumkuli Scientific Center for the Production of Genetic Resources of the Institute of the Turkmen Academy of Sciences	DC	Collection of accessions of Turkmen and Central Asian fruit crops. In the early 2000s, the number of accesses to the bank decreased significantly: the harvest of cherry plum (<i>Prunus cerasifera</i>), peach, pear and apricot were completely lost, and the grape harvest was cut in half.	National
Local flora, fauna and microorganisms catalogue	Institute of General and Practical Biology of Oguzkhan Engineering and Technological University	DC	Study, analysis, organisation and systematisation of flora, fauna and microorganisms of the country, development of hybrids, new species and varieties of agricultural plants, as well as biomedical experiments.	National
Uzbekistan				
Regeneration of threatened crops	The Research Institute of Plant Industry, in the framework of the Crop Trust cooperation	DC	The initiative aims at regenerating, characterising and safely duplicating sorghum accessions with the objective of rescuing threatened diversity and enhancing use of the crop.	National

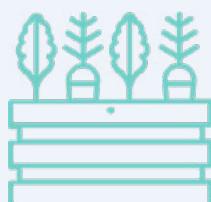


3.1 International data collection and monitoring systems relevant for biodiversity for food and agriculture

We provide the following list of relevant initiatives of data collection undertaken at the international level and directly related to BFA.

Four databases monitor the status of genetic resources and collect information on activities and facilitate the exchange of information directed to countries, supporting them in the implementation of the relevant Global Plans of Action: the Second Global Plan of Action for

Plant Genetic Resources for Food and Agriculture (FAO, 2011), the Global Plan of Action for Animal Genetic Resources (FAO, 2007), and the Global Plan of Action for the Conservation, Sustainable Use and Development of Forest Genetic Resources (FAO, 2014b). Surveying, inventorying, characterising and monitoring of genetic resources for food and agriculture are amongst the priorities of all three Action Plans. ➤



- **On plant genetic resources (PGRFA):**

The World Information and Early Warning System (WIEWS)²¹ “facilitates exchange of information on plant genetic resources amongst member countries as well as periodic assessments of the status of plant genetic resources conservation, sustainable use and capacity” (FAO, 2021b, para. 2).

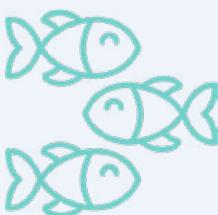
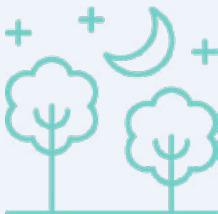


- **On animal genetic resources (AnGRFA):**

“The Domestic Animal Diversity Information System (DAD-IS)²² is a communication and information tool for the management of animal genetic resources for food and agriculture. (...) DAD-IS provides access to searchable databases of breed-related information and photos and links to other online resources on livestock diversity. (...) DAD-IS provides a tool to analyse the diversity of livestock breeds on national, regional and global levels including the status of breeds regarding their risk of extinction” (FAO, 2021b, para. 8–9). In addition, FAO produces biannual “Status and Trends” reports for AnGR (FAO, 2020).

²¹ <http://www.fao.org/wiews/en/>

²² <http://www.fao.org/dad-is/en/>



• On forest genetic resources (FGRFA):

The Global Forest Resources Assessment (FRA) has been periodically conducted by FAO since 1946. The latest FRA from 2020 “examines the status of, and trends in, more than 60 forest-related variables in 236 countries and territories in the period 1990–2020”²³ (FAO, 2021c, para. 2).

• On aquatic genetic resources (AqGRFA):

The first global assessment of the status of aquatic genetic resources was presented by FAO in 2019. Based on the Country Reports submitted by 92 countries, the Report “focuses on farmed aquatic species and their wild relatives within national jurisdiction” (FAO, 2019).

Data provided by countries to compile WIEWS and DAD-IS monitoring systems are used as monitoring mechanisms for Indicators 2.5.1 and 2.5.2 of the 2030 Sustainable Development Goals “Plant and Animal Genetic Resources.” Both monitoring systems represent data at national, regional and global levels.

Assessments related to BFA and its specific components have been conducted at international and regional levels: FAO annual publications on the State of Food and Agriculture (SOFA),²⁴ State of World Fisheries and Aquaculture (SOFIA),²⁵ State of the World’s Forests (SOFO),²⁶ state of knowledge of soil biodiversity (FAO, ITPS, GSBI, CBD and EC, 2020), the IPBES assessment report on pollinators, pollination and food production (IPBES, 2016), IPBES global assessment of biodiversity and ecosystem services (IPBES, 2019), and the IPBES Regional Assessment Report on Biodiversity and Ecosystem Services for Europe and Central Asia (IPBES, 2018a).

The Diversity Assessment Tool for Agricultural Biodiversity and Resilience (DATAR), developed by the (open-source) Platform for Agrobiodiversity Research (PAR), supports the assessment of genetic diversity at farm and community levels (Platform for Agrobiodiversity Research, 2021) and is “a scientific IT tool to conduct assessments on intra-specific genetic diversity on farm and at community level for intra-specific genetic diversity of crop, livestock and aquatic farm types at farm and community level” (Platform for Agrobiodiversity Research, 2021, para. 4).

Tools for the monitoring of habitat biodiversity at the global level also exist, such as the Earth Observation Data for Habitat Monitoring (EODHaM) system developed within the BIO_SOS – BIODiversity Multi-Source Monitoring System – from Space TO Species (a project implemented by Wageningen University & Research from 2010 to 2013 years).²⁷

²³ <http://www.fao.org/forest-resources-assessment/fra-2020/country-reports/en/>

²⁴ <http://www.fao.org/publications/sofa/en/>

²⁵ <http://www.fao.org/state-of-fisheries-aquaculture>

²⁶ <http://www.fao.org/publications/sofo/en/>

²⁷ https://www.wur.nl/en/show/BIO_SOS-BIODiversity-Multi-Source-Monitoring-System-from-Space-TO-Species.htm

3.1.1 FOCUS ON POLLINATORS

Amongst all taxa of pollinators, bees are the most monitored (and honeybees even more) in the countries that reported to FAO for The State of the World's Biodiversity for Food and Agriculture (2019). Also, DAD-IS allows countries to report on honeybees.

The regions of interest to this report are – as many others in the world – particularly poor in data collection on insects (Sánchez-Bayo and Wyckhuys, 2019).

International data collection on pollinators is performed by an FAO initiative (“Taking stock of initiatives, policies and instruments for the sustainable use and conservation of pollinators” [FAO, 2021d, para. 1]) to list data collection and monitoring initiatives as well as policies and instruments related to pollinators conservation. Data assessment is reflected in the IPBES Assessment Report on Pollinators, Pollination and Food Production (IPBES, 2016).



Hummingbird Moth (*Macroglossum stellatarum*) in Belgrade, Serbia
©Milan Ivanovic

3.2 The Western Balkan countries and the Republic of Moldova

A detailed description of actions undertaken to document and monitor BFA is available in an [online annex](#).

3.2.1 GENERAL SITUATION

The last regional biodiversity monitoring activity was the establishment of a regional platform for Biodiversity Information Management and Reporting (BIMR), supported through the Open Regional Fund for Biodiversity (ORF BD) project as a standardised IT base for further development of appropriate data management systems in the region (except in the Republic of Moldova). This activity includes the creation of a database containing a list of selected endemic plant and animal taxa. When it comes to BFA, the situation is different.

In countries where significant activities in animal genetic resources (AnGR) are happening (Albania, North Macedonia, Montenegro), conservation depends much more on the willingness of farmers and the existence of regular sources of funds. The most efficient way to preserve AnGR is to establish *in vivo* conservation methods (Volk, 2010; Cukaliev *et al.*, 2018; Rivera *et al.*, 2018). Indeed, there are many preconditions required for

cryopreservation of sperm and oocytes: space, equipment, trained staff, and ongoing maintenance of the gene bank.

In the area of fisheries (AqGR), monitoring has been done through several projects, mostly oriented towards marine fisheries due to the length of the Albanian coast, which facilitates the possibility of various Instrument for Pre-Accession Assistance (IPA) cross-border cooperation projects, such as conservation of fish in Prespa (conservation of Prespa trout habitats) (Koutseri, 2012), principally implemented by the Society for the Protection of Prespa in collaboration with WWF Greece and environmental organisations (Protection and Preservation of the Natural Environment in Albania and Macedonian Alliance for Prespa in the period 2001–2002). Conservation of coastal and marine diversity (UNEP/MAP-RAC/SPA, IUCN-Med and IUCN ELC, 2014) is through the development of a Mediterranean marine and coastal protected area (MPA) network and via the Ecological Monitoring for ➤

Sustainable Marine Aquaculture in the Vlora Bay.

In the case of plant genetic resources (PGR), the situation is somewhat easier. This is because there is greater traditional knowledge of farmers who maintain local and old varieties and populations of species that reproduce by seed and the ways of their reproduction. However, in order to increase the volume of use of both genetic resources and to further diversify activities (product development and branding, promotion and marketing), it is necessary to have a permanent support system that is both professional and scientific and is able to provide suitable financial support (Đurić, 2019; Đurić, Mićić and Mićić, 2017; Thorn, 2012).

Despite several initiatives for forest genetic resources (FGR), such as EUFORGEN – the European Forest Genetic Resources Programme²⁸ – and The State of the World's Forest Genetic Resources,²⁹ there are still low levels of participation and contribution from Western Balkan countries and the Republic of Moldova. When it comes to genetic resources related to pollinators (see section 3.2.2) and fishery, there is less data and activity. An EU-funded project related to sustainable agriculture and the role of biodiversity service providers (Eco Stack, 2018–2022) involves Serbian and Bosnian partners. With regard to soil biodiversity, the Republic of Moldova reported to have partially developed an assessment system with indicators, criteria, statistical parameters and scale of the soil biota (FAO, ITPS, GSBI, CBD and EC, 2020).

To preserve the on-farm conservation activities, supporting policies and

monitoring systems are necessary, i.e. the formation of a database of farms where local and old varieties and populations, as well as autochthonous breeds of animals, can still be found. That system does not exist in any country at the time of this study.

The areas that contain farms where the practices of growing autochthonous varieties and breeds have been maintained are facing the problems of aging and depopulation (Volk, 2010; Cukaliev *et al.*, 2018; Rivera *et al.*, 2018). Their productions are generally small-scale, without any use of chemicals and, therefore, are more labour-intensive than commercial farms. The aging of household members on these farms and the outflow of population from rural areas threatens the existence of these numerous and invisible biodiversity conservation centres.

To monitor the level of BFA conservation in the region, it would be necessary to assess the conservation activities existing at farm level. The enormous contribution of small-scale farmers to biodiversity conservation will, therefore, gain visibility and supporting policies, and coordinated efforts with scientists could finally be implemented.

There is also a lack of data on the consequences of industrial agriculture on the loss of wild and BFA. This underestimated or hidden cost should be highlighted to identify the effective policies, best practices, enabling legislative frameworks and actions to mitigate biodiversity loss in the region.

²⁸ <http://www.euforgen.org/>

²⁹ <http://www.fao.org/3/i3825e/i3825e.pdf>

BOX 3: National Programmes on Protection and Management of the Genetic Resources

In North Macedonia, the first committed national programme for AnGR protection was commenced in the period 2011–2017. This programme was the pioneering effort in which identification, registration, description and recoding in some of the locally adapted breeds were achieved. The annual support granted is up to EUR 100 000.

Albania has developed an overall strategic plan for this purpose that includes both plant and animal genetic resources, accompanied by an action plan and supported by a respective financial allocation. The remit of these efforts is the study of the current situation of the genetic fund and also of future actions to improve the management of genetic resources. It defines the duties of each institution and stakeholder and explicitly notes the importance of the protection and use of autochthonous (indigenous) varieties and breeds in agriculture.

In Bosnia and Herzegovina, the Republika Srpska, a programme on plant genetic resources preservation – adopted by the National Assembly in 2008 – is in force and has a dedicated annual budget. The entity also adopted a programme (2013–2025) for conservation of forest

genetic resources (Mataruga *et al.*, 2014) as well as a programme (2020–2024) for conservation of genetic resources in the field of animal husbandry. The Federation of Bosnia and Herzegovina has an operational plan for the conservation of plant genetic resources without a dedicated support fund.

In Montenegro, a programme that was previously in existence expired in 2015, and no information on a new one being prepared was mentioned in the respective national report to this study.

In Serbia, the final draft of the programme for plant genetic resources conservation has been prepared and is awaiting approval to be officially enacted. The ordinance National Programme for the Conservation of Biological Diversity of Domestic Animals for the period of 2017–2021 was temporarily withdrawn from the process of adoption until the Law on Animal Husbandry has been changed to establish the appropriate frame for its implementation.

The Republic of Moldova developed respective strategies and plans to maintain genetic diversity targeting both in situ and ex situ conditions.

3.2.2 FOCUS ON POLLINATORS

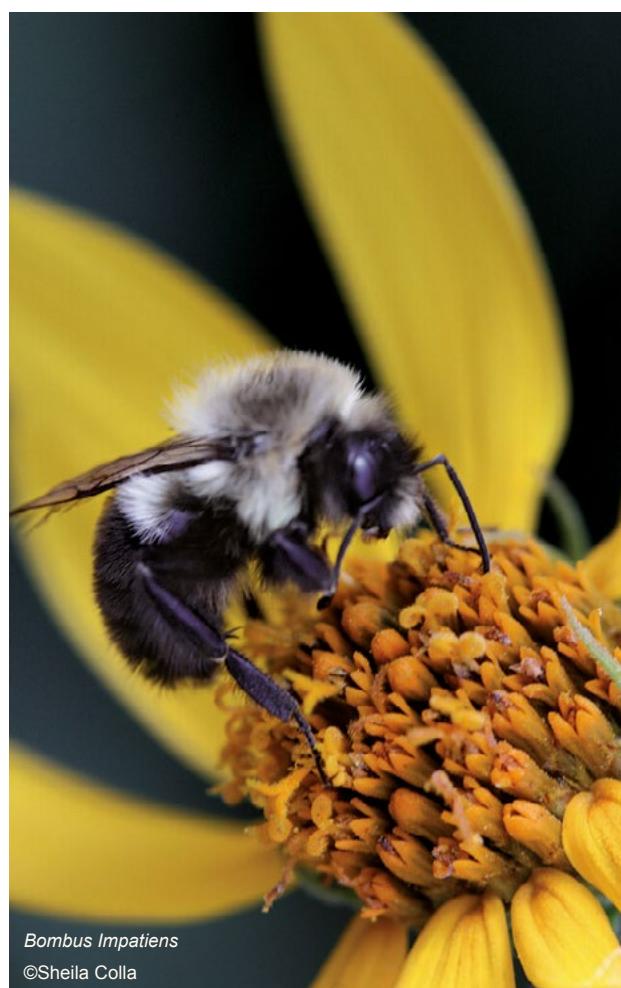
In the Balkan region, which is experiencing rapid land-use change and urbanisation, there is a clear lack of information regarding pollinators (wild and domesticated) and their economic, social and cultural values (IPBES, 2016). The BES-Net Trialogue on Pollinators, Food Security and Rural Development reports clearly that "pollinator decline and its link to food security are not seen as a priority topic and, therefore, are not included in agricultural or environmental policies and plans" (Pataridze, Heylings and Proaño-Castro, 2017, p. 12).

There is limited information about the status and trends of pollinators in the region, and there are many unknowns regarding the contribution of pollination services to agriculture and how public and private actors impact the delivery of these services. The gaps in knowledge and data result in an absence of legislation and policies to safeguard pollinators and help improve beekeeping activities. The beekeeping sector infrastructure is currently in poor condition in some of the countries (Breeze *et al.*, 2014).

Research on the abundance and diversity of pollinators and other beneficial insects, beyond the pollination services they provide, can help develop biological control measures of harmful organisms.

We found one paper (Breeze *et al.*, 2014) that drew the evolution (2005–2010) of honeybee colonies (related to pollination increasing needs) in the Balkan countries. Another interesting project is "Sustainable Pollination Service of the Horticulture Plants in Republic of Srpska – Species Inventorisation, Management

and Biological Threats" in Bosnia and Herzegovina that propagated two species of wild bees in the Botanical Garden of the University of Banja Luka (Đurić and Golub, 2018; Ivanovska and Andonov, 2018; Rivera *et al.*, 2018). Populations of entomopathogenic nematodes were also collected and maintained *in vivo* in the Department of Nematology at the Faculty of Agriculture in Banja Luka. Besides the attention given to honey production, the Republic of Moldova has made important efforts that could help pollinator protection, such as the sustainable management of pastures and agricultural ecosystems, by extending and diversifying eco-agricultural products.



3.2.3 DATA COLLECTION AND MONITORING SYSTEMS: LACK OF COORDINATION

In Balkan countries, it is mainly research and academic institutions that are responsible for inventorying, collecting, characterising and evaluating, storing in gene banks, and documenting genetic resources. These institutions are deeply engaged in other activities focused on in situ and/or ex situ conservation or breeding programmes. In many cases, research institutions also participate in policy making and strategy development as an advisor. In some cases, they also act to promote the use of traditional varieties and breeds in some activities implemented by governmental institutions, such as environmental protection agencies.

The number and focus of non-governmental and entrepreneurial organisations in the Balkan countries

depends on the purview of those organisations and funding sources for their activities. In most countries, these organisations are very active in the conservation and use of genetic resources, but they face certain common issues and constraints.

Because most of the biodiversity data collecting relates to some projects that are supported by different funding sources, the design of databases (if any) is adapted to project and reporting requirements of a particular project. In most cases, after a completion of a project and the submission of reports (or publication of the results), the data stays in this format without it being saved to a (private or institutional) central storage system, making it difficult to use in different contexts.



3.3 The South Caucasus countries, Turkey, Belarus and Ukraine

3.3.1 GENERAL SITUATION

The activities reported by the countries on BFA, including data collection and monitoring of BFA, are mainly focused on data collection through field visits of the scientific institutions aiming to monitor the distribution and status of concrete crops and CWRs in the areas of their origin or distribution, as well as in some cases of local breeds of domestic animals the collection of their propagation material for ex situ conservation. Other projects are related to ex situ conservation of local crops in live collections and gene banks, including their maintenance, genetic characterisation, development of databases, etc. Some reported actions are dedicated to the genetic improvements of cultivars. In general, as it was expected, the South Caucasus countries and Turkey have reported more actions related to BFA conservation in comparison to Ukraine and Belarus. There are, however, only a few initiatives aiming at the conservation of local varieties and CWRs in situ/on farm: for example, projects implemented with Erebuni State Reserve in Armenia, which was formed to protect the wild types of Poaceae, including the *Triticum araraticum*; and in Azerbaijan, the project "Protection and sustainable use of globally

important agro-biological diversity" directly promotes the use of "traditional material"³⁰ in farming activities.

In Georgia, a local organisation Elkana conducts several projects on BFA, mainly on farm conservation, including the publication of "A Catalogue of Georgian Agricultural Biodiversity," a project on "Conservation and Sustainable Use of Georgia's Agricultural Biodiversity (2004–2009)", for the reintroduction of the landraces on farms and the implementation of two conservation farms (Biological Farming Association Elkana, 2019).

It has to be mentioned that GIZ (Germany) implemented a project – Integrated Biodiversity Management in the South Caucasus (IBiS) – which works closely with the local authorities and organisations of the South Caucasus countries on inclusion of BFA in NBSAP and establishment and improvement of National Biodiversity Monitoring Systems (BMSs), including the issues related to agricultural biodiversity conservation and promoting public awareness on such things as heritage varieties and breeds.³¹

³⁰ <https://www.az.undp.org/content/azerbaijan/en/home/projects/conservation-and-sustainable-use-of-globally-important-agro-biodi0.html>

³¹ <https://www.giz.de/en/worldwide/20319.html>

3.3.2 FOCUS ON POLLINATORS

Data collection on wild and domesticated pollinators is very poor in the region.

The Economics of Ecosystems and Biodiversity (TEEB), which is active in Armenia and Georgia, IPBES, and the Millennium Ecosystem Assessment reports do not include any country specific data on pollinators in the target countries; regardless, none of the internationally reported environmental monitoring indicators on which countries have the obligation to provide data include issues surrounding the state of pollinator species (if they are not included in the IUCN red lists). Target countries do not participate in any international FAO- or CBD-led initiative or projects on pollinators.

When looking at statistical records, we find out that only Azerbaijan, Georgia

and Turkey have data on honeybee populations.

Some information regarding the population trends of honeybees and other populations can be obtained via the FAO Global Survey of Honeybees and Other Pollinators conducted in 2018 (CBD/SBSTTA/22/INF/16) (CBD, 2018). The data on honeybee and other pollinators populations is again either of very poor quality or unavailable. Only Georgia and Turkey can draw an upward trend for honeybee populations.

In Georgia, it is worth mentioning the NBSAP (2014–2020), which foresees the assessment of the status of pollinators and entomophagous insects and the development of recommendations for their conservation (Pataridze, Heylings and Proaño-Castro, 2017).



3.3.3 FOCUS ON SOILS

IPBES global assessment on land degradation reports that Caucasus countries have a low to middle level of soil biodiversity index and high potential threats (IPBES, 2018b). The loss of soil organic matter is not well documented there, as it is hard to separate out erosion and mineralisation-driven loss of humus in mountainous countries (FAO & ITPS, 2015). Ukraine reports that 57.5 percent of its lands are eroded, 20 percent polluted, and 12 percent flooded, which results in decreased content of nutrient substances in soils and annual losses of humus of 0.65 tons per 1 hectare. Turkey reports that productive soil layers lose around 600 million tons of soil every year. Similarly alarming is the situation in other countries of the region.

Soil biodiversity is one of the most complex issues for management, monitoring and data collection. Soil types are studied in all target countries; detailed maps with the description of the soil properties are available.

There were several projects/regional initiatives on land and soil issues from a perspective of preventing further soil degradation, like the REC Caucasus project “Sustainable Land Management for Mitigating Land Degradation and Reducing Poverty in the South Caucasus Region”.³² Scientific monitoring is carried out in Ukraine

to assess soil degradation on agricultural land and quality changes under biologisation of agriculture. Country reports working on the improvement of the National Digital Map of Ukraine on Soil Carbon are an integral part of the Global Soil Organic Carbon Map (GSOC Map) (FAO, ITPS, GSBI, CBD and EC, 2020).

Land and soil monitoring data is collected mostly by scientific institutions and shared with the governments, which, based on the data, introduce different programmes/legal acts related to land and soil conservation and restoration. The main emphasis of the scientific work and the resulting recommendations is drawn on soil degradation – like desertification, salinization, wind and water erosion, pollution due to excessive or inappropriate use of agrochemicals, industrial waste, radiation (due to the Chernobyl catastrophe) and unsustainable livestock breeding practices.

³² The REC Caucasus project “Sustainable Land Management for Mitigating Land Degradation and Reducing Poverty in the South Caucasus Region” has a regional scope and addresses policy and institutional issues in the South Caucasus countries. Some key publications produced by the project are: Strategic Development Plan, Road Map and Long Term Investment Plan for the Solid Waste Management Sector in Armenia, 2017; Assessment of Pasture Condition in Sagarejo Municipality, Georgia, 2019; Pasture Management in Georgia, 2019; Regulatory Impact Assessment (RIA) of the draft law on Soil Protection of Georgia, 2020; National Action Programme (NAP) to Combat Desertification in Georgia; etc.



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3.4 Central Asia

Central Asia is a region where many fruits and nuts wild relatives exist in protected forests, where the more extended grassland in the world is hosted, where local knowledge is key for biodiversity conservation and where a great deal of people's livelihood and food relies on pollinators; we will, therefore, structure the presentation of the too few actions implemented for BFA in regard to the above-mentioned four aspects.

Some of the reported actions include data collection of specific varieties of plants and animals, but none of them is dedicated to BFA in general and no monitoring system currently exists in the region.

3.4.1 PROTECTED FRUIT FORESTS

As mentioned in section 2.4.2, specially protected natural areas (SPNAs) and UNESCO biosphere reserves are well developed in the region. These initiatives are dedicated to the preservation of natural habitats where wild relatives of fruits and nuts species are hosted: apple and apricot forests in Kazakhstan; walnut forests in Kyrgyzstan; peaches, cherries, walnuts, and hawthorn in Tajikistan; pistachio, apple, walnuts, Turkmen pear and figs in Turkmenistan; and almonds, apples, hawthorn, pistachios and walnuts in Uzbekistan.

The countries of the region also have UNESCO biosphere reserves to preserve cultural values and traditional agricultural systems and preserve the cultivation of local species and varieties.

There is no regional initiative of collecting, monitoring or conserving wild fruits varieties going beyond habitat

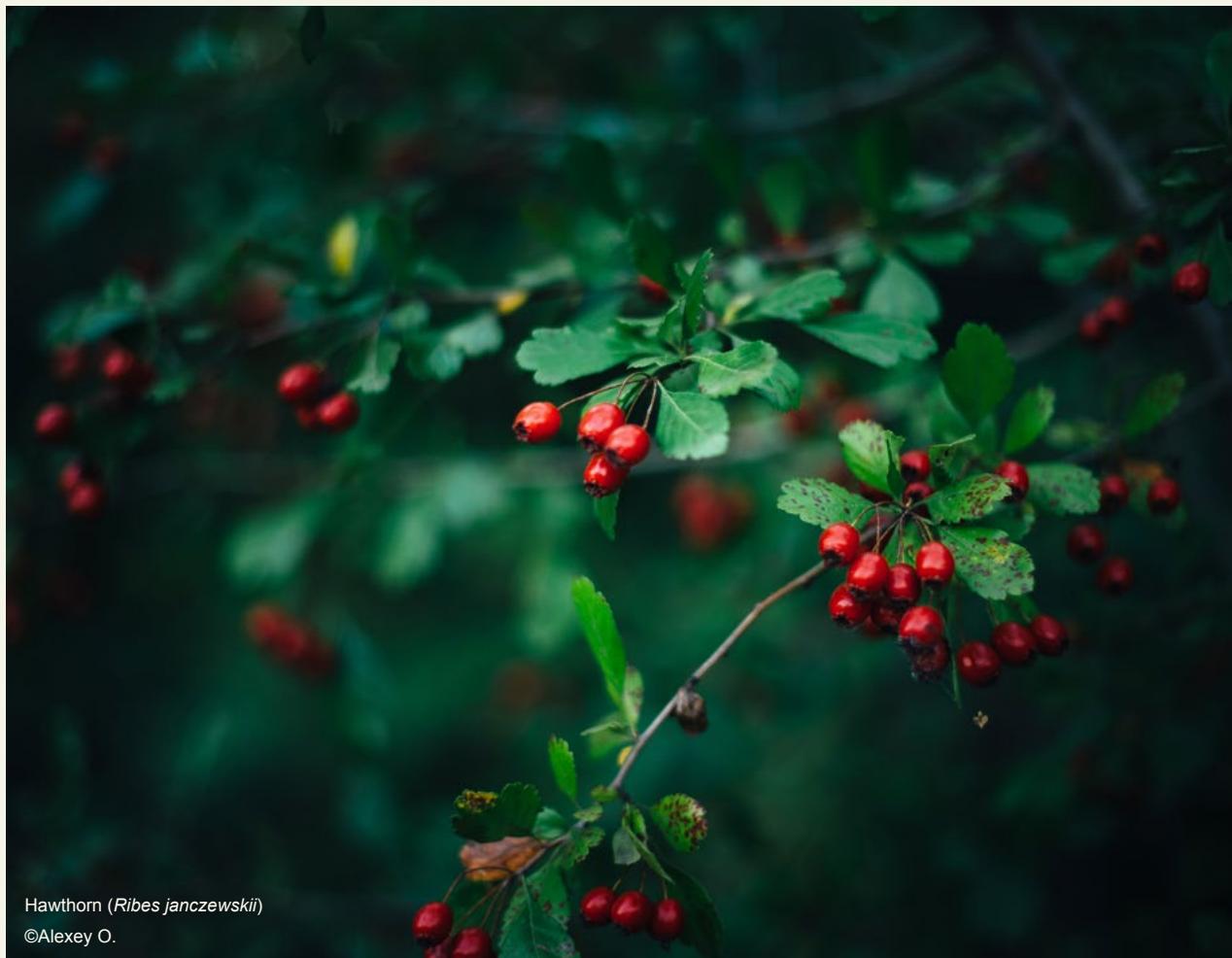
conservation. At the national level, we can highlight the past project of the Makhtumkuli Scientific Centre for the Production of Genetic Resources (of the Institute of the Turkmen Academy of Sciences) which implemented a gene bank of wild fruit trees that, unfortunately, has been declining since the 2000s.



BOX 4: Rare fruit species protection in Kazakhstan

Most of the natural habitats of rare fruit species have SPNA status, e.g. apple (*Malus niedzwetzkyana*, *Malus sieversii*), apricot, and wild grape habitats in Ile-Alatau National Natural Park and Dzhungar National Nature Park. Protection concerns communities or a system of plant communities, not specific species. Conservation measures apply to habitats and their important biotic and abiotic components, such as restoring the natural genetic makeup of

natural apple and apricot populations. It is also a priority for action due to genetic erosion of natural apple and apricot populations. The conservation status of hawthorn (*Ribes janczewskii*), Niedzwetski apple (*Malus niedzwietzkyana*), Sievers apple (*Malus sieversii*), common apricot (*Armeniaca vulgaris*) and wild grapes (*Vitis vinifera*) has been codified in a special resolution approving the list of rare and endangered species and plants.



Hawthorn (*Ribes janczewskii*)

©Alexey O.

3.4.2 PASTORALISM AND BIODIVERSITY

As well summarised by Nunez *et al.*, (2020), traditional pastoralism in Central Asia was extensive and characterised by a high level of livestock mobility. Grasslands were, under this model, relatively preserved. Biodiversity then benefitted from agricultural land abandonment after the Soviet Union collapse and recently has been significantly damaged by a new form of pastoralism based on intensified and sedentary grazing systems.

The relation between pastoralism and biodiversity in Central Asia is poorly documented. Some bird and plant species depend on pastoralism-generated habitats to live (Roué and Molnár, 2017), while other species are losing potential habitats because of pastoralism activities.

Few actions are specifically dedicated to pastures degradation. One is implemented by an NGO in Kyrgyzstan to limit pastures degradation, including in terms of plant biodiversity loss, by implementing a catalogue of plants (forest and biodiversity management, including environmental monitoring). A second one in Northern Tien Shan (Kyrgyzstan) also looks at protecting pastures (NGO), while a third one in Tajikistan looks at preserving the natural vegetation and related traditional techniques in the face of land degradation due to over-grazing (Community Conservation Resilience Initiative).



3.4.3 INDIGENOUS AND LOCAL KNOWLEDGE FOR BIODIVERSITY CONSERVATION

Indigenous and local knowledge is established as key for biodiversity conservation by IPBES and is acknowledged by the scientific community as a critical tool for an improved understanding of local biodiversity status and trends.

Very few reported activities explicitly refer to indigenous and local knowledge and techniques to deal with BFA. The above-mentioned Community Conservation Resilience Initiative in Tajikistan is one of them. Because of an interesting action to record local ethnobotanical knowledge

in the Turkestan Range, southwestern Kyrgyzstan was also emphasised. An NGO in Tajikistan and Kyrgyzstan undertook an effort of traditional agricultural and pastoral knowledge recovery. In addition, local endemic fruit varieties have been identified and preserved through the project "Preservation and Popularization of Local Agricultural Biodiversity and Traditional Knowledge" in Tajikistan.



3.4.4 FOCUS ON POLLINATORS

As in every part of the world, food is being produced thanks to pollination services. The livelihood of a great deal of the population heavily depends on pollination-dependent crops and fruits. The specificity of Central Asia regarding pollination is particularly vulnerable to the decreasing pollination activity (IPBES, 2016).

Despite this threat, no data collection, monitoring systems or conservation actions dedicated to pollinators (wild and domesticated) have been reported in the frame of this study. The outcome document of the BES-Net's Regional Trialogue for Central Asia and Azerbaijan on Land Degradation, Biodiversity and Climate Change (held in Almaty, Kazakhstan, on 9–11 October 2019) provides interesting data collection activities in this regard:

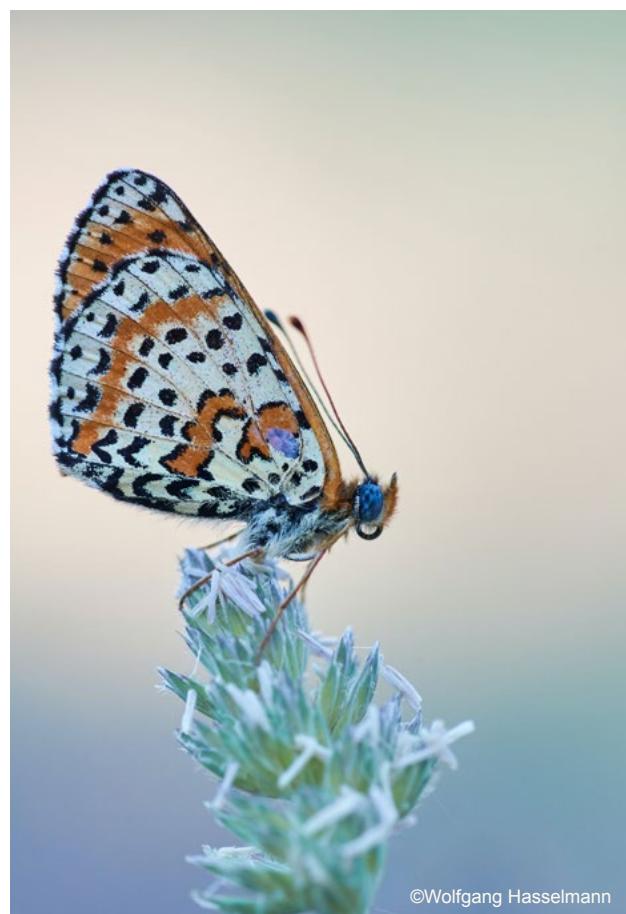
- Survey on the most effective pollinators for forage crops, which appeared to be wild pollinators and not honeybees: Diurnal Insect Pollinators of Legume Forage Crops in Southeastern Kazakhstan (Isataevich Temreshev *et al.*, 2017).
- Survey on pollinators diversity in apple orchards in Kyrgyzstan (Ysyk-Köl and Chüi regions)
- Research project “Identifying Functional Pollinator Biodiversity and Threats to its Decline in Georgia and Kyrgyzstan”, indicated as unpublished field data

The outcome documents also state that in Kyrgyzstan and Turkmenistan experts observe a decline of pollinators – specifically, wild pollinators – due to habitat loss (caused by overgrazing and

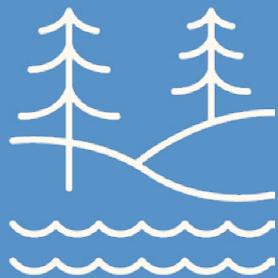
extractive industries). Experts note that sightings of previously abundant wild pollinators have become rare. Another indirect indicator of wild pollinator decline may be failing harvests of endemic wild apple and pear species (Turkmenistan).

The drivers of pollinator loss are caused by land-use changes due to extractive activities and intensive grazing and agriculture. The document highlights that the “rapid rotation between forage crops and other cash crops reduces the abundance and diversity of wild pollinator species”.³³

³³ BES-Net's Regional Trialogue for Central Asia and Azerbaijan on Land Degradation, Biodiversity and Climate Change (held in Almaty, Kazakhstan, on 9–11 October 2019).



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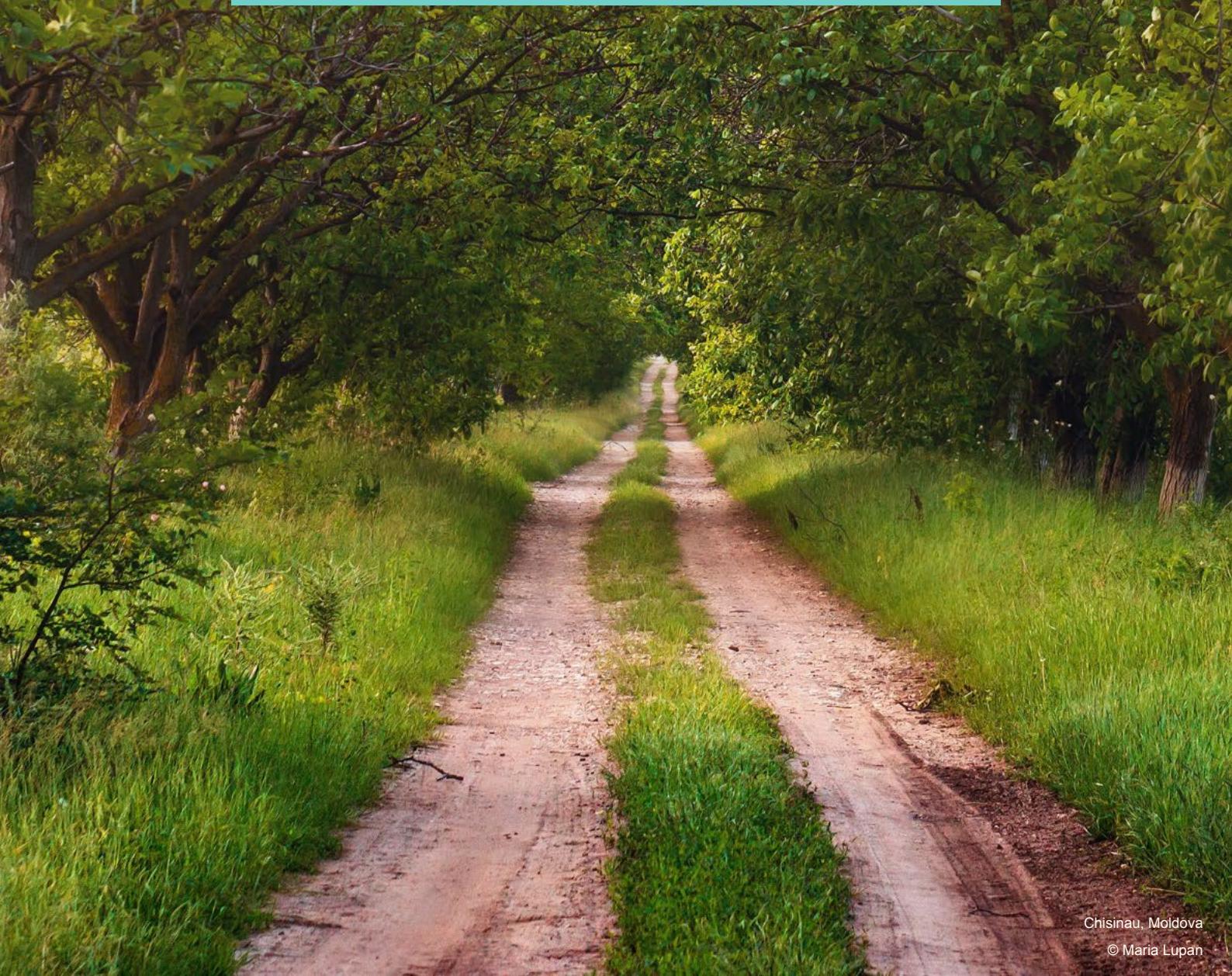


PART II

IDENTIFICATION OF GAPS AT THE REGIONAL LEVEL

1

THE WESTERN BALKAN COUNTRIES AND THE REPUBLIC OF MOLDOVA



1.1 Legislative gaps

This section represents a general overview of the existing gaps in the region. However, this is not fully representative of the unique and varying legislation for each country that composes the region.

The main gaps in the region, in terms of legislation that has been identified in this study, are:

- The institutional and legal framework for the regulation and management of BFA conservation and its sustainable use is weak and fragmented.

- The responsibilities of the different ministries and institutions involved in biodiversity and BFA are not clearly defined; this is both at the policy level and at the level of the management and support measures for the conservation and use of genetic resources.

- A cross-sectorial body working on BFA and natural biodiversity conservation and use is missing.

- The seed legislation does not recognise the importance of farmers' contribution to BFA, and it prevents them from developing their activities to promote BFA (non-catalogued seed exchange and marketing, community seed banks, etc.).

- Strategic documents, programs, and updated action plans addressing biodiversity conservation and use of genetic resources linked to food systems are generally missing in the region. In some cases, such documents exist, but the implementation is poor due to insufficient institutional structures, funding, or staff.

1.2 Gaps in monitoring systems and data collection

Monitoring of BFA is extremely weak and almost non-existent as a regular activity. In general, there is no monitoring system in force or only partial monitoring is in place.

Although the Balkan region is well-known for its exceptional wealth of general biodiversity at the regional, national, and local levels, this region is facing many challenges regarding biodiversity information management and reporting or monitoring.

The key missing elements are the lack of compatible structured or standardised forms for data collection, the poor quality of data, and the unavailability of data and clear reporting protocols amongst relevant institutions. The biodiversity data is produced by different public institutions, researchers, and non-governmental organisations. However, the data is not systematically structured and validated, which makes it very difficult to use and/or establish or improve monitoring.

Solving these issues requires understanding the importance of joint transnational actions and decisions to establish a feasible and effective mode for the implementation of monitoring and information systems, both within and across Balkan countries.

Regarding conservation actions, the gaps can be formulated as the following:

- Activities mainly performed in the framework of some (national or international) projects and lacking long-term perspectives and long-term funding and engagement
- Insufficient involvement of local actors, specifically farmers, in conservation activities (BFA, wild biodiversity, breeding programmes)
- Lack of funding to co-finance BFA conservation measures and projects
- Poor support and a lack of interconnection amongst local community gene banks initiatives and food value chains based on local and traditional products and practices
- The absence of or weak rural extension programmes/formal and informal training in the field of BFA and agroecology

1.3 Focus on pollinators

The lack of policies in favour of the protection of pollinators in the region can be explained by the lack of data on pollinator status and on the links between food production systems and pollination services.

Legislative and policy gaps

Pollinator decline and the consequences for food security is not seen as a priority topic and, therefore, is not included in agricultural or environmental policies and plans.

There is no policy formulated to prevent the decline of pollinators in the region. The region experiences continuous land-use changes, including land abandonment, disparate forest cover changes, and the rapid expansion of urban and semi-urban areas resulting from increasing rural-to-urban migration (Alix-Garcia *et al.*, 2016). Most rural smallholders have unclear property rights and, individually, they contribute to a low percentage of their country's gross domestic product (GDP).

All countries share a similar political context, including the alignment of agriculture, land and rural development policies to European Union (EU) standards. Furthermore, they are signatories to trade agreements that are encouraging large scale agriculture, which damages habitats for wild and domesticated pollinators, at the expense of agroecology systems that protect pollinators and nature in general. Harmonisation with a trend towards the

aggregation of smallholdings to create large-scale, competitive farming is still not prominent in the region although this could pose a potential future threat to pollinators if this results in changes in the landscape and creation of large-scale monocultures.

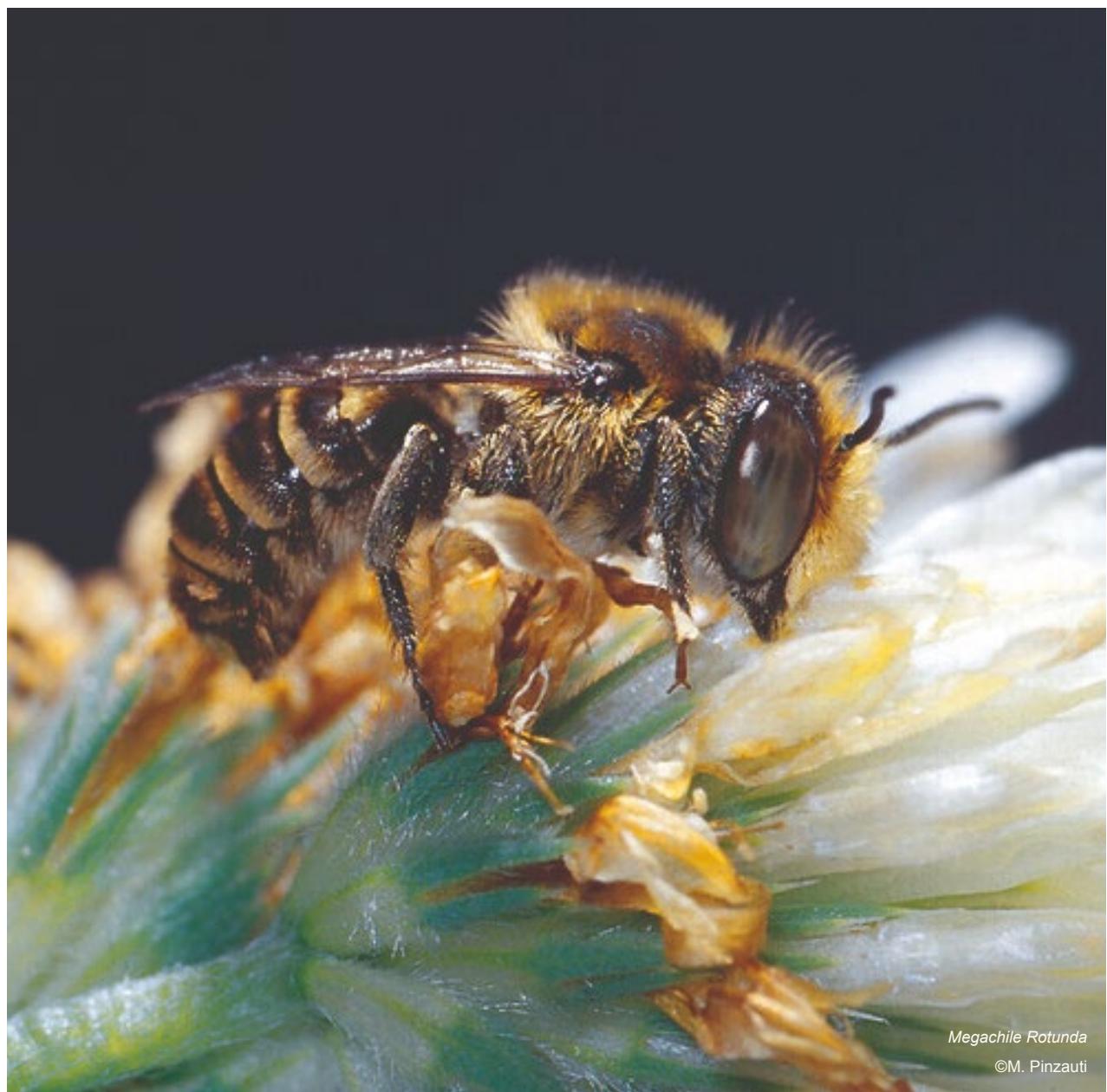
Data collection and monitoring gaps:

- In Central and Eastern Europe, there is little documentation of the biodiversity, economic, social, and cultural values of most wild pollinators (bumble bees, solitary bees and hover flies, such as *Bombus apidarius*, *Anthidium manicatum*, *Helophilus pendulus*, amongst others [IPBES, 2016]) and managed pollinators (*Apis mellifera* spp. and *Bombus terrestris* [IPBES, 2016]), apart from some estimations of the economic and social value of honeybees in some of those countries (UNDP, 2018).
- The volume of inputs (pesticides, fertilisers, and their adjuvants) utilised by landholders is not clearly assessed and their consequences on pollinator decline are not studied, thereby remaining unknown.
- There is limited information about the status and trends of pollinators in the region.
- There is an underestimation of the role of pollinators in agriculture amongst different public and private agencies, ➤

which is reflected in the gap in statistics and legislation regarding beekeeping development. Therefore, the beekeeping sector infrastructure is currently in poor condition in certain countries.

In Albania and in the region, the situation is well stated by BES-Net Trialogue, that there are limited capacities at all levels in the country in need of development, "including: experts with proper knowledge on pests and measures, communication

and cooperation between all actors/stakeholders on this issue, studies and information on pollinators and food chains, subsidies in sustainable agriculture (integrated and organic production), and environmentally friendly inputs for farmers" (Pataridze, Heylings and Proaño-Castro, 2017, p. 24).



Megachile Rotunda
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2

THE SOUTH CAUCASUS COUNTRIES, TURKEY, BELARUS AND UKRAINE



2.1 Legislative gaps

As described in section 2.2.2 on national policies and legislation, the regulations dedicated to BFA are disseminated in diverse environmental and biodiversity conservation laws. There is no regulation specifically dedicated to critical cross-cutting points between biodiversity and food systems (see Recommendations section).

2.2 Gaps in monitoring systems

There is no special, effectively applied monitoring system dedicated to BFA state or trends in the countries of the region. The actions are focused on the improvements of cultivated crops, sometimes valuing the crop wild relatives (CWR), but definitely miss the monitoring of the impacts of existing causes of wild and cultivated biodiversity degradation to be found in food systems. In the National Biodiversity Monitoring System (NBMS), only Georgia has proposed an indicator directly related to BFA: "Agricultural Biodiversity – Status of the selected species and local varieties/breeds of the cultivated plants and farmed and domesticated animals, as well as other socioeconomically and/or culturally valuable species and products (e.g. honeybee, mushrooms, silkworm,

endemic micro flora of traditional fermented products, etc.)."³⁴

When legislative frameworks and national plans exist, they are poorly implemented on the ground. For example, the NBSAP report of Georgia underlines that government initiatives for the promotion of environmentally friendly and agroecological practices, such as exclusion of the deteriorated lands from turnover, reduction of the use of agrochemicals, no-till farming, landscape planning, planting of windbreaks, crop rotation, etc., as well as programs for restoring heavily eroded/polluted soils, are not sufficient or effective enough to combat the existing problems.

³⁴ Indicator 2, National Biodiversity Monitoring System (NBMS)

2.3 Focus on pollinators

A paucity of data

There is a lack of good examples of data collection, vulnerability assessments of groups of pollinator species, or assessments of changes in the distribution and levels of pollination services. There are also gaps in the monitoring systems and conservation/management plans for these thematic areas. There is a clear lack of information on the decline and threats to pollinator communities in the region.

Scientific institutions (e.g. beekeeping centres/research institutes, national academies of sciences, institutes of zoology, etc.) within the target countries sporadically conduct data collection and analysis on pollinators/pollination services, mainly in specific regions or related to specific species (mostly honeybees). Some pollinators are even included in the national Red Books (e.g. Red Book of Belarus includes three wild pollinator species). These studies are, however, mainly produced for narrow scientific purposes and are poorly known to policymakers and/or civil society interested in BFA conservation. Moreover, they are often difficult to access and are, therefore, not used for monitoring species or the agricultural ecosystem condition levels in the country and/or in its constituent regions.

Possible reasons explaining the lack of data

The main reason for this information gap concerns the **high costs of comprehensive studies**. This is also tangentially linked to poor availability of experts in this field at the national level, as well as a scarcity of good taxonomic information about species and their biological characteristics (including floral relationships and ecological linkages), etc.

In addition, the inherent difficulty is the **"unruliness" of pollinators** – their population numbers vary naturally and tremendously both in their spatial and geographic distribution due to environmental reasons. It is, therefore, difficult to determine the difference between natural- and anthropogenically-induced variations in population.

It must also be highlighted that the international agrochemical industry and intensive agroproduction **lobbyists hamper studies** on the impact of intensive agriculture on wild and domesticated pollinator decline. These scientific uncertainties result in policy gaps, and inadequate legislation, monitoring and conservation systems for pollinators worldwide, including in the South Caucasus countries, Turkey, Belarus and Ukraine.

2.4 Focus on soils

Here again the lack of data is pointed out. The National Biodiversity Strategies and Action Plans (NBSAP) of Turkey underline that the lack of comprehensive knowledge about the functions of agricultural ecosystems makes it difficult to achieve holistic conservation and sustainability objectives. For example, the studies on **soil biota** are insufficient.

The NBSAP of Georgia also refers to the data deficiency related to the **ecological**

condition of the soils and mentions that most of the available data are outdated or incomplete.

Data on **soil microbiological diversity** are also lacking and when data collection programmes exist, they are mostly conducted for pure scientific purposes, and no regulation or any kind of policies have been developed thus far.



Caucasus Mountains, Kazbegi, Georgia

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3

CENTRAL ASIA



3.1 Legislative gaps

This section represents a general overview of the existing gaps in the region. However, this is not fully representative of the unique and varying legislation for each country that composes the region.

- 1.** The area of protection and preservation of biological diversity of wild flora and fauna is relatively well regulated by the legal system; however, the area of BFA is generally neglected. Official activities for the protection of BFA take place mainly as part of various national or regional projects financed by foreign donors.
- 2.** No BFA is defined in the legal systems of the countries of the region. In legislation and national strategies, this concept is not mentioned, e.g. it is absent in the legislative act on the protection of breeding achievements and seed productions.
- 3.** There is a poor coordination between various legal acts as well as incompatibility and duplication of the legal basis regarding the protection and management of soil, genetic resources of cultivated plants. There is also a lack of developed practical mechanisms for implementing the acts and the rules.
- 4.** There are no clearly defined and uniform legal regulations regarding access to genetic resources and benefit-sharing or the protection of traditional knowledge associated with genetic resources.

- 5.** There are no legal and institutional mechanisms that allow farmers to legally market their seeds of local plant varieties.
- 6.** There are no instruments that allow for monitoring and assessment of the quality of seed and planting material.

It is worth to highlight interesting gaps per country to illustrate the above described elements:

In Kazakhstan, there is no single body that coordinates the management of genetic resources. This competence is shared between three ministries, a number of departments and organisations. Some 14 laws of the country are more or less related to the regulation of access to genetic resources. On the other hand, there is no clear and understandable mechanism for regulating access to and use of benefits on a fair and equitable basis.

In Kyrgyzstan, many ministries and departments are involved in the protection of genetic resources, but the lack of a clear definition of responsibilities does not allow for the full achievement of the assumed goals. Unfortunately, the level of the national legal and administrative system ensuring access and benefit-sharing as well as traditional knowledge associated with genetic resources is insufficient. Kyrgyzstan's genetic resources are under-researched due to limited research funding and a lack of qualified specialists. ➤

There are no mechanisms of stakeholder cooperation at any stage – from gaining access to the genetic resource to the development of the final product, i.e. a system for the exchange of reproductive material in the region. There are also insufficient regulatory requirements for access and benefit-sharing. The causes of these gaps are, amongst others, the very limited budgetary resources for access and benefit sharing, the low level of specialists in the field of genetic research, and the low level of awareness of the local population regarding access to genetic resources associated with traditional knowledge.

Even though one of the strategic goals of Tajikistan's development is food security, the country lacks stable management in the area of agriculture: ineffective regulations concerning land use in agriculture, land degradation and low soil fertility, and unsustainable use of water and pasture resources.

in the national strategy and action plan for the conservation and sustainable use of biodiversity) and no mention of the protection of biodiversity in agricultural policy and agricultural law

- no monitoring system for BFA

In Uzbekistan, the institutions (i.e. The Main Forestry Department of the Ministry of Agriculture and the State Committee for Nature Conservation) responsible for the protection of biodiversity, including wild fruit trees, do not coordinate their activities, instead building their own methodological and technological framework, which makes it very difficult to make optimal decisions both at the central and local levels.

In Turkmenistan, there are some contradictions between the SPNA, the Forest Code and other legal acts that prevent the full implementation of the regulations contained in them.

The main identified problems are:

- the incompatibility of the legal basis in the field of environmental protection and agriculture, which has a direct impact on the issue of agrobiodiversity
- the lack of coordination between various legal acts, incompatibility and duplication of the legal basis regarding the protection and management of soil, earth and genetic resources of cultivated plants, and no developed practical mechanisms for implementing the rules set out in various acts
- no regulation, despite the law regulating the sphere of biodiversity protection quite well, to secure the resources of agricultural ecosystems (this is not properly mentioned)

3.2 Gaps in monitoring systems and data collection

General weaknesses in reporting on BFA in Central Asia

In Central Asia, small-scale farms represent the main place for the preservation of local plant varieties and breeds, but farmers are neither involved in data collection nor monitoring systems of biodiversity. They are poorly considered as potential allies or knowledge holders by official systems.

There is no state-supported BFA monitoring system. The loss of biodiversity in the region is exacerbated by the lack of institutional abilities. There is a general lack of information and databases, poor support from scientific institutions, little financial support for the protection of forests, pastures and other areas important for BFA, all of which translates into poor protection of plant genetic resources. For example, many national lists of valuable species do not include wild fruit species that require special protection.

There is a lack of permanent cooperation between the countries of the region in the areas of protection and preservation of genetic material of local crops and livestock and protection against invasive plants.

Specific areas of improvement: protection of wild fruit trees

The protection of wild fruit crops in the Central Asian region requires a transformation from manual or passive protection to active protection promoting the maintenance of natural ecosystems containing target taxons, which can be achieved through the creation of genetic reserves to protect target species, creating lists that would allow monitoring of genetic variability and genetic erosion of given species. Currently, most protected areas are not designed to protect specific species. There is no specific legal recognition of certain wild fruit species needing protection. The main activities for the protection of fruit and nut trees are general lists of tree and shrub species included in the national forest codes.

Only some countries have specified species of wild fruit trees requiring protection, Uzbekistan has compiled a list of High Value Tree Species Uzbekistan, which added ancestors of many cultivars included in the Forest Code including wild apple, pear, apricot, almond, walnut, grapevine, pomegranate, pistachio, fig, cherry plum and hawthorn. This instrument gives special conservation status to species classified as "valuable". ➤

In Kyrgyzstan, there is the State Cadastre of Specially Protected Natural Areas, created through the Law on Specially Protected Areas (2011), which assesses the state of nature reserves, defines the development prospects for these areas, works to increase the effectiveness of state control over compliance with the established regime, and also takes these areas into account when planning socioeconomic development. This allows for better control and monitoring of the state of protected areas. In Kyrgyzstan, efforts are being made to restore the walnut forests of the Jalal-Abad region. In Kazakhstan, work is being carried out to preserve wild apple trees in their native

habitat conditions (*in situ*), as well as in botanical gardens and research stations (*ex situ*).

In Uzbekistan, there are over 90 forest stands, including 20 natural plantations of wild fruit species. Adequate biodiversity protection systems have not been established, especially in unsecured natural areas where the pressure on natural ecosystems is much greater.

In Turkmenistan, there are serious gaps in *in situ* conservation as a special mechanism for the protection of wild fruit crops.





PART III

CONCLUSIONS

1. General observations

The evidence shows that:

- The regions of interest are hotspots of biodiversity. These areas represent major centres of origin of cultivated crops, especially grain, vegetables, fruit and nut-bearing trees, and, despite increasing threats, are still a major reservoir of crop wild relatives.
- Despite the lack of monitoring systems and reliable data, the loss of biodiversity – and BFA in particular – is a reality in the regions of interest (FAO, 2019c; IPBES, 2018a; FAO, 2015; FAO, 2014b; FAO, 2010).
- BFA relies on the dynamic management of species, on-farm and in situ, by small-scale food producers practicing agroecology and other sustainable agriculture practices.
- When managed by small-scale food producers, BFA can have a high level of heterogeneity embedded within it (inter- and intra-varietal, inter- and intra-specific and at agroecosystem levels), thereby improving its adaptive capacity and resilience to threats such as climate change. Adaptive capacity at variety, species and agroecosystem levels, is also of high importance to overcome social and economic shocks, such as those caused by COVID-19 pandemic.

The results of this study show that:

- BFA loss is poorly monitored in Eastern Europe and Central Asia.
- There is a lack of institutional capacities for monitoring the trends of BFA. In the Balkan's countries, the lack of structured and harmonised data collection along with

the lack of coordination amongst actors and institutions is pointed out. In the South Caucasus countries, Turkey, Belarus and Ukraine, the capacity (in terms of experts and funds availability) to effectively implement data collection and monitoring projects is highlighted. The same observations are made for Central Asia countries where here also the lack of institutional abilities, financial support and cooperation within the region are pointed out.³⁵

- The analysis conducted by this study highlights the nonexistent or very low involvement of farmers in biodiversity monitoring and conservation.
- Although all countries signed the Convention on Biological Diversity (CBD), national laws and regulations are not implemented and hinder the potential positive effects of the CBD on BFA.³⁶

³⁵ The situation is globally the same at the international level. The State of the World's Biodiversity for Food and Agriculture highlights the general lack of data and capacity to monitor the trends of agricultural biodiversity or the *biodiversity for food and agriculture*: "While it is clear that many components of BFA are declining, lack of data often constrains the planning and prioritization of effective remedial measures (FAO, 2019a, p. xxxix)." Further, "lack of capacity is widely reported by countries to be a significant constraint to the monitoring of associated biodiversity. Some countries indicate that much of the monitoring work that does take place is done by (expert or non-expert) volunteers. (...) Monitoring of butterflies and birds is largely volunteer-based in most countries in Europe" (FAO, 2019a, p. 126).

³⁶ Article 7 of the CBD states that "each Contracting Party shall, as far as possible and as appropriate, in particular for the purposes of Articles 8 to 10: (a) Identify components of biological diversity important for its conservation and sustainable use having regard to the indicative list of categories set down in Annex I; (b) Monitor, through sampling and other techniques, the components of biological diversity identified pursuant to subparagraph (a) above, paying particular attention to those requiring urgent conservation measures and those which offer the greatest potential for sustainable use" (CBD, 2020, sec. Convention, Article 7).

2. General recommendations

From these observations, the following general recommendations are made.

1. To be able to monitor BFA better, we recommend considering the following in the development of monitoring activities:

- **A shift in the governance of BFA monitoring**, adopting a producer-centred approach.³⁷ Food producers are the ones living on farms in rural areas where biodiversity is and where its loss happens. They have a specific ground-based knowledge of the evolution of the ecosystems and its biodiversity while maintaining and developing BFA. The institutional top-down approach of monitoring, using specific indicators and relying on costly experts, can hardly capture the complexity and variety of the studied ecosystems over time.³⁸ The high level of cost and institutional capacities requested to implement data and monitoring actions have been highlighted in this report as a major obstacle. Beyond recognising the legitimacy of food producers in assessing changes in biodiversity, farmer-based data collection systems are also cost-effective and require far fewer institutional resources. Actions must be designed and implemented

in collaboration with scientists, public institutions and food producers and focused on low cost, simple solutions.

- **An encompassing conceptual framework** of BFA that would acknowledge the importance of heterogeneity at genetic, species and ecosystem levels and include the wider “associated biodiversity” that supports the cultivated, raised and harvested species, in particular pollinator populations³⁹ and soil biota.
- The development of BFA monitoring programmes locally governed and managed (as previously described) and **well-articulated at the regional level**. A regional approach is needed to preserve and sustain BFA, especially including crop wild relatives, within the regional biomes that cut across national boundaries.
- The development of monitoring systems that target local species, varieties and breeds. Specific instruments should be developed for domesticated and wild pollinators which will investigate the connection between population trend/size of these pollinators and the application of pesticides or monoculture production.⁴⁰ ➤

³⁷ Note that the FAO/PAR document acknowledges the importance of a community-based approach. “The improved use of biodiversity for food and agriculture has been successfully achieved in many developing countries through projects using community-based approaches” (FAO and Platform for Agrobiodiversity Research, 2011, p. 46).

³⁸ See: *Indicators Relevant for Indigenous Peoples: A Resource Book* (Baguio City: Tebtebba Foundation, 2008) and *Indigenous Peoples & the Convention on Biological Diversity: An Education Resource Book* (Baguio City: Tebtebba Foundation, 2012).

³⁹ An advanced project to protect pollinators based on local knowledge is given here, for example, by The Indigenous Pollinators Network: “In 2013, the Network undertook a review of the complex knowledge systems on pollination of local indigenous communities. In the Nilgiri Biosphere Reserve in southern India, the community decided that they would want to contribute equally on the scientific side as on the traditional knowledge side and asked to be trained in the application of scientific protocols to detect pollination deficits” (FAO, 2016, pp. 29–30).

⁴⁰ This might inevitably be linked to pesticide application or monoculture production, which could then be contrasted with agroecological production in similar environmental conditions and timeframes. This would include an emphasis on the potential impacts of the state phytosanitary programmes.

2. To be able to protect BFA better, we recommend that the following (i) general and (ii) more specific actions are considered:

(i) General

- Identify how **agroecology**,⁴¹ which relies on and enhances BFA, can be supported.
- Look at the **root causes** of BFA and wild biodiversity losses that are to be found in the region of interest of this report, including those that – through land use changes – result from the extractive economy of timber products and from industrial agriculture.
- Promote a **systemic approach to governance** that should lead any regulations, policies and projects related to BFA to integrate ecological, climate, livelihoods and food production objectives, amongst others.
- Encourage **respect and fulfilment of international instruments** that support BFA. At the international level, the International Seed Treaty (Article 9 on Farmers' Rights related amongst other things to **access to genetic resources and benefits sharing**) as well as the UN Declaration on the Rights of Peasants and Other People Working in Rural Areas (UNDROP) have to be respected and fulfilled. At the regional and national levels, cross-sectorial legislative frameworks should be developed to encompass the complexity of BFA across the region. National seed laws should explicitly incorporate these internationally agreed

treaties and instruments in favour of food producers' rights, allowing small-scale food producers to sustain and enhance BFA, including marketing seeds and planting material.

- Determine natural based solutions (IUCN) that can contribute to restoring and protecting eco-systems and consider them in strategies to protect BFA.
- Develop a permanent and coordinated **data collection and monitoring system** of biodiversity (and its permanent financing) which links the evolution of wild biodiversity and BFA to food systems in general (production, food chains, consumption, land use, chemicals along the food chains, etc.) and is based on food producers' knowledge and central participation.
- Develop **national and regional strategies** in the field of BFA protection that involve scientists, food producers and civil society and that go beyond the protection of habitats, targeting local and threatened species and varieties.
- Recognise High Value Nature (HNV) and Globally Important Agricultural Heritage (GIAHS), which implies the preservation of biodiversity linked to traditional agricultural knowledge, through the implementation of activities, strategies and policies of an action plan for dynamic conservation. ➤

⁴¹ From IAASTD report (IAASTD, 2009) to the recent HLPE report (HLPE, 2019), evidence is growing for recognising the high potential for agroecology to meet a wide set of the Sustainable Development Goals (SDGs), including biodiversity conservation. High levels of biodiversity – both domesticated and 'wild' biodiversity – are essential for agroecology and underpin food production. Agroecology supports and protects biodiverse ecosystems and relies on, and enhances, genetic and species diversity of crops and animals. As reported by FAO, agroecology is built on "ecological principles, in particular on biodiversity, overall diversity and healthy soils" (Leipert *et al.*, 2020, p. xiii). The biodiversity basis of agroecology improves the resilience of ecosystems to threats such as climate change.

(ii) Specific

- Implement specific **national regulations** dedicated to the following components of BFA:

- The status of crop wild relatives and the issues associated with their conservation
- The status of endemic species and landrace/local varieties of cultivated plants, as well as of the local varieties of domesticated animals and other endemic species of socioeconomic value (e.g. honeybee, silkworm and microbial flora of traditional products), along with the issues associated with their in situ and ex situ conservation and production/distribution of the reproductive material, including farmers' rights to exchange and sell their selected seeds
- The status of pollinator species and the issues associated with their conservation
- The conservation status and management of agricultural soils, especially its edaphon or microbial, and plant and animal diversity within it, regulating the damaging agricultural practices on it

- Develop **enabling policies and programmes** (including subsidies) to support farmers in maintaining the gene pool of local varieties of plants and local breeds of livestock, including supporting programmes to on-farm conservation and marketing of landrace products.⁴²

- Develop a pertinent network involving research institutions (public and private), farmers organisations, and other civil society organisations to facilitate the development of local seed conservation and recovery, including through **community gene banks**.⁴³
- Protect local strains of micro-organisms in milk or meat products local production.
- **Unify the law** regarding the protection and preservation of BFA (e.g. the law concerning the management of soils, forest resources, preservation and access to genetic resources) so that individual laws and regulations **do not contradict** each other and the development of administrative and legal instruments enabling the implementation of assumptions in existing strategies and legislation.
- Support the co-creation of knowledge between food producers and scientists, strengthening peer-to-peer training initiatives as farmers schools involving academia and research institutions.

⁴² In situ (on-farm) conservation is generally based on individual initiatives of small-scale farmers who, in most cases, grow endemic species and local varieties for their own consumption.

⁴³ Research institutions should be supported by the governments to conclude contracts with farmers maintaining various local varieties and breeds, which is a sustainable way of on-farm conservation but also of evaluation activities. Besides that, researchers would collect in situ long-term information from the farmers about the varieties' morphological and productive characteristics; moreover, samples for the seed collections from gene bank could be easily regenerated. This is specifically adequate for the open pollinated crops that acquire isolation systems during regeneration. The farmers would have access to scientific results and would be supported to approach the seed or products buyers.



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ENDNOTES

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FAOC100432

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ENDNOTES

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ccxcvii • Ветеринария туралы (available, in Kazakh, at: https://adilet.zan.kz/kaz/docs/Z020000339_)

ccxcviii • Available, in English, at: <https://www.cbd.int/doc/world/kg/kg-nbsap-v3-en.pdf>

ccxcix • Айлана-чөйрөнү коргоо жөнүндө (available, in Kyrgyz, at: <http://cbd.minjust.gov.kg/act/view/ky-kg/218>)

ccc • Available, in English, at: <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC036600>

ccci • Available, in English, at: <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC036604>

ccci • Жаныбарлар дүйнөсү тууралуу (available, in Kyrgyz, at: <http://cbd.minjust.gov.kg/act/view/ky-kg/224>)

ccci • Өзгөчө коргулуучу жаратылыш аймактары жөнүндө (available, in Kyrgyz, at: <http://cbd.minjust.gov.kg/act/view/ru-ru/203262/40?cl=ky-kg&mode=tekst>)

ccciv • Балыктын ысык-Көлдү жана Соң-Көлдү байырлаган баалуу жана эндемикалық түрлөрүн кармоого, ташууга, сатып алууга, сатууга жана алып чыгууга тыюу салуу жөнүндө (available, in Kyrgyz, at: <http://cbd.minjust.gov.kg/act/view/ru-ru/202405/30?cl=ky-kg&mode=tekst>)

cccv • Программа развития рыболовства и аквакультуры в Кыргызской Республике на 2019–2023 годы (available, in Russian, at: <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC196020>)

cccvi • Концепция развития лесной отрасли Кыргызской Республики на период до 2040 года (available, in Russian, at: <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC196023>)

cccvii • Концепция развития органического сельскохозяйственного производства в Кыргызской Республике на 2017–2022 годы (available, in Russian, at: <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC201686>)

cccviii • Кыргыз Республикасынын айыл чарбасын өнүктүрүү жөнүндө (available, in Kyrgyz, at: <http://cbd.minjust.gov.kg/act/view/ky-kg/202555?cl=ky-kg>)

cccxix • Кыргыз Республикасынын Жер кодекси (available, in Kyrgyz, at: <http://cbd.minjust.gov.kg/act/view/ru-ru/8/545?cl=ky-kg&mode=tekst>)

cccx • Жайыттар жөнүндө (available, in Kyrgyz, at: <http://cbd.minjust.gov.kg/act/view/ru-ru/202594/60?cl=ky-kg&mode=tekst>)

cccxii • Айыл чарба багытындагы жерлердин кыртышынын күрдүүлүгүн

коргоо жөнүндө (available, in Kyrgyz, at: <http://cbd.minjust.gov.kg/act/view/ky-kg/203765?cl=ky-kg>)

cccxi • Кыргыз Республикасындагы органикалык айыл чарба өндүрүшү жөнүндө (available, in Kyrgyz, at: <http://cbd.minjust.gov.kg/act/view/ru-ru/111912/10?cl=ky-kg&mode=tekst>)

cccxii • Өсүмдүктөрдү химиялаштыруу жана коргоо жөнүндө (available, in Kyrgyz, at: <http://cbd.minjust.gov.kg/act/view/ky-kg/179>)

cccxiv • Available, in English, at: <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC07313>

cccxv • О культивировании ореховых плантаций в Кыргызской Республике (available, in Russian, at: <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC203109>)

cccxvi • Кыргыз Республикасынын мал чарбасындагы асылдандыруу иши жөнүндө (available, in Kyrgyz, at: <http://cbd.minjust.gov.kg/act/view/ru-ru/202519/40?cl=ky-kg&mode=tekst>)

cccxvii • Available, in English, at: <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC025597>

cccxviii • Салттуу билимдерди коргоо жөнүндө (available, in Kyrgyz, at: <http://cbd.minjust.gov.kg/act/view/ru-ru/202149/40?cl=ky-kg&mode=tekst>)

cccxix • Available, in English, at: <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC026823>

cccxx • Постановление О мерах по развитию пчеловодства в Кыргызской Республике (available, in Russian, at: <http://cbd.minjust.gov.kg/act/view/ru-ru/34503/10?cl=ru-ru&mode=tekst>)

cccxxi • Available, in English, at: <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC036604>

cccxxii • Жайыттар жөнүндө (available, in Kyrgyz, at: <http://cbd.minjust.gov.kg/act/view/ru-ru/202594/60?cl=ky-kg&mode=tekst>)

cccxxiii • Национальная Стратегия и план действий по сохранению биоразнообразия Республики Таджикистан (available, in Russian, at: <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC190445>)

cccxxiv • Об охране окружающей среды (available, in Russian, at: <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC111613>)

cccxxv • Об особы охраняемых природных территориях (available, in Russian, at: <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC111743>)

cccxxvi • Об охране и использовании растительного мира (available, in Russian, at: <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC094352>)

cccxxvii • О животном мире (available, in Russian, at: <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC084981>)

- cccxxviii • Available, in English, at: https://nafaka.tj/images/zakoni/new/strategiya_2030_en.pdf
- cccxxix • Земельный Кодекс Республики Таджикистан (available, in Russian, at: <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC034460>)
- cccxxx • Об охране почв (available, in Russian, at: <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC111608>)
- cccxxxi • О государственном регулировании обеспечения плодородия земель сельскохозяйственного назначения (available, in Russian, at: <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC183753>)
- cccxxxii • О пастбищах (available, in Russian, at: <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC188331>)
- cccxxxiii • О биологическом хозяйствовании и производстве (available, in Russian, at: <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC149862>)
- cccxxxiv • О семеноводстве (available, in Russian, at: <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC111605>)
- cccxxxv • О сборе, сохранении и рациональном использовании генетических ресурсов культурных растений (available, in Russian, at: <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC117782>)
- cccxxxvi • Об охране сортов растений (available, in Russian, at: <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC155001>)
- cccxxxvii • О племенном деле (available, in Russian, at: <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC183749>)
- cccxxxviii • Лесной Кодекс Республики Таджикистан (available, in Russian, at: <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC181164>)
- cccxxxix • О рыболовстве и сохранении водных биологических ресурсов (available, in Russian, at: <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC170862>)
- cccxl • О рыбоводстве (available, in Russian, at: <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC111029>)
- cccxli • Дар бораи шикор ва хочагии шикор (available, in Tajik, at: <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC170864>)
- cccxlii • О пчеловодстве (available, in Russian, at: <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC117815>)
- cccxliii • О ветеринарии (available, in Russian, at: <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC181163>)
- cccxliv • О животном мире (available, in Russian, at: <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC084981>)
- cccxlv • Национальная стратегия Туркменистана по сохранению биоразнообразия 2018–2023 гг (available, in Russian, at: <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC198302>)

cccxlvii • Об охране природы (available, in Russian, at: <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC132755>)

cccxlviii • О растительном мире (available, in Russian, at: <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC118784>)

cccxlix • О животном мире (available, in Russian, at: <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC145349>)

cccl • Об особо охраняемых природных территориях (available, in Russian, at: <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC118777>)

cccli • О государственном регулировании развития сельского хозяйства (available, in Russian, at: <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC183756>)

ccclii • Кодекс Туркменистана «О земле (available, in Russian, at: <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC081992>)

ccclii • О пастбищах (available, in Russian, at: <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC158536>)

cccliii • О семеноводстве (available, in Russian, at: <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC105929>)

cccliv • О сборе, сохранении и рациональном использовании генетических ресурсов культурных растений (available, in Russian, at: <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC184356>)

ccclv • О правовой охране селекционных достижений (available, in Russian, at: <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC106006>)

ccclvi • О коневодстве и конном спорте (available, in Russian, at: <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC158528>)

ccclvii • Об охоте и ведении охотничьего хозяйства (available, in Russian, at: <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC042576>)

ccclviii • Лесной Кодекс Туркменистана (available, in Russian, at: <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC106005>)

ccclix • О рыболовстве и сохранении водных биологических ресурсов (available, in Russian, at: <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC105999>)

ccclx • О пчеловодстве (available, in Russian, at: <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC158532>)

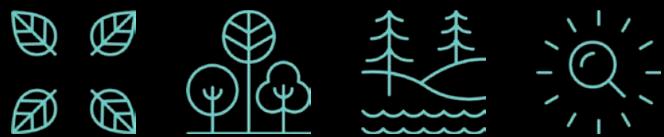
ccclxi • О пастбищах (available, in Russian, at: <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC158536>)

ccclxii • 2019–2028 йиллар даврида Ўзбекистон Республикасида биологик хилмакилликни саклаш стратегиясини (available, in Uzbek, at: <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC189329>)

ccclxiii • 2030 йилгача бўлган даврда Ўзбекистон Республикасининг Атроф муҳитни мухофаза қилиш концепциясини тасдиқлаш тўғрисида (available, in Uzbek, at: <https://lex.uz/ru/docs/4574008>)

- ccclxiv • Табиатни муҳофаза қилиш тўғрисида (available, in Uzbek, at: <https://lex.uz/docs/107115>)
- ccclxv • Ҳайвонот дунёсини муҳофаза қилиш ва ундан фойдаланиш тўғрисида (available, in Uzbek, at: <https://lex.uz/acts/-3029502>)
- ccclxvi • Ўсимлик дунёсини муҳофаза қилиш ва ундан фойдаланиш тўғрисида (available, in Uzbek, at: <https://lex.uz/ru/docs/28070>)
- ccclxvii • Available, in English, at: <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC061349>
- ccclxviii • Available, in English, at: <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC050766>
- ccclxix • Ўзбекистон Республикаси қишлоқ хўжалигини ривожлантиришнинг 2020–2030 йилларга мўлжалланган стратегиясини (available, in Uzbek, at: <https://lex.uz/ru/docs/4567334>)
- ccclxx • Ўзбекистон Республикасида ўрмон хўжалиги тизимини 2030 йилгача ривожлантириш концепциясини (available, in Uzbek, at: <https://lex.uz/ru/docs/5037201>)
- ccclxxi • Ўзбекистон Республикасида органик қишлоқ хўжалиги ва органик озиқовқат маҳсулотлари ишлаб чиқаришни ривожлантириш концепцияси (available, in Uzbek, at: <https://lex.uz/ru/docs/4815923>)
- ccclxxii • Available, in English, at: <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC070912>
- ccclxxiii • Яйловлар тўғрисида (available, in Uzbek, at: <https://lex.uz/docs/4344714>)
- ccclxxiv • Уруғчилик тўғрисида (available, in Uzbek, at: <https://lex.uz/ru/docs/4202718>)
- ccclxxv • Наслчилик тўғрисида (available, in Uzbek, at: <https://lex.uz/ru/docs/120349>)
- ccclxxvi • Селекция ютуқлари тўғрисида (available, in Uzbek, at: <https://lex.uz/ru/docs/34032>)
- ccclxxvii • Ов қилиш ва овчилик хўжалиги тўғрисида (available, in Uzbek, at: <https://lex.uz/ru/docs/4890112>)
- ccclxxviii • Ўрмон тўғрисида (available, in Uzbek, at: <https://lex.uz/ru/docs/86126>)
- ccclxxix • 2017–2021 йилларда асаларичиликтармоғини комплекс ривожлантириш чора-тадбирлари (available, in Uzbek, at: <https://lex.uz/ru/docs/3380814>)
- ccclxxx • Ўрмон тўғрисида (available, in Uzbek, at: <https://lex.uz/ru/docs/86126>)
- ccclxxxi • Наслчилик тўғрисида (available, in Uzbek, at: <https://lex.uz/ru/docs/120349>)
- ccclxxxii • Ветеринария тўғрисида (available, in Uzbek, at: <https://lex.uz/ru/docs/112306>)

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