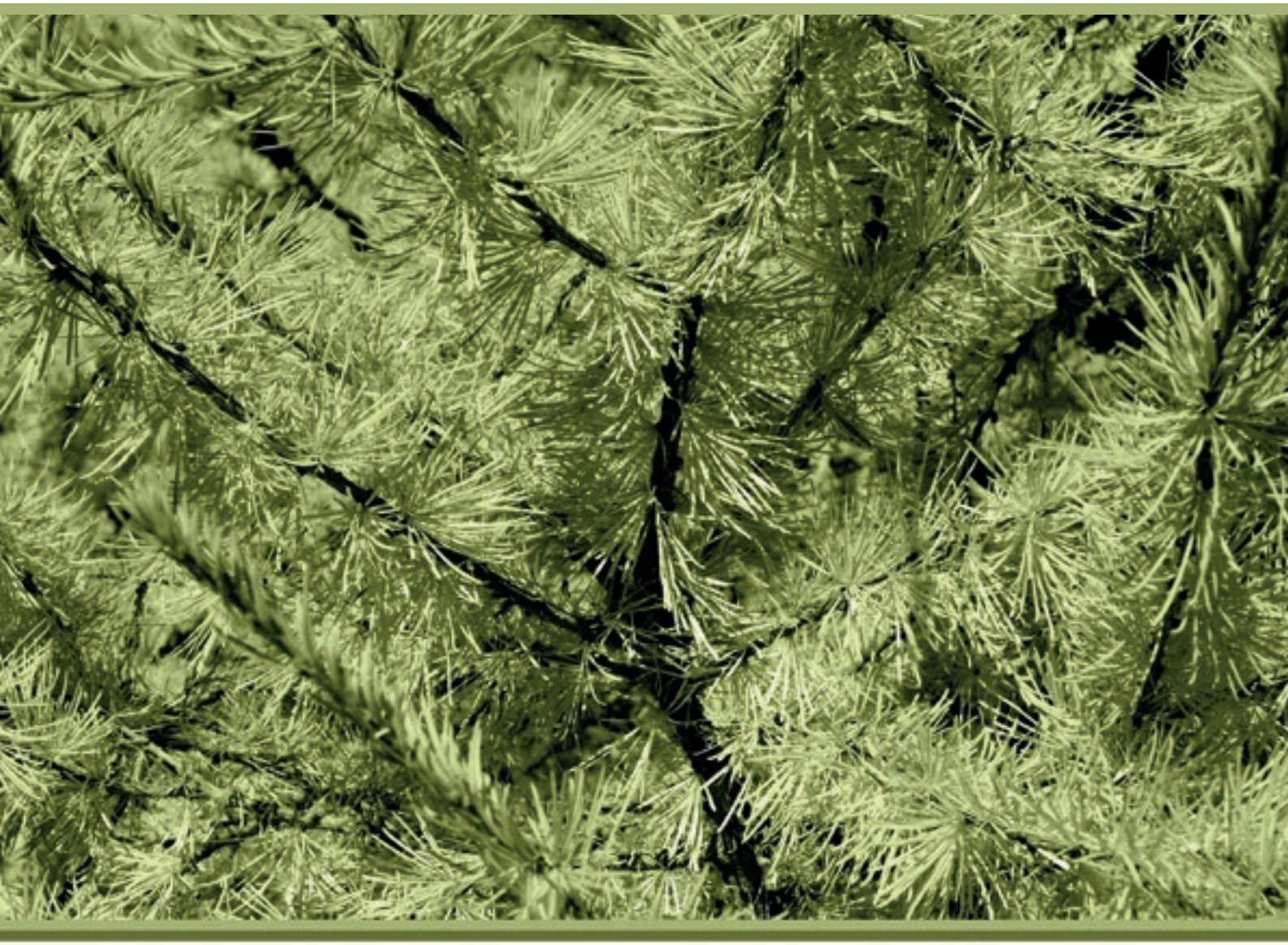
Food and Agriculture Organization
of the United Nations

Policy analysis of nationally determined contributions in Europe and Central Asia



Policy analysis of nationally determined contributions in Europe and Central Asia

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FOREWORD

This publication offers an overview of Europe and Central Asia (ECA) countries, presenting their current agricultural profiles and socio-economic situations, highlighting the availability of natural resources and the impact of natural hazards and climate change on agriculture, while examining their mitigation and adaptation potential as well as the implementation of actions within the context of their global commitments towards the realization of the Paris Agreement.

The ECA countries fully embark on the 2030 Agenda and embrace the Sustainable Development Goals (SDGs), while building on their food and nutrition security achievements in recent decades. However, climate change is expected to have both direct and indirect adverse impacts on these countries' agricultural productivity, including changing rainfall patterns, increasing frequency and severity of hydrometeorological hazards such as droughts, storms and floods, and increased outbreaks and geographical redistribution of animal and plant pests and diseases. In the ECA region, climate change can potentially undermine the ability to ensure regional food and nutrition security, eradicate poverty and achieve sustainable development.

Smallholder farmers, herders, fishers and foresters are among the most vulnerable to the impact of climate change due to the high climate sensitivity of agriculture and because their livelihoods are dependent on the sector and its activities. Agriculture is also one of the drivers of climate change, due to the greenhouse gases (GHGs) emitted by the fossil fuels used by agricultural machinery and equipment, and through enteric fermentation in small ruminants, use of fertilizers and pesticides, and rice farming. However, the sector also offers opportunities in contributing to reduce GHG emissions by applying practices for storing carbon, such as agroforestry, mulching and reduced tillage, and preservation of forests, wetlands and peatlands.

Addressing climate change implies the implementation of both mitigation and adaptation activities. Therefore, the ECA countries must mainstream climate change in all national planning instruments; strengthen institutional coordination and technical capacity with regard to developing climate change policies; and implement activities across relevant sectors, addressing data gaps and improving methodologies for assessing the impacts on agriculture and related sectors, and collecting accurate and up-to-date information to establish and regularly update GHG emissions databases. Access to financial resources is therefore very important. Countries' response to climate change can be financed through climate funds, such as the Green Climate Fund (GCF), available to developing countries, which are among the most vulnerable and in need of support in terms of capacity development, technology transfer and investments. It is crucial to increase people's understanding and awareness of climate change and of the consequent need for regional and transboundary cooperation in the areas of mitigation and adaptation and in the context of sustainable production and consumption, reduction of losses and waste along the food system, and increase in energy efficiency and use of renewable energy.

This research publication is developed within the new Regional Initiative 3, Sustainable Natural Resources Management under Climate Change, approved at the FAO Regional Conference for Europe in May 2018 as a mechanism to support FAO Member Countries in building resilience to climate change and natural disasters for sustainable food systems. It will support Member Countries in their implementation of the Paris Agreement, which is essential for achieving the Sustainable Development Goals and provides a road map for climate actions that will reduce countries' greenhouse gas emissions and build climate resilience throughout the region.

Vladimir Rakhmanin

Assistant Director-General and Regional Representative
for Europe and Central Asia

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ABBREVIATIONS AND ACRONYMS

ADB	Asian Development Bank
AFOLU	Agriculture, Forestry and Other Land Use
BAU	Business as usual
BR	Biennial report
BR CTF	Biennial reporting common tabular format
BUR	Biennial updated report
CCA	Climate change adaptation
CIF	Climate Investment Funds
CIS	Commonwealth of Independent States
COP	Conference of the Parties
CSA	Climate-smart agriculture
DRM	Disaster risk management
DRR	Disaster risk reduction
EBRD	European Bank for Reconstruction and Development
ECA	Europe and Central Asia
EFTA	European Free Trade Association
EIB	European Investment Bank
EIT	Economies in Transition
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FDI	Foreign direct investment
GCF	Green Climate Fund
GDP	Gross domestic product
GEF	Global Environment Facility
GHG	Greenhouse gas
HFC	Hydrofluorocarbon
IFAD	International Fund for Agricultural Development
IFC	International Finance Corporation
INDC	Intended Nationally Determined Contribution
INFORM	Index For Risk Management
IPCC	Intergovernmental Panel on Climate Change
IPPU	Industrial processes and product use
LULUCF	Land use, land-use change, and forestry
NAMA	Nationally appropriate mitigation actions
NCR	National communication report
NCSP	National Communication Support Programme
NDC	Nationally determined contribution
NGO	Non-governmental organization
NIR	National inventory report
OECD	Organisation for Economic Co-operation and Development
PFC	Perfluorocarbon
QA	Quality assurance
QC	Quality control
REU	Regional Office for Europe and Central Asia
SDG	Sustainable Development Goal
SEE	Southeastern Europe
SEECA	Southeastern Europe and Central Asia
TCPF	Technical Cooperation Programme Facility project
UN	United Nations
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
WB	World Bank

INTRODUCTION AND OBJECTIVE

The Paris Agreement constitutes a landmark achievement in the international response to climate change, as developed and developing countries alike have committed to do their part in the transition to a low-emissions and climate-resilient future. The nationally determined contributions (NDCs) represent the main national strategic and policy scheme, under the United Nations Framework Convention on Climate Change (UNFCCC), by which Parties communicate their climate commitments to the international community and report on the progress made – and the support needed – towards achieving them.

Globally, climate change has become an issue of national security and survival for many countries. In the Europe and Central Asia (ECA) region, climate change is also a growing threat, particularly for food security, nutrition and ecosystem services. Temperature and precipitation changes and the increase in frequency and intensity of extreme weather events threaten to reduce yields and productivity in crops, livestock, fisheries and forestry in many areas of the region, as well as increase the risk of natural hazards such as droughts, floods and landslides. Such extreme events have already caused considerable damage and production losses.

Considering the impacts of climate change and the fact that most countries in the ECA Caucasus, Central Asia, Commonwealth of Independent States (CIS) and Southeastern Europe (SEE) region are middle-income economies that are more reliant on agriculture than the economies of the European Union (EU) and the European Free Trade Association (EFTA), it is crucial to intensify countries' efforts to plan and implement their commitments to the UNFCCC, in order that they may realize their development projections and for the sake of the overall well-being of the population.

In the context of a changing climate, FAO has more than six decades of experience dealing with climate-related issues and is scaling up this expertise and its support to countries. This is reflected in the FAO biannual theme for 2018–2019, Climate change and its impact on the work activities of FAO, and in the newly launched FAO Strategy on Climate Change of 2017, which aims to: enhance institutional and technical capacities of Member States; improve the integration of food security, agriculture, forestry and fisheries within the international climate agenda; and strengthen internal coordination and delivery of FAO's work, which includes FAO's support for Member Countries to plan and implement their NDCs, including incorporating a gender perspective (FAO, 2017a).

At regional level in Europe and Central Asia, this aligns with the newly launched Regional Initiative 3, Sustainable Natural Resources Management under Climate ChangeSustainable, climate-resilient natural resource management, which strengthens the role of FAO's Regional Office for Europe and Central Asia (REU) through interventions in the countries of operation to better respond to the challenges of climate change. With technical expertise and regional experience, the REU has been supporting countries in the ECA region to develop policies, plans and capacities for climate change mitigation and adaptation through Technical Cooperation Programme Facility projects (TCPFs) on climate change.

In this context, this regional NDC Report follows up on the previous effort to report on NDC implementation in the region and will lead to the creation of a more detailed research study including an in-depth analysis of NDCs. Specifically, this Report compiles and analyses the most relevant and updated information on policies and regulatory frameworks related to climate change in the ECA region, including information on access to available climate finance to support countries in the implementation of their NDCs.

The main purpose of the Report is to identify the current commitments, policy and finance gaps, and opportunities for enhancing climate change mitigation and adaptation ambitions in ECA countries. It assesses the impact of climate change on relevant sectors in the region, particularly agriculture, and reviews the linkages with other ongoing national processes, such as the implementation of the Sustainable Development Goals (SDGs) in FAO Member Countries.

The Report makes a vital contribution to FAO's support to Member Countries, facilitating exchange of experiences among different countries and promoting enhanced access to global financial windows, including FAO's climate-smart agriculture, forestry and fisheries interventions that can support countries in achieving their NDC objectives.

The Report comprises two main sections. Part I presents the current state of the region's natural resources and the impacts of climate change on its socio-economic systems. Part II comprises an in-depth situation analysis of NDC, including the greenhouse gas (GHG) emissions profile and relevant climate change policies and strategies of the ECA countries; it also describes the latest information on NDC implementation, highlighting institutional gaps and climate finance opportunities in each country.

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PART I

EUROPE AND CENTRAL ASIA REGION: BACKGROUND AND RELEVANT INFORMATION TO UNDERSTAND COUNTRY PROCESSES IN A CHANGING CLIMATE

KEY MESSAGES

- The ECA region is highly diverse in terms of its physical geography, economic development, biodiversity, agricultural production and productivity, and climatic characteristics.

- Drivers such as population growth, increasing per capita income and urbanization, combined with degraded and limited natural resources, including land, water and energy, will pose challenges to the region's food and nutrition security in the coming decades.

- Some countries in the ECA region are among the most vulnerable to climate variability and change, resulting in an adverse impact on agricultural production systems, which in turn undermines one of the main sources of people's livelihoods, in terms of both income and employment.

PART I. EUROPE AND CENTRAL ASIA REGION: BACKGROUND AND RELEVANT INFORMATION TO UNDERSTAND COUNTRY PROCESSES IN A CHANGING CLIMATE

1.1 CLIMATE AND NATURAL RESOURCES

The Europe and Central Asia region covers 53 countries in various geographical subregions, including Europe, Caucasus, Central Asia, Commonwealth of Independent States (CIS) and Southeastern Europe (SEE).[1] These countries are highly diverse in terms of geography, climate, population and social and economic levels of development.

This huge region spans the continents of Europe and Asia, across plains, vast grassy steppes, tundra, plateaus and tablelands, sandy deserts, forests, highlands and extensive mountain ranges, including the Alps, Pyrenees, Balkans, Carpathians, Urals, Caucasus, Pamir and the Tian Shan, some with peaks of over 7 000 m. The region's climate is also highly diverse; there are various climatic zones with marine, Mediterranean, semi-arid, highland, humid subtropical and humid continental climates.

Climate change is a growing threat to food security, agriculture and ecosystems in the Europe and Central Asia region. Average temperatures across the region have already risen by 0.5 °C in the south and 1.6 °C in the north of the region since the early 1990s (FAO, 2016a), with overall increases of 1.6 °C to 2.6 °C and reductions in precipitation expected by 2050 (World Bank, 2009). These climatic changes, as well as the increase in the frequency and intensity of extreme weather events, such as droughts and floods, are already adversely affecting crop yields and livestock productivity in many areas of the region and are expected to lead to further damage and production losses in the crop, livestock, fisheries and forestry subsectors.

International frameworks have been established in recent years with the objective of addressing climate change and its effects. At the 21st Conference of the Parties (COP21) to the UNFCCC in December 2015, 195 countries adopted the legally binding global climate deal – the so-called "Paris Agreement" – to keep the global temperature rise this century well below 2 °C above pre-industrial levels and to limit the increase to 1.5 °C. The Sendai Framework for Disaster Risk Reduction 2015–2030, adopted at the Third UN World Conference in Sendai, Japan in March 2015, also laid out a pathway for the next 15 years of disaster risk reduction (DRR) and disaster risk management (DRM) under a changing climate.

While natural resources are not equally spread within the ECA region, overall the majority of countries have land resources that are suitable for agriculture, providing an important basis for agricultural production. The ECA region represents around 18 percent of the world's arable land, compared with only 13.2 percent of the world's population (FAO, 2012a).

Table 1. Agricultural land in the ECA region, 2014

	TOTAL LAND AREA, MILLION HA	AGRICULTURAL LAND AREA, (% OF TOTAL LAND AREA)	COMPOSITION OF AGRICULTURAL LAND AREA		
			ARABLE LAND, (% OF AGRICULTURAL LAND AREA)	PERMANENT CROPS, (% OF AGRICULTURAL LAND AREA)	MEADOWS AND PASTURES, (% OF AGRICULTURAL LAND AREA)
CAUCASUS					
Armenia	2.8	59.0	26.67	3.4	70.0
Azerbaijan	8.3	57.7	40.4	4.9	54.7
Georgia	6.9	36.8	17.9	6.2	75.9
CENTRAL ASIA					
Kazakhstan	270.0	80.4	13.5	0.1	86.4
Kyrgyzstan	19.2	55.0	12.1	0.7	87.2
Tajikistan	13.9	34.2	15.4	3.0	81.6
Turkmenistan	47.0	72.0	5.7	0.2	94.1
Uzbekistan	42.5	62.9	16.4	1.4	82.2
CIS					
Belarus	20.3	42.5	65.7	1.4	32.9
Republic of Moldova	3.3	74.8	73.9	11.9	14.2
Russian Federation	1 637.7	13.3	56.6	0.7	42.7
Ukraine	57.9	71.2	78.8	2.2	19.0
SEE					
Albania	2.7	42.9	52.4	6.8	40.7
Bosnia and Herzegovina	5.1	42.2	46.8	4.9	48.3
Montenegro	1.3	17.1	3.8	2.2	94.0

[1] The following subregions of the ECA region and their corresponding countries are included in the report:

Caucasus (3) – Armenia, Azerbaijan, Georgia; Central Asia (5) – Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan; CIS (4) – Belarus, Republic of Moldova, the Russian Federation and Ukraine; SEE countries (6) – Albania, Bosnia and Herzegovina, Montenegro, Serbia, The former Yugoslav Republic of Macedonia, and Turkey; EU (28) – Austria, Belgium, Bulgaria, Croatia, Cyprus, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden and United Kingdom of Great Britain and Northern Ireland (the); and EFTA (4) – Iceland, Liechtenstein, Norway and Switzerland.

	TOTAL LAND AREA, MILLION HA	AGRICULTURAL LAND AREA, (% OF TOTAL LAND AREA)	COMPOSITION OF AGRICULTURAL LAND AREA		
			ARABLE LAND, (% OF AGRICULTURAL LAND AREA)	PERMANENT CROPS, (% OF AGRICULTURAL LAND AREA)	MEADOWS AND PASTURES, (% OF AGRICULTURAL LAND AREA)
Serbia	8.7	40.1	74.3	5.4	20.3
The former Yugoslav Republic Macedonia	2.5	50.1	32.8	3.0	64.2
Turkey	77.0	50.1	53.7	8.4	37.9
EU-28					
Austria	8.2	34.8	49.8	2.4	47.8
Belgium	3.0	44.1	61.4	1.7	36.9
Bulgaria	10.8	46.8	70.0	2.6	27.4
Croatia	5.5	23.7	53.9	5.1	41.0
Cyprus	0.9	12.8	73.8	24.5	1.7
Czechia	7.7	54.7	74.5	1.8	23.7
Denmark	4.2	63.4	92.5	0.2	7.3
Estonia	4.2	22.2	66.5	0.7	32.8
Finland	30.3	7.5	98.4	0.2	1.4
France	54.7	53.1	63.1	3.5	33.3
Germany	34.8	47.9	71.0	1.2	27.8
Greece	12.8	63.2	28.6	14.2	57.2
Hungary	9.0	58.9	82.4	3.4	14.2
Ireland	6.8	66.1	23.7	n.a.	76.3
Italy	29.4	47.3	51.1	18.2	30.7
Latvia	6.2	29.2	64.6	0.3	35.1
Lithuania	6.2	44.7	79.6	1.2	19.2
Luxemburg	0.2	50.5	47.8	1.2	51.0
Malta	0.03	32.1	87.7	12.3	n.a.
Netherlands	3.3	56.1	56.8	2.0	41.2
Poland	30.6	48.5	75.8	2.6	21.6
Portugal	9.1	39.7	30.7	20.2	49.1
Romania	23.0	60.7	63.5	3.1	33.4
Slovakia	4.8	40.1	72.5	1.0	26.5
Slovenia	2.0	22.7	30.0	8.6	61.4
Spain	50.0	55.2	46.2	18.5	35.3
Sweden	40.7	7.4	85.3	0.3	14.4
United Kingdom	24.1	70.9	36.2	0.2	63.6
EFTA					
Iceland	10.0	15.8	6.5	n.a.	93.5
Liechtenstein	n.a.	40.6	43.6	n.a.	56.4
Norway	36.5	3.8	81.7	0.5	17.8
Switzerland	3.9	38.0	26.3	1.7	72.0

Source: FAO (2017b).

Note: The data are mainly based on FAO questionnaires from countries and/or country official publications or websites or trade country files. However, it also contains manual estimations for certain countries as follows; Belarus (arable land), Georgia (crop/meadows and pastures), Kazakhstan, the Russian Federation, Tajikistan, Turkmenistan, Uzbekistan. EU-28 and EFTA country data are for 2011, except for total land area.

outlines agricultural land as a percentage of total land as well as the different types of land usage per country. At subregional level, the CIS countries have the largest total land area (1 719 million ha), which is mainly the result of the land size of the Russian Federation, followed by the EU-28 countries (422 million ha), Central Asia (392 million ha), Southeastern Europe (77 million ha), the EFTA countries (50 million ha) and the Caucasus (18 million ha). The highest average percentage of agricultural land as part of the total land area is located in Central Asia (61 percent), followed by the Caucasus (51 percent), the CIS (50 percent), the EU-28 (43 percent), Southeastern Europe (40 percent) and the EFTA countries (25 percent).

At country level, the Russian Federation, Kazakhstan and Ukraine have the largest agricultural land area in the region: 217 million ha, 216 million ha and 41 million ha, respectively. Kazakhstan, Republic of Moldova and Ukraine have the highest share of agricultural land relative to their total land size: 77.5, 74.8 and 71.3 percent, respectively. An average of 79 percent of the total agricultural land comprises meadows and pastures in the Caucasus and Central Asia, where livestock production is dominant. Turkey has the largest area for permanent crops: 4.2 million ha. Overall, the share of agricultural land as part of total land has remained largely unchanged across the region in recent years (FAO, 2014a).

1.2 POPULATION AND ECONOMY

Demographic trends, due to changes over time regarding the size and structure of a country's population, are the main driver of demand for food in the region; this will shape the development of agricultural and food systems across the ECA region. The United Nations (UN) anticipates that by 2050 the total population of the region will grow by 9.7 million people (UN DESA, 2017). However, this population change will differ among and within the subregions and countries (Table 2). It is expected that Turkey will experience the largest absolute population increase, of 17 million (21.8 percent). However, in relative terms, countries in Central Asia, such as Tajikistan and Kyrgyzstan, anticipate that their populations will increase by 68.5 percent (5.8 million) and 38.9 percent (2.3 million), respectively, by 2050. While the populations in the CIS and the Western Balkan countries are expected to decrease by 26.7 million and 2.6 million, respectively (UN, 2015).

Table 2. Population and urbanization projections for the ECA region

	POPULATION (MILLIONS)	POPULATION INCREASE/ DECREASE (%)	URBAN POPULATION AS A SHARE OF TOTAL (%)	GDP PER CAPITA (USD, CURRENT PRICES)	
	2015 – 2050	2015-2050	2015 – 2050	2015	2022
CAUCASUS					
Armenia	[3.0–2.7]	- 9.6	[62.1–71.8]	3 520	4 631
Azerbaijan	[9.7–10.9]	12.4	[53.8–65.1]	5 396	5 870
Georgia	[4.0–3.4]	- 13.0	[57.7–67.5]	3 761	5 550
CENTRAL ASIA					
Kazakhstan	[17.6–22.4]	27.3	[50.7–58.1]	10 427	11 869
Kyrgyzstan	[5.9 - 8.2]	38.9	[34.3–49.1]	1 109	1 344
Tajikistan	[8.4–14.2]	68.5	[27.2–43.3]	926	1 073
Turkmenistan	[5.3–6.5]	21.9	[50.0–65.6]	6 690	12 028
Uzbekistan	[29.8–37.1]	24.2	[36.1–50.8]	2 111	2 611
CIS					
Belarus	[9.5 - 8.1]	- 14.5	[74.8–77.2]	5 941	7 061
Republic of Moldova	[4.0 - 3.2]	- 20.4	[38.0–45.1]	1 828	2 653
Russian Federation	[143.4–128.6]	- 10.4	[73.3–76.2]	9 521	12 931
Ukraine	[44.8–35.1]	- 21.6	[69.4–75.7]	2 135	3 528
SEE					
Albania	[2.9 - 2.7]	- 6.6	[63.4–86.5]	3 943	5 997
Bosnia and Herzegovina	[3.8 - 3.0]	- 19.4	[39.9–59.9]	4 206	5 782
The former Yugoslav Republic Macedonia	[0.6–0.5]	- 9.5	[57.9–67.4]	4 854	6 881
Montenegro	[8.8–7.3]	- 17.2	[63.6–70.1]	6 464	8 320
Serbia	[2.0–1.9]	- 6.7	[59.2–64.6]	5 244	7 561
Turkey	[78.6 - 95.8]	21.8	[71.6–82.6]	10 909	12 193
EU-28	[505.1–499.8]	- 0.9	[75.6–84.8]	27 784	33 025
EFTA	[13.8–17.1]	23.4	[76.0–87.6]	68 715	81 952

Source: Population – UN (2015); Percentage of population at mid-year residing in urban areas by major area, region and country, 1950–2050 – UN DESA (2014); GDP per capita – IMF (2017).

The urban population throughout the region is expected to continue to expand. By 2050, more than half the population of all ECA countries, except for Tajikistan (43.3 percent) and Kyrgyzstan (49.1 percent), will reside in urban areas. These two countries, together with Uzbekistan, are the largest sources of labour migration in the region, as well as the largest receivers of remittances, primarily from the Russian Federation and Kazakhstan. At subregional level, the highest urbanization rates are anticipated for the EU-28 (84.8 percent of the total population will reside in cities) and EFTA countries (87.6 percent). At country level, the largest urban populations are projected in Turkey (82.6 percent) and Albania (86.5 percent).

In terms of ageing population and gender, different observations can be made. Several countries in the region, including Belarus, Georgia, Republic of Moldova, the Russian Federation, Ukraine and, to a lesser extent, Armenia and Kazakhstan, have a share of population aged 60 years and over which is above the global average (12 percent). In all these countries, women form a significant portion of the pension age population (in the Russian Federation, over 72 percent).

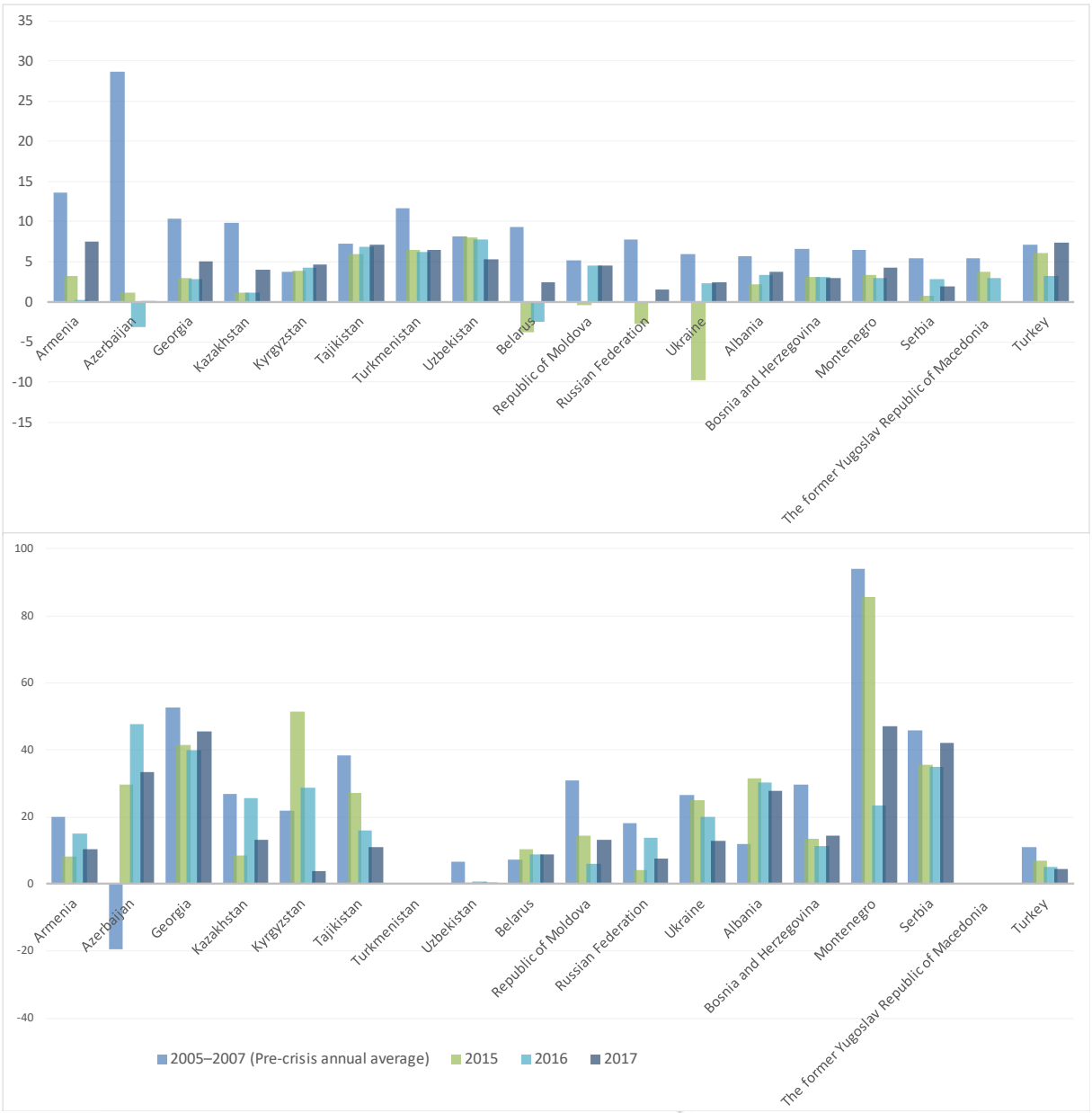
Besides the overall increase in population in the ECA region, incomes are also expected to rise. Turkmenistan, rich in natural gas and oil reserves, is among the countries that are projected to experience a substantial increase in gross domestic product (GDP) per capita from USD 6 990 in 2015 to USD 12 028 in 2022, which is among the highest in the region when the EU-28 and EFTA countries are excluded. This is an estimation based on the expected gradual rise in energy commodity prices. Income growth is expected to result in higher demand for food and certain types of food products, including meat, dairy and eggs, as consumption patterns change.

In general, the economies in the ECA region have recorded great macroeconomic achievements since the 1990s with a relatively high economic growth rate compared with many other regions of the world. The sources of economic growth have varied across countries in the ECA region. For example, Azerbaijan, Kazakhstan, Uzbekistan and Turkmenistan have achieved their growth with fiscal revenues from raw commodity

exports, such as oil and natural gas. On the other hand, Armenia, Kyrgyzstan and Tajikistan are heavily dependent on remittances from abroad. However, this reliance on a small number of economic drivers makes countries vulnerable to external shocks and stresses: the volatility of commodity prices for the former, the economic slowdown of the Russian Federation as a source of remittances for the latter.

Most countries in the ECA region were affected, to a greater or lesser degree, by the financial crisis of 2008 (see Figure 1). They have not yet recovered to pre-crisis level, in terms of either economic growth rate or inward foreign direct investment (FDI) flow, as a percentage of gross fixed capital formation, which refers to the increase in physical assets (investments minus disposals) for 2015, 2016 and 2017.

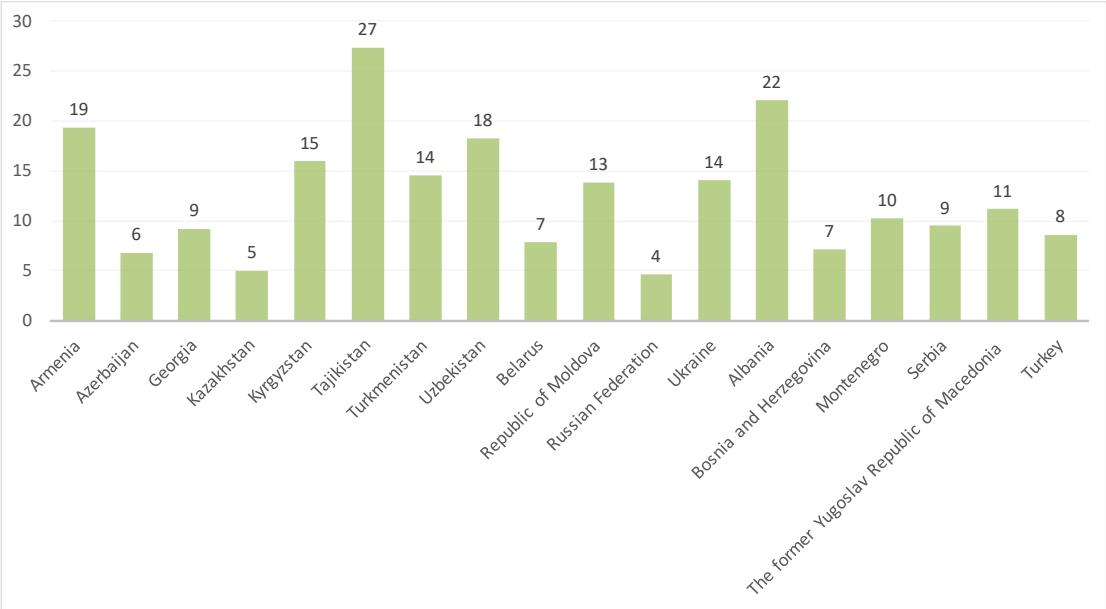
Figure 1. Economic growth rate (%, annual) and inward FDI flow (% of gross fixed capital formation) of ECA economies before and after financial crisis of 2008



Source: Economic growth rate – World Bank (2018); Inward FDI flow – UNCTAD (2018).

The importance of the agricultural sector to the economy in the ECA region varies (Figure 2). For instance, the share of agriculture in the GDP ranges from around 4 percent in the Russian Federation to 27 percent in Tajikistan (FAO, 2015a). However, these figures do not include the EU-28 and EFTA countries, where the share of the agricultural sector in almost all countries is lower than 5 percent of their GDP with differences varying from 0.1 percent in Luxemburg to 5.1 percent in Bulgaria (FAO, 2015a).

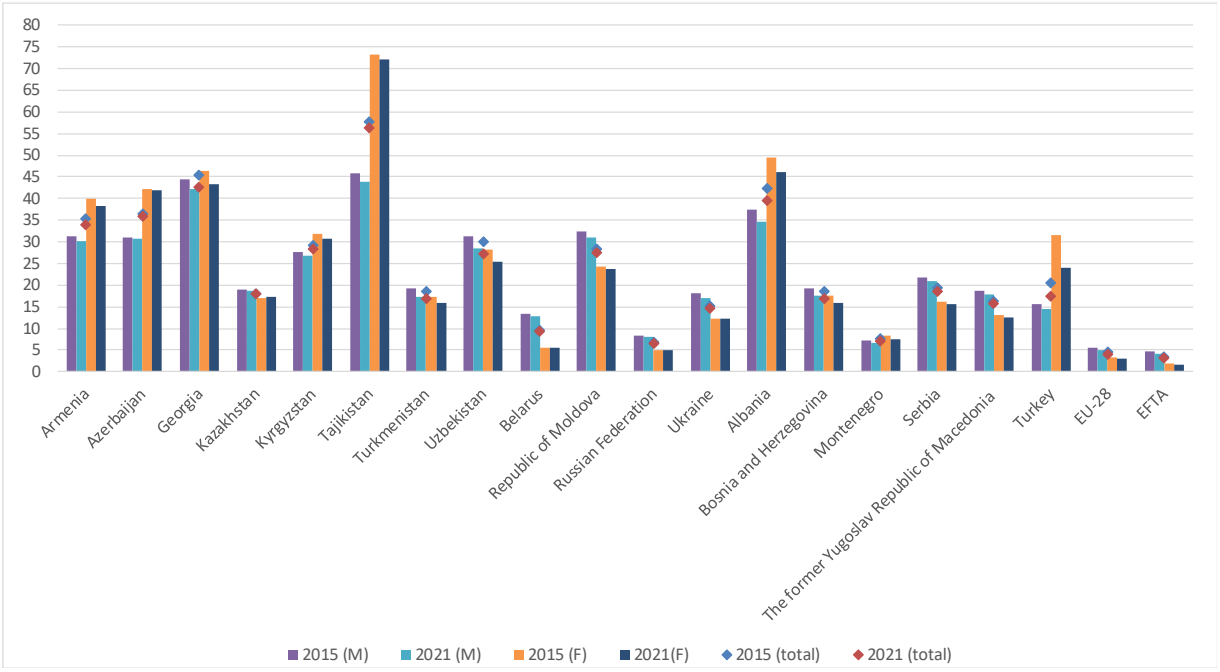
Figure 2. Agriculture, value added to GDP in the ECA region, 2015 (%)



Source: FAO (2017b).

In terms of employment in the sector, similar trends can be observed. The share of agricultural employment as part of the total employment is significant across the majority of the ECA countries, when compared with the average share of 4.5 percent and 3 percent in 2015 in the EU-28 and EFTA countries, respectively (Figure 3). In the non-EU ECA countries, employment in the sector is the highest in Tajikistan with 58 percent of the total labour population engaged in agriculture in 2015, followed by Georgia (45 percent) and Albania (42 percent). In these countries, almost half of female labour is involved in agricultural activities. However, irrespective of gender, agricultural employment is expected to decline over time in most countries.

Figure 3. Agricultural employment of total employment and by sex in ECA countries, 2015 and 2021 (%)



Source: ILO (2018).

Note: No data available of Liechtenstein.

Furthermore, ageing rural populations in many countries in the region and a gradual reduction in the number of younger people residing in rural areas is anticipated to lead to a reduced labour force in the sector. The agricultural labour force is expected to decrease from approximately 50 million (i.e. 17 percent of the rural population) to around 15 million by 2050 (FAO, 2012a). Within this context, the development of future sustainable and climate-resilient production systems will also need to take into consideration the reduced workforce (FAO, 2014a).

1.3 CLIMATE-RELATED HAZARDS, VULNERABILITIES AND RISKS

[WATER SCARCITY]

Significant withdrawal of water for agriculture leads to higher levels of water stress in many ECA countries. This is already a concern in the region as it results in a decline in freshwater resources in terms of quantity (e.g. aquifer overexploitation, dry rivers) and quality (e.g. eutrophication, organic matter pollution, saline intrusion) (EEA, 2016a). It is projected that by 2020 all the countries in Central Asia and the Caucasus, except for Georgia, will be experiencing "high" or "extremely high" levels of water stress[2] (Table 3). This scenario is also expected for certain CIS countries, such as the Russian Federation and Ukraine, for the Southeastern European countries of The former Yugoslav Republic of Macedonia and Turkey, as well as for some EU countries, such as Greece, Italy, Portugal and Spain. By 2040, it is anticipated that, in addition to the countries mentioned above, Republic of Moldova and Belgium will also be experiencing "high" levels of water stress, while for Bulgaria and the Russian Federation it is expected that they will experience an improvement in their levels of water stress from "high" to "medium to high" (Luo, Young and Reig, 2015).

Table 3. Projections of water stress levels for agriculture in the ECA region[3]

SCORE	0-1	1-2	2-3	3-4	4-5
VALUE	LOW (<10%)	LOW TO MEDIUM (10-20%)	MEDIUM TO HIGH (20-40%)	HIGH (40-80%)	EXTREMELY HIGH (> 80%)

NAME	2020	2030	2040
Kyrgyzstan	4.91	4.92	4.93
Kazakhstan	4.79	4.77	4.79
Armenia	4.16	4.46	4.74
Turkmenistan	4.13	4.38	4.76
Azerbaijan	4.10	4.34	4.58
The former Yugoslav Republic Macedonia	4.03	4.05	4.13
Uzbekistan	3.97	4.26	4.30
Spain	3.93	4.09	4.22
Greece	3.86	4.12	4.23
Turkey	3.71	3.95	4.12
Italy	3.61	3.72	3.8
Ukraine	3.54	3.70	3.22
Tajikistan	3.30	3.36	3.42
Portugal	3.14	3.37	3.61
Bulgaria	3.05	2.86	2.69
Russian Federation	3.04	3.06	3.02
United Kingdom	2.88	2.87	2.81
Belgium	2.81	3.01	3.25
Luxemburg	2.75	2.76	2.75
Georgia	2.41	2.67	2.94
Albania	2.32	2.44	2.56
Republic of Moldova	2.12	2.84	3.77
Poland	2.09	2.21	2.21
Netherlands	1.92	2.35	2.75
Lithuania	1.74	1.93	2.09
Czechia	1.74	1.88	1.91
Austria	1.73	1.77	1.89
Germany	1.65	1.68	1.67
France	1.58	1.77	1.9
Belarus	1.28	1.37	1.37
Ireland	1.27	1.25	1.22
Switzerland	1.23	1.28	1.34
Hungary	1.17	1.29	1.39
Romania	1.15	1.32	1.42

[2] Water stress measures the total annual water withdrawals – municipal, industrial and agricultural – expressed as a percentage of the total annual available blue water (water from rivers, lakes and groundwater). Higher values indicate more competition among users (Luo, Young and Reig, 2015).

[3] Under a business-as-usual scenario

Montenegro	1.09	1.44	1.68
Estonia	1.06	1.27	1.50
Sweden	0.89	0.92	0.93
Finland	0.71	0.63	0.54
Liechtenstein	0.47	0.53	0.59
Latvia	0.46	0.56	0.63
Slovakia	0.38	0.58	0.73
Slovenia	0.35	0.59	0.82
Serbia	0.30	0.42	0.60
Norway	0.20	0.21	0.21
Croatia	0.12	0.23	0.32
Denmark	0.03	0.23	0.53
Bosnia and Herzegovina	0.01	0.01	0.02
World average	1.92	2.00	2.09

Source: Luo, Young and Reig (2015).

Note: Water stress measures total annual water withdrawals (municipal, industrial and agricultural) expressed as a percentage of the total annual available blue water. Higher values indicate more competition among users. No data available for Iceland.

The effects of climate change, including the possible adverse impacts on water availability, are already being felt across the region (ENVSEC, 2014). Climate change projections for the coming decades include a rise in global average annual temperatures as well as a likely decline in the average annual precipitation (IPCC, 2014). Since the early 1990s, average temperatures have already increased by 0.5 °C in the south and 1.6 °C in the north of the region. Further temperature rises by up to an average 2.6 °C are projected by 2050 in ECA countries (World Bank, 2009). Also, seasonal differences are expected throughout the region, with northern areas likely to experience more temperature changes in winter, and the south likely to face more warming during the summer. For instance, the number of hot days is expected to increase annually by 22–37 days during the period 2030–2049, with the greatest increase in heatwave duration in the North Caucasus, the Urals and West Siberia, Kazakhstan and Central Asia. In contrast, the number of frost days is likely to decrease by 14–30 days, especially in the Baltic countries (World Bank, 2009).

With regard to precipitation, it is expected that the northern and eastern parts of the ECA region will become wetter, while the southern part will become drier. In most parts of the regions of the Russian Federation, mean annual precipitation is projected to rise by 5–11 percent by 2050 (with the exception of the North Caucasus: -2 percent), with an increase in winter precipitation of 9–18 percent. For the rest of the ECA region, more rainfall in winter (9 percent) and spring (5 percent) is anticipated, with the exception of Southeastern Europe (-6 percent for annual mean). Moreover, the intensity of precipitation will increase, varying between 2 percent and 6 percent for the entire region, which may lead to more flooding. In addition, runoff is expected to decrease everywhere (except the Russian Federation), with the largest decline in Southeastern Europe (-25 percent), which may lead to more dry spells and droughts (World Bank, 2009).

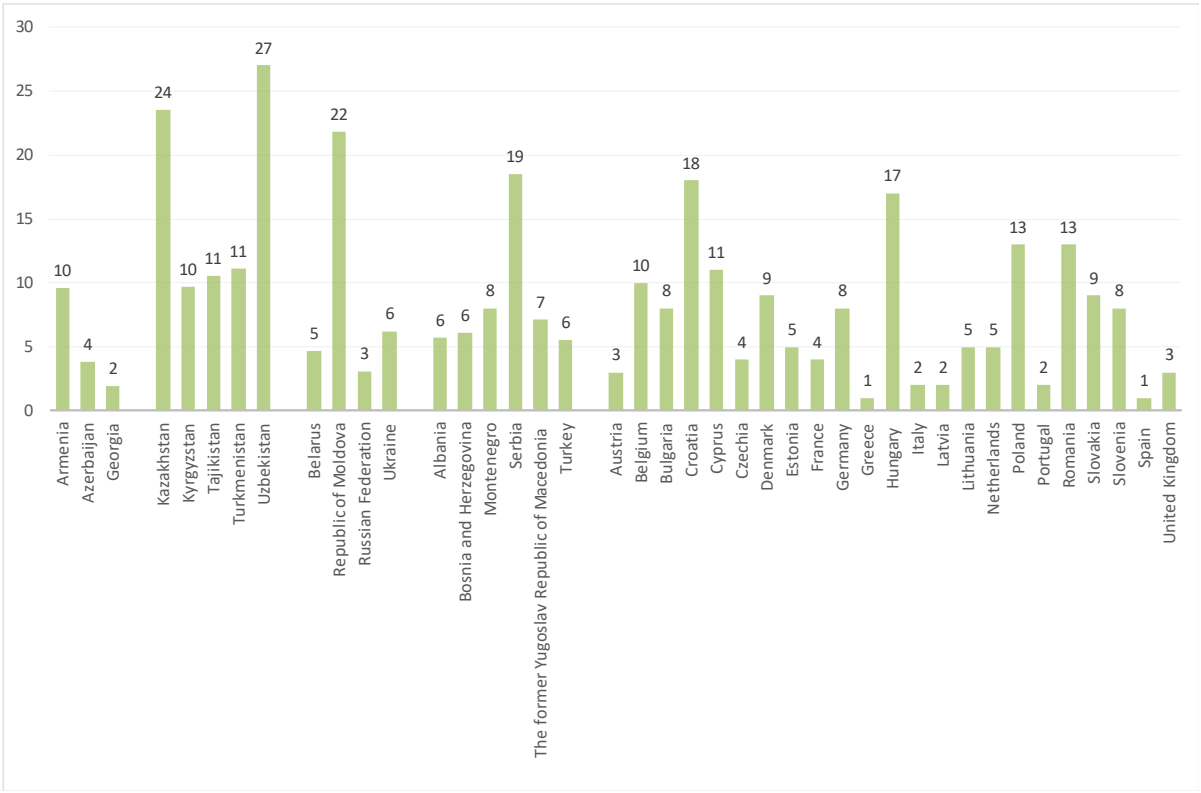
Besides the expected rise in dry spells and droughts due to temperature increases, which will lead to greater evaporation from soils, less water availability for plants and reduced input to groundwater, other extreme weather events will also occur. For instance, due to the temperature rises, warmer air can hold more water vapour, which can result in more intense storms and heavy rainfall as well as a higher risk of flooding. Glaciers, like those in Central Asia and the Caucasus, may melt more rapidly due to the warming, which may reduce water flow by up to 40 percent and negatively impact long-term water availability in some ECA countries (World Bank, 2009).

[LAND DEGRADATION]

The ECA region is also increasingly experiencing degradation, depletion and overexploitation of its land resources, which is undermining the sustainability of production systems (FAO, 2016b). For instance, in countries such as Republic of Moldova, Kazakhstan and Uzbekistan, over 20 percent of the population already reside on degraded land (Figure 4), limiting the ability to increase agricultural production. Furthermore, land degradation reduces ecosystem services, such as the ability to regulate climate and natural hazards. As a result, ecosystems that are less diverse and healthy have a reduced resilience to mitigate future extreme weather events, which are expected to be more severe and more frequent due to climate change.

In EU-28 and EFTA countries, water and wind erosion affect, respectively, around 16 percent and 6 percent of the total land. Soil erosion on arable land is a significant issue for the EU-28 countries, in particular in the south and centre, with Italy being the most affected, followed by Croatia, Greece, Portugal, Slovakia, Slovenia and Spain. It is also calculated that approximately 45 percent of soil in the EU-28 countries has low organic content (EU JRC, 2012). Climate change is expected to adversely impact soil degradation, which may lead to further desertification (EU JRC, 2012; EEA, 2016a).

Figure 4. Population living on degraded land, 2010 (% of total population)



Source: UNDP (2013).

Note: Data was not available for Finland, Iceland, Ireland, Liechtenstein, Luxembourg, Malta, Norway, Sweden and Switzerland.

The Southeastern Europe subregion is especially impacted by these processes; for example, in Turkey, approximately 79 percent, (61.3 million ha) of the country is affected. As four-fifths of the country's soil is located on slopes that are steeper than 15°, wind erosion is estimated to impact around 500 000 ha (Senol and Bayramin, 2013). Even more affected is The former Yugoslav Republic of Macedonia, where it is estimated that in 1993 approximately 96.5 percent of the total area was affected by land degradation and erosion (Mitkova and Cvetkovska, 2006). The impact of soil erosion and compaction on agriculture is substantial; for instance, in Albania, it was calculated that in 2011, on-site losses in agriculture accounted for USD 138.2 million annually or approximately 5.5 percent of the agricultural GDP (Binaj et al., 2014).

Soil erosion is also substantial in the CIS countries, for example in Ukraine, where erosion from arable land is estimated to be more than 500 million tonnes of soil every year, which is a loss of 32.5 million ha of fertile soil (FAO, 2014b). Republic of Moldova is less impacted by soil erosion; nevertheless, it is estimated that it loses approximately 26 million tonnes of fertile soil every year (Leah, 2012). In the Russian Federation, in particular in the Volga, the Southern Ural and West Siberia, one-quarter of the arable land is eroded and this increases every year by 4 000–5 000 km2. This negatively affects soil fertility and as a result the productivity of the arable land has reduced by 36 percent (Glazovsky, 2009).

The above land degradation issues (in particular, in the CIS and SEE countries) are the result of inappropriate agricultural practices – including overgrazing, improper drainage and irrigation practices, and illegal logging – as well as other activities, such as mining and construction (FAO, 2015b). The greatest impact, however, has been felt in the Central Asia countries.

[NATURAL HAZARDS]

The ECA countries are vulnerable and exposed to various natural hazards, including droughts, floods, earthquakes, landslides and storms. The Index For Risk Management (INFORM) (Table 4) indicates that the highest exposure to earthquakes is observed in all five mountainous countries of Central Asia and the Caucasus, as well as in the Black Sea Basin (Turkey, Armenia and Azerbaijan). Floods are most likely to affect Serbia, the Russian Federation and Ukraine, while Albania, Tajikistan and Kyrgyzstan are highly prone to drought. Tajikistan, Uzbekistan, the Russian Federation and Turkey have a very high overall risk to natural hazards.[4]

[4] The natural hazard risk component of the INFORM Risk Index comprises the geometric average of a variety of natural hazard risks to, among others, earthquake, tsunami, flood, tropical cyclone and drought (INFORM, 2016).

Table 4. Natural hazard risk in the ECA region except EU-28 and EFTA countries

SCORE	0.0-1.4	1.5-2.6	2.7-4.0	4.1-6	6.1-10.0
VALUE	VERY LOW	LOW	MEDIUM	HIGH	VERY HIGH

	COUNTRY	EARTHQUAKE	FLOOD	DROUGHT	NATURAL DISASTERS
CAUCASUS	Armenia	8.0	4.7	5.7	4.4
	Azerbaijan	8.2	4.9	5.3	4.5
	Georgia	7.8	5.7	5.4	4.5
CENTRAL ASIA	Kazakhstan	7.5	5.8	5.0	4.3
	Kyrgyzstan	9.7	5.6	7.2	5.9
	Tajikistan	9.7	5.6	7.7	6.1
	Turkmenistan	8.5	5.3	5.0	4.6
	Uzbekistan	9.9	6.3	6.7	6.1
CIS	Belarus	0.1	6.1	3.2	2.3
	Republic of Moldova	5.1	5.9	6.1	3.9
	Russian Federation	7.1	8.4	5.5	6.3
	Ukraine	2.7	7.1	3.5	3.2
SEE	Albania	6.2	4.9	7.8	5.8
	Bosnia and Herzegovina	6.3	7.3	3.5	4.2
	Montenegro	4.2	4.9	2.1	4.0
	Serbia	6.6	8.6	2.7	4.6
	The former Yugoslav Republic Macedonia	6.6	4.4	4.5	3.6
	Turkey	9.3	6.1	3.8	6.0

Source: INFORM (2017).

The agricultural sector is one of the most climate-sensitive sectors; of all climate-related hazards, it is most adversely affected by floods, droughts and storms.[5] It is estimated by FAO (2015a) that the agricultural sector absorbed around 22 percent of the total damage and losses caused by the medium- and large-scale natural disasters which occurred during 2003–2013 in developing countries. As climate-change-related natural hazards are expected to increase in frequency and intensity (IPCC, 2014), agricultural producers, in particular smallholder farmers, will be highly vulnerable and are expected to be negatively impacted, together with other stakeholders that are involved in or dependent on the sector's activities for food security and income generation. Moreover, these climate change processes are expected to result in further economic damage and losses that may significantly impact people's livelihoods and hinder sustainable development (FAO 2017c).

Accurate and reliable post-disaster agricultural damage and losses data are often lacking due to the absence of or limited human, technical and financial resources and capacities to implement a systematic assessment for the agricultural sector. Nevertheless, some data exist on the impact of climate-related hazards on agriculture in the Caucasus, Central Asia and the CIS. For example, the 2000/01 drought substantially impacted Tajikistan and Georgia at an estimated 5 percent and 6 percent of their respective GDPs (World Bank, 2009). It was measured that precipitation was below the long-term average in nearly all areas in Tajikistan (an average of 60 percent of normal levels), while river flows were approximately 40–85 percent of normal levels (FAO and WFP, 2001). This reduced rainfall led to a decline in crop yields of 30–40 percent (CAREC, 2015). Another example is the drought that affected Republic of Moldova in the summer of 2007, which negatively affected approximately 84 percent of the country's arable land and led to economic losses from crop failures and livestock deaths of around USD 407 million (World Bank, 2009). A frost at the end of March 2015 in Tajikistan impacted 225 000 people and resulted in significant damage and losses to crops and orchards in the Sughd province (OCHA, 2015).

In Southeastern Europe, many people, including smallholder farmers, have been affected by floods and droughts. For example, during the 2014 floods and landslides in Serbia and Bosnia and Herzegovina, extraordinarily heavy rains – the highest rainfall measured in the last 120 years – resulted in extensive flooding, affecting 24 municipalities in Serbia and 81 in Bosnia and Herzegovina and causing substantial damage and losses to the agricultural sector: EUR 228 million (19 percent of total damage and losses) in Serbia and EUR 187 million (9 percent of total damage and losses) in Bosnia Herzegovina (UN/EU/World Bank, 2014a; UN/EU/World Bank, 2014b). The floods and landslides washed away newly planted crops, drowned and killed livestock, and destroyed agricultural equipment and facilities, such as storage areas and animal shelters.

The former Yugoslav Republic of Macedonia is one of the SEE countries vulnerable to drought. The agricultural zone most at risk is the Povardarie region, in particular, the areas around the Crna, Bregalnica and Vardar rivers. The estimated impact of the 1993 drought, which led to a total crop failure, was evaluated at approximately 7.6 percent of the total national income (UN/EU/World Bank, 2014a; UN/EU/World Bank, 2014b). In the 2000s, droughts were observed in 2003 and 2006/07; however, due to lack of or limited damage and loss data, the exact impact on the agricultural sector is not entirely known.

[5] According to the research, crop and livestock production were mostly impacted by floods and droughts, forestry by floods and storms, and fisheries by tsunamis and storms. This study helped to fill some of the data gaps that currently exist for measuring the adverse impact of natural hazards on the agricultural sector, which is crucial in order to better understand people's vulnerabilities and risks as well as to better inform decision-making and undertake effective risk reduction measures and investments (FAO, 2015a).

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PART II

NATIONALLY DETERMINED CONTRIBUTIONS AND CLIMATE CHANGE POLICIES OF ECA COUNTRIES

KEY MESSAGES

- The majority of the ECA countries have ratified the Paris Agreement and submitted their first nationally determined contributions (NDCs); the exceptions are Kyrgyzstan, the Russian Federation, Turkey and Uzbekistan.

- In order for most countries to fulfil their obligations and make progress, the following issues need to be addressed: enhancing the mainstreaming of climate change and agriculture throughout national and sectoral planning instruments; strengthening institutional coordination and technical capacities; improving methodologies for assessing the climate change impacts on agriculture and related sectors; and addressing data gaps.

- Uncertainty is inherent when accounting for carbon stocks and emissions; nevertheless, it is important, when possible, to identify, quantify and reduce any uncertainty to give confidence to the figures reported and communicated.

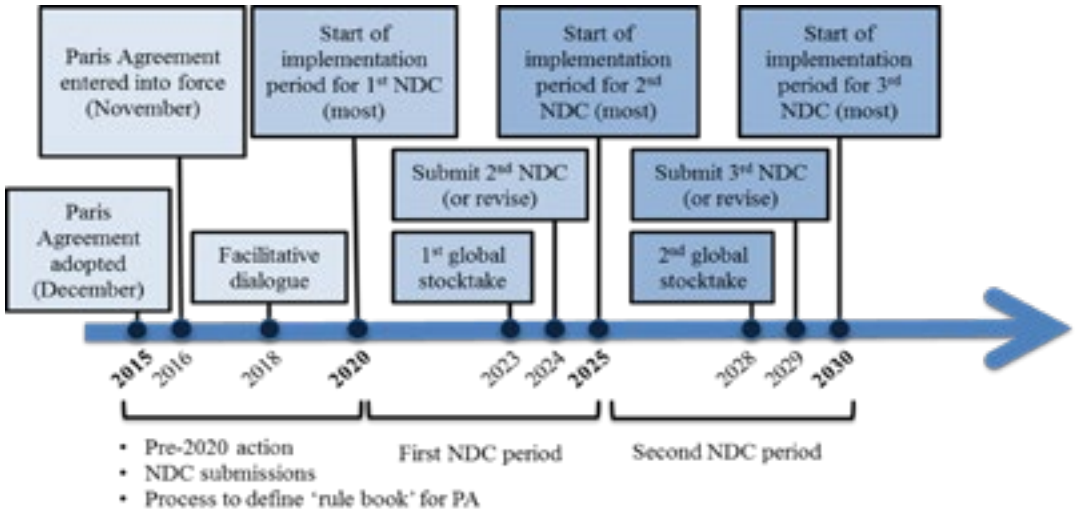
- Mobilizing financial resources by tapping into multilateral funds, such as the Green Climate Fund (GCF), is crucial to achieve implementation of the NDCs in the ECA region.

Part II focuses on the process of the nationally determined contributions (NDCs). Section 2.1 analyses the NDCs of the ECA countries with regard to, for example, their set greenhouse gas (GHG) targets, coverage of GHGs and sectors. Section 2.2 presents a profile of current GHG emissions to provide a context in which reductions will be undertaken. Section 2.3 presents an in-depth analysis of the countries' different national planning instruments, including the extent of policy coherence and mainstreaming in national law and policy documents on climate change, and looks at low emissions/energy, climate change mitigation and adaptation in agriculture and disaster risk reduction. This section also aims to gain a better understanding of the countries' institutional ability to coordinate and researches the technical capacity to implement climate change activities in order to ensure adequate cross-sectoral institutionalization and integration in development planning. Section 2.4 examines the implementation of the NDCs and highlights challenges related to reporting, data collection and monitoring that are closely linked to the countries' ability to reduce its GHG emissions. Finally, Section 2.5 focuses on the availability of financial resources and budgets to implement these activities.

2.1 NDC STATUS

The Intended Nationally Determined Contributions (INDCs), prepared and developed by the Parties before the Paris Conference, indicated the national efforts to reduce GHG emissions and increase resilience and reduce vulnerability to climate change within the context of sustainable development. Under the Paris Agreement, the INDCs were formalized as NDCs and each Party is required to provide their NDCs every five years. A periodic global stocktake is to be undertaken to assess the collective progress towards achieving the purpose of the Agreement and its long-term goals. The first global stocktake will take place in 2023 and is meant to result in revised NDCs by 2025. Figure 5 outlines the NDC process from the adoption of the Paris Agreement in 2015 until 2030.

Figure 5. Nationally determined contribution process



Source: FAO.

According to Article 4, paragraph 12 of the Paris Agreement, the NDCs of all Parties are recorded in a public registry (interim) maintained by the Secretariat of the United Nations Framework Convention on Climate Change (UNFCCC). As of November 2018, 179 of the 197 Parties have submitted their first NDCs. In the ECA region, four countries have not yet submitted their first NDC reports: Kyrgyzstan, the Russian Federation, Turkey and Uzbekistan.

In terms of ratification, as of 11 November 2018, 183 of the 197 Parties have ratified the Agreement. In the ECA region, Turkey and the Russian Federation signed the Paris Agreement on 22 April 2016, while Kyrgyzstan signed on 21 September 2016 and Uzbekistan on 19 April 2017. However, not all have ratified the Agreement and not all have submitted their first NDC. On behalf of the European Union and its 28 member states (EU-28), the European Commission submitted joint NDCs on 5 October 2016, aiming to reduce by at least 40 percent domestic GHG emissions by 2030 (compared with 1990).

Table 5 provides an overview of the status of all ECA countries with regard to their first NDC submission dates and ratification of the Paris Agreement.

Table 5. Status of NDCs submission and Paris Agreement ratification in the ECA region

PARTY	DATE OF FIRST NDC SUBMISSION/ RATIFICATION ACCEPTANCE	PARTY	DATE OF FIRST NDC SUBMISSION/ RATIFICATION ACCEPTANCE
Albania	21 Sept. 2016	Liechtenstein	20 Sept. 2017
Armenia	23 Sept. 2017	Lithuania	2 Feb. 2017
Austria	5 Oct. 2016	Luxembourg	4 Nov. 2016
Azerbaijan	9 Jan. 2017	Malta	5 Oct. 2016
Belarus	21 Sept. 2016	Montenegro	21 Dec. 2017
Belgium	6 Apr. 2017	Netherlands	28 July 2017
Bosnia and Herzegovina	16 Mar. 2017	Norway	20 June 2016
Croatia	24 May 2017	Poland	7 Oct. 2016
Cyprus	4 Jan. 2017	Portugal	5 Oct. 2016
Czechia	5 Oct. 2017	Republic of Moldova	20 June 2017
Denmark	1 Nov. 2016	Romania	1 June 2017
Estonia	4 Nov. 2016	Russian Federation	–
European Union	5 Oct. 2016	Serbia	25 July 2017
Finland	14 Nov. 2016	Slovakia	5 Oct. 2016
France	5 Oct. 2016	Slovenia	16 Dec. 2016
Georgia	8 May 2017	Spain	12 Jan. 2017
Germany	5 Oct. 2016	Sweden	13 Oct. 2016
Greece	14 Oct. 2016	Switzerland	6 Oct. 2017
Hungary	5 Oct. 2016	Tajikistan	22 Mar. 2017
Iceland	21 Sept. 2016	The Former Yugoslav Republic of Macedonia	9 Jan. 2018
Ireland	4 Nov 2016	Turkey	–
Italy	11 Nov. 2016	Turkmenistan	21 Oct. 2016
Kazakhstan	6 Dec. 2016	Ukraine	19 Sept. 2016
Kyrgyzstan	–	United Kingdom	18 Nov. 2016
Latvia	16 Mar. 2017	Uzbekistan	–

Sources: UNFCCC interim NDC Registry (http://www4.unfccc.int/ndcregistry/Pages/Home.aspx)

United Nations Treaty Collection (https://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-7-d&chapter=27&clang=_en)

The different types of GHG emissions covered vary significantly depending on the region and country, with the exception of the EU-28 and EFTA countries. Their NDCs cover all GHGs not controlled by the Montreal Protocol,[6] which include carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulphur hexafluoride (SF6) and nitrogen trifluoride (NF3). This is also the case for Republic of Moldova, Ukraine, Montenegro and Turkey as their NDCs cover these seven types of GHGs. Albania and The former Yugoslav Republic of Macedonia only focus on CO2, while Tajikistan, Turkmenistan and Bosnia and Herzegovina include CH4 and N2O. Table 6 shows the different types of GHGs covered by the ECA countries.

Table 6. Scope and coverage of GHGs in the submitted NDCs in the ECA region

REGION	COUNTRY	CO2	CH4	N2O	HFCS	PFCS	SF6	NF3
CAUCASUS	Armenia	✓	✓	✓	✓	-	-	-
	Azerbaijan	✓	✓	✓	✓	✓	-	-
	Georgia	✓	✓	✓	✓	✓	✓	-
CENTRAL ASIA	Kazakhstan	✓	✓	✓	✓	✓	✓	-
	Kyrgyzstan*	✓	✓	✓	✓	✓	✓	-
	Tajikistan	✓	✓	✓	-	-	-	-
	Turkmenistan	✓	✓	✓	-	-	-	-
	Uzbekistan *	✓	✓	✓	-	-	-	-
EUROPEAN CIS	Belarus	✓	✓	✓	✓	✓	✓	-
	Republic of Moldova	✓	✓	✓	✓	✓	✓	✓
	Russian Federation *	✓	✓	✓	✓	✓	✓	✓
	Ukraine	✓	✓	✓	✓	✓	✓	✓
SEE	Albania	✓	-	-	-	-	-	-
	Bosnia and Herzegovina	✓	✓	✓	-	-	-	-
	The former Yugoslav Republic Macedonia	✓	-	-	-	-	-	-
	Montenegro	✓	✓	✓	✓	✓	✓	✓
	Serbia	✓	✓	✓	✓	✓	✓	
	Turkey*	✓	✓	✓	✓	✓	✓	✓
EU-28	EU-28	✓	✓	✓	✓	✓	✓	✓
EFTA	Iceland	✓	✓	✓	✓	✓	✓	✓
	Liechtenstein	✓	✓	✓	✓	✓	✓	✓
	Norway	✓	✓	✓	✓	✓	✓	✓
	Switzerland	✓	✓	✓	✓	✓	✓	✓

Source: UNFCCC interim NDC Registry (http://www4.unfccc.int/ndcregistry/Pages/Home.aspx)

Note: * INDCs.

[6] The Montreal Protocol is a treaty structured around several groups of halogenated hydrocarbons which deplete the stratospheric zone.

For the agricultural sector, CO2, CH4 and N2O, are the most relevant GHGs of the seven mentioned in the NDCs. Carbon dioxide, for example, is released through use of tractors and other agricultural equipment driven by fossil fuels as well as through deforestation and burning of land; CH4 is emitted through enteric fermentation from ruminant livestock, manure and paddy rice farming; and N2O is released by agricultural sources, including synthetic fertilizer and manure.

A diverse picture emerges as different countries in the ECA region include different economic sectors and source categories in their NDCs. The EU-28 and EFTA countries cover all five sectors, as do Kyrgyzstan, Republic of Moldova, the Russian Federation, Ukraine, Bosnia and Herzegovina, Serbia and Turkey. The total figures for the ECA region per targeted sector are as follows: Energy (21 countries plus EU-28); Industrial processes and product use (IPPU) (18 countries plus EU-28); Agriculture (15 countries plus EU-28); Land use, land-use change and forestry (LULUCF) (12 countries plus EU-28); and Waste (18 countries plus EU-28), as shown in Table 7.

Table 7. Coverage of economic sectors and source categories in the submitted NDCs in the ECA region

REGION	COUNTRY	ENERGY	IPPU	AGRICULTURE	LULUCF	WASTE
CAUCASUS	Armenia	✓	✓	-	✓	✓
	Azerbaijan	✓	-	✓	✓	✓
	Georgia	✓	✓	✓	✓	✓
CENTRAL ASIA	Kazakhstan	✓	-	✓	✓	✓
	Kyrgyzstan*	✓	✓	✓	✓	✓
	Tajikistan	✓	✓	✓	✓	-
	Turkmenistan	✓	✓	✓	-	✓
	Uzbekistan *	n.a.	n.a.	n.a.	n.a.	n.a.
CIS	Belarus	✓	✓	✓	-	✓
	Republic of Moldova	✓	✓	✓	✓	✓
	Russian Federation *	✓	✓	✓	✓	✓
	Ukraine	✓	✓	✓	✓	✓
SEE	Albania	✓	✓	-	-	-
	Bosnia and Herzegovina	✓	✓	✓	✓	✓
	The former Yugoslav Republic Macedonia	✓	-	-	-	-
	Montenegro	✓	✓	✓	-	✓
	Serbia	✓	✓	✓	✓	✓
	Turkey*	✓	✓	✓	✓	✓
EU-28	EU-28	✓	✓	✓	✓	✓
EFTA	Iceland	✓	✓	✓	✓	✓
	Liechtenstein	✓	✓	✓	✓	✓
	Norway	✓	✓	✓	✓	✓
	Switzerland	✓	✓	✓	✓	✓

Source: UNFCCC interim NDC Registry (http://www4.unfccc.int/ndcregistry/Pages/Home.aspx)

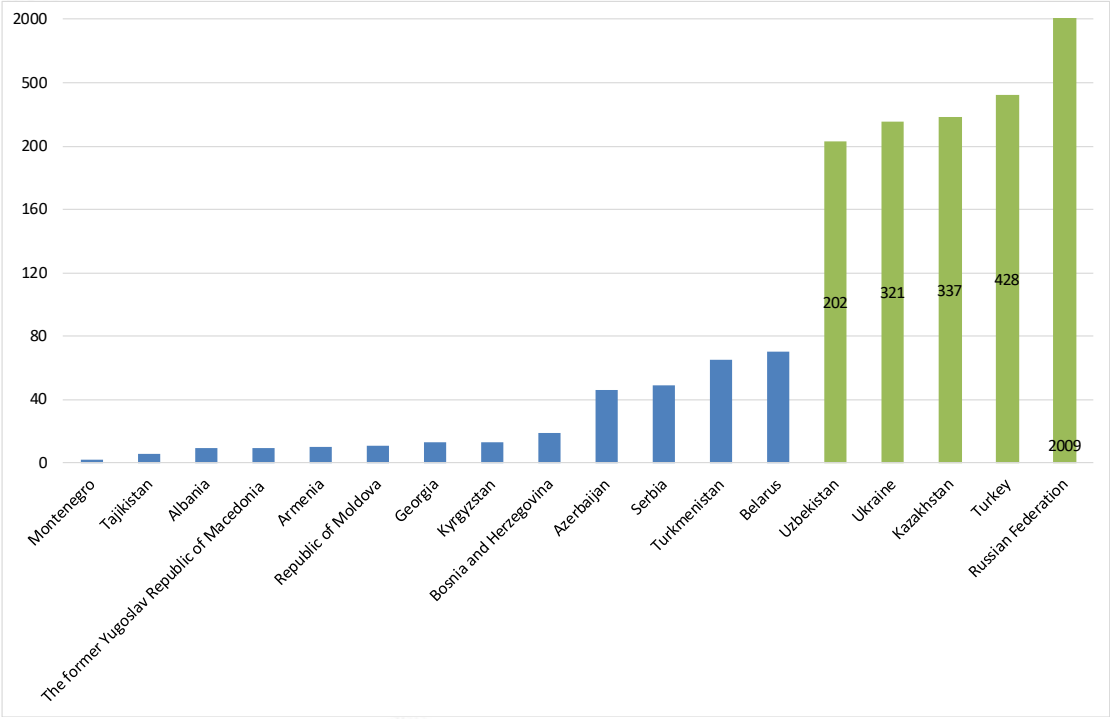
Note: * INDCs. Note that coverage of economic sectors and source categories was not clearly included in Uzbekistan's INDC

The agricultural sector is not covered by the NDCs of Albania, Armenia and Bosnia and Herzegovina despite its importance for their economies, accounting, respectively, for 22 percent, 19 percent and 7 percent of the GDP (FAO, 2017b).

2.2 GHG EMISSIONS PROFILE

The quantity of GHG emissions differs among the various countries in the ECA region, due to the presence of both developed and developing countries. Figure 6 presents an overview of the total net GHG emissions with LULUCF.

Figure 6. Total net GHG with LULUCF emissions in ECA countries (million tonnes CO2 eq.)



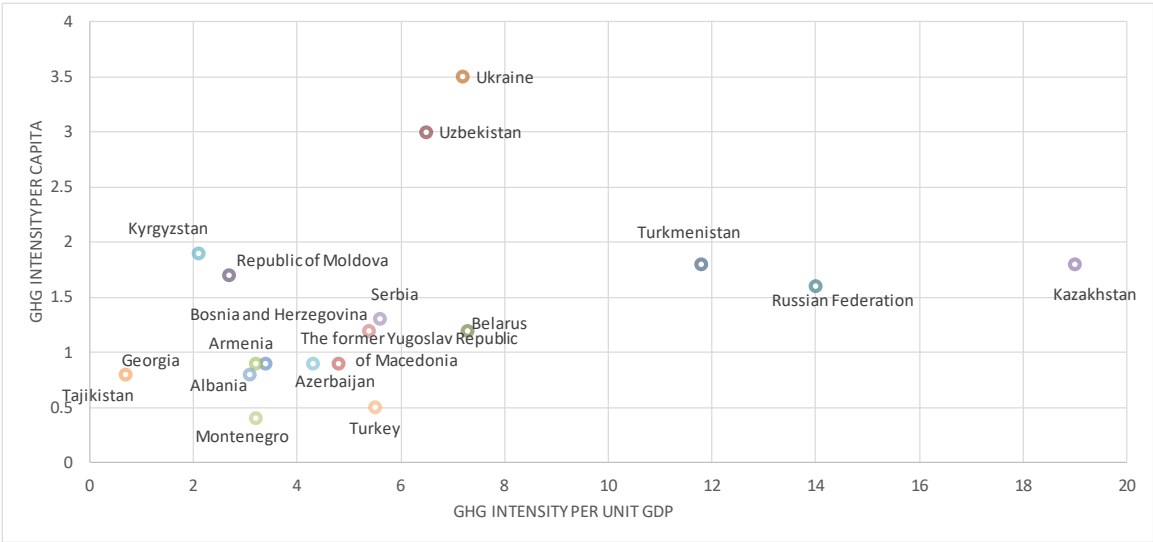
Source: UNFCCC GHGI (http://unfccc.int/resource/cd_roms/na1/ghg_inventories/).

Note: (Country/Year) = Armenia/2014, Azerbaijan/2012, Georgia/2013, Kazakhstan/2016, Kyrgyzstan/2010, Tajikistan/2010, Turkmenistan/2010, Uzbekistan/2012, Belarus/2016, Republic of Moldova/2015, Russian Federation/2016, Ukraine/2016, Albania/2009, Bosnia and Herzegovina/2014, Montenegro/2011, Serbia/2014, The former Yugoslav Republic of Macedonia/2014, Turkey/2016.

The Russian Federation has the largest amount of net GHG emissions in Europe and Central Asia (2009 million tonnes), followed by Turkey (428 million tonnes), Kazakhstan (337 million tonnes), Ukraine (321 million tonnes) and Uzbekistan (202 million tonnes), while the remaining countries emit less than 100 million tonnes per annum. Although there are exceptions depending on countries' economic structure, the net amount of GHG emissions in a country generally increases in proportion to the scale of the economy.

Figure 7 describes the GHG intensity per capita basis (person and unit GDP); the lower the numerical value of both axes, the more efficient the socioeconomic system of the country is. All the largest GHG-emitting countries described in Figure 7 need to intensify their efforts to improve GHG intensity, whether per unit GDP (Kazakhstan, the Russian Federation, Turkmenistan) or per person (Ukraine, Uzbekistan).

Figure 7. GHG intensity1 per capita (tonnes CO2 eq./person) and unit GDP (tonnes CO2 eq./1 000 USD) in ECA countries

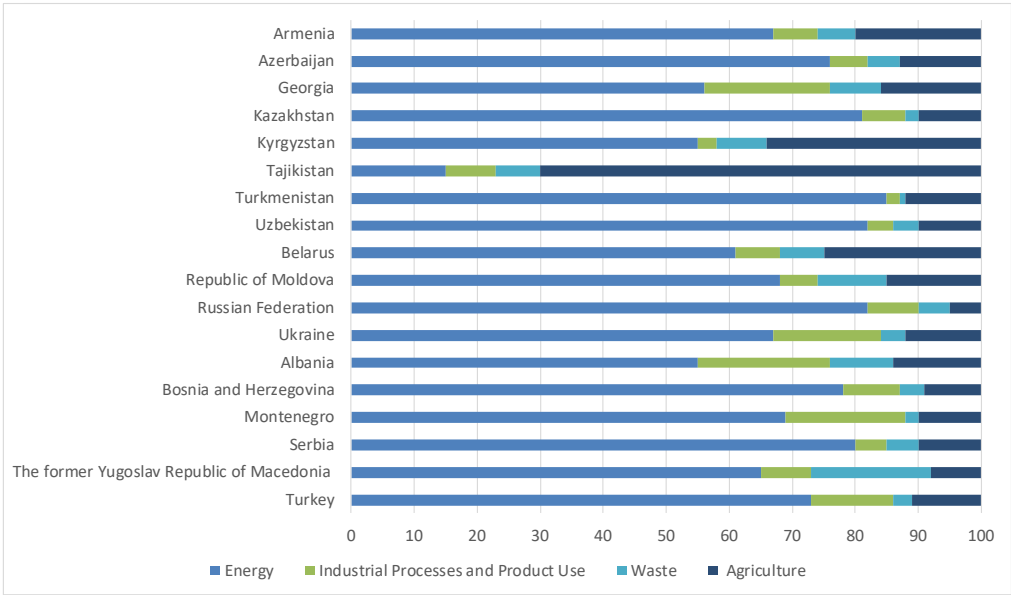


Source: UNFCCC GHGI (http://unfccc.int/resource/cd_roms/na1/ghg_inventories/).

Note: (Country/Year) = Armenia/2014, Azerbaijan/2012, Georgia/2013, Kazakhstan/2016, Kyrgyzstan/2010, Tajikistan/2010, Turkmenistan/2010, Uzbekistan/2012, Belarus/2016, Republic of Moldova/2015, Russian Federation/2016, Ukraine/2016, Albania/2009, Bosnia and Herzegovina/2014, Montenegro/2011, Serbia/2014, The former Yugoslav Republic of Macedonia/2014, Turkey/2016.

Figure 8 below takes a closer look at net GHG emissions without LULUCF by economic sectors in ECA countries. This would be an important point to identify in which sectors a country should reduce GHG emissions.

Figure 8. Net GHG emissions without LULUCF by economic sector in ECA countries (%)



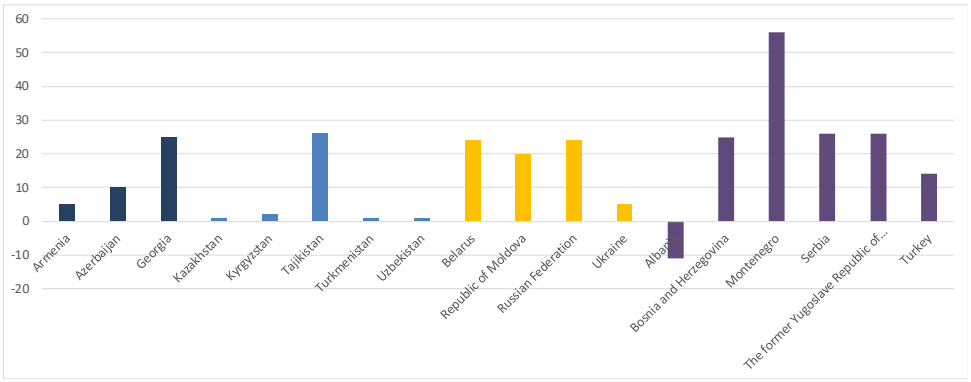
Source: UNFCCC GHGI (http://unfccc.int/resource/cd_roms/na1/ghg_inventories/).

Note: (Country/Year) = Armenia/2014, Azerbaijan/2012, Georgia/2013, Kazakhstan/2016, Kyrgyzstan/2010, Tajikistan/2010, Turkmenistan/2010, Uzbekistan/2012, Belarus/2016, Republic of Moldova/2015, Russian Federation/2016, Ukraine/2016, Albania/2009, Bosnia and Herzegovina/2014, Montenegro/2011, Serbia/2014, The former Yugoslav Republic of Macedonia/2014, Turkey/2016.

Energy is one of the main sources of GHG emissions in most ECA countries. For example, in almost all countries, the energy sector contributed to more than a half of GHG emissions, except Tajikistan, where 70 percent of its emissions originate from agriculture, and – remarkably – in Turkmenistan (85 percent), Kazakhstan (81 percent), Uzbekistan (82 percent), the Russian Federation (82 percent) and Serbia (80 percent). The share of industrial processes and produce use is substantial in Georgia (21 percent), Albania (20 percent) and Ukraine (17 percent). In terms of waste, GHG emissions are highest in Albania (10 percent), Republic of Moldova (11 percent) and The former Yugoslav Republic of Macedonia (19 percent), while GHG emissions from agriculture[7] are highest in Tajikistan (70 percent), relatively high in Belarus (25 percent) and Kyrgyzstan (34 percent), and lowest in the Russian Federation (5 percent), The former Yugoslav Republic of Macedonia (8 percent) and Bosnia and Herzegovina (9 percent).

Figure 9 describes the ratio of absorption by LULUCF in each economy. Bosnia and Herzegovina has more than 50 percent of GHG absorption by LULUCF activities, followed by Tajikistan, Serbia, The former Yugoslav Republic of Macedonia (26 percent) and Georgia (25 percent). The CIS countries, except for Ukraine, also have a large ratio of GHG absorption by LULUCF, with Belarus, the Russian Federation and Republic of Moldova all at 24 percent. Only in Albania is the LULUCF sector a net GHG emitter.

Figure 9. Ratio of absorption by land use, land-use change and forestry (LULUCF) in GHG emissions in ECA countries (%)



Source: UNFCCC GHGI (http://unfccc.int/resource/cd_roms/na1/ghg_inventories/).
Note: (Country/Year) = Armenia/2014, Azerbaijan/2012, Georgia/2013, Kazakhstan/2016, Kyrgyzstan/2010, Tajikistan/2010, Turkmenistan/2010, Uzbekistan/2012, Belarus/2016, Republic of Moldova/2015, Russian Federation/2016, Ukraine/2016, Albania/2009, Bosnia and Herzegovina/2014, Montenegro/2011, Serbia/2014, The former Yugoslav Republic of Macedonia/2014, Turkey/2016.

[7] FAO also analyses NDC in the agricultural sector, which provides a regional synthesis of the current climate change mitigation and adaptation baselines in the agricultural sectors of Southern Europe, Eastern Europe and Central Asia. The main findings and figures can be seen in Annex I. The full report, Regional analysis of the nationally determined contributions of countries in Southern-Eastern Europe and Central Asia – Gaps and opportunities in the agriculture sectors, is forthcoming.

Based on these recent data, Section 2.3 analyses climate-change-related policies and institutions and how they are interlinked to these sectors and activities.

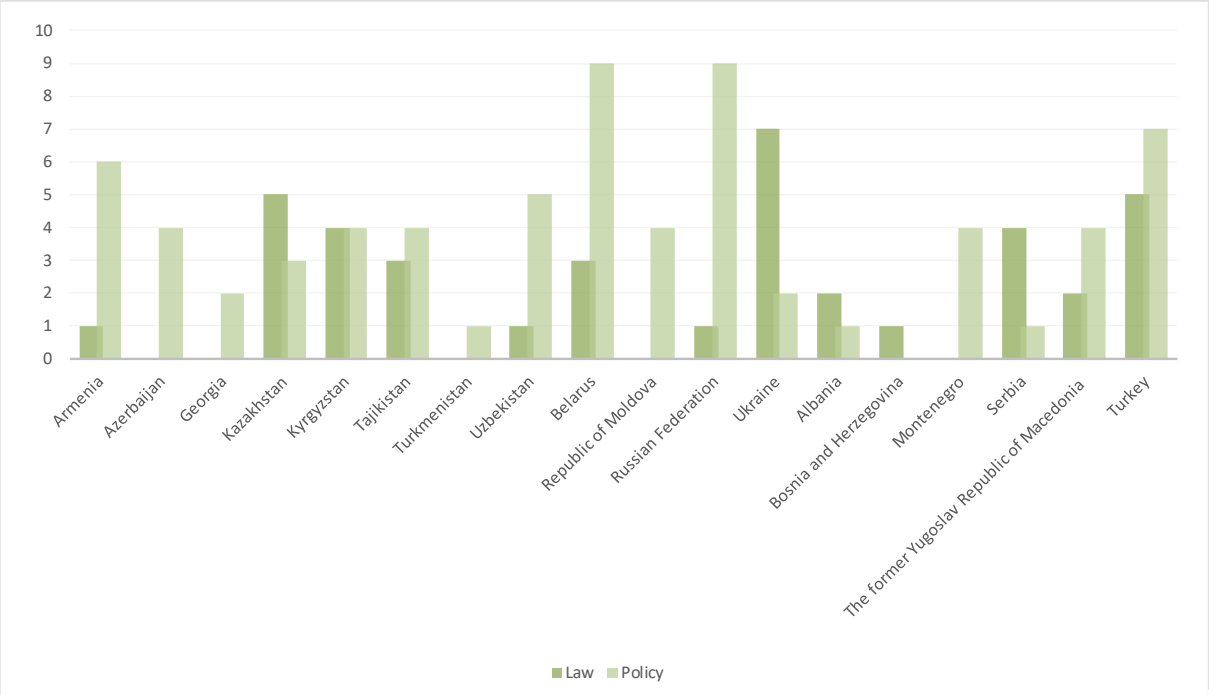
2.3 CLIMATE-CHANGE-RELATED POLICIES AND INSTITUTIONS

Countries are developing and implementing various national planning instruments, such as policies, strategies and action plans, to enforce legal and institutional frameworks as well as to help guide their countries' objectives and goals with regard to climate change. These climate change efforts are undertaken by the ECA countries in order to fulfil their obligations to the Paris Agreement.

Accordingly, all Parties are required to reduce their emissions through the NDCs and to regularly report on their progress and the individual actions they have undertaken. Policies, strategies and action plans aim to translate governments' political vision into programmes and activities to deliver certain outcomes.

This section focuses on the analysis of the legal and policy frameworks established by the ECA countries (Figure 10) to promote low-carbon and climate-resilient growth and build resilience to natural hazards and climate change. Cross-sectoral policy coherence and mainstreaming is reviewed for each country in the ECA region to investigate the extent of coherence in national laws and policies on climate change across mitigation in energy sectors, adaptation and mitigation in agricultural sectors and links to disaster risk reduction/ management (DRR/M).

Figure 10. Climate change laws and policies in the ECA region



Source: FAO, with reference to: Grantham Research Institute on Climate Change and the Environment and Sabin Center for Climate Change Law (2018); and OECD (2016)..

2.3.1 POLICY COHERENCE AND MAINSTREAMING - CLIMATE CHANGE POLICY ANALYSIS

CAUCASUS

Even though Armenia and Azerbaijan do not yet seem to have a climate change policy or strategy, Azerbaijan's climate-related framework focuses on the following areas: greenhouse gas inventory; vulnerability and adaptation; and GHG mitigation and carbon financing (OECD, 2016). In addition, the State Programme for the socioeconomic development of the regions of Azerbaijan for the period 2014–2018 and Azerbaijan 2020: Look into the future development concept refer to alternative and renewable energy sources, and low-carbon production is considered a priority. However, climate change is only referred to in relation to natural hazards and the adverse impacts these can cause to people, their lives and the economy. Promoting the use of alternative (renewable) energy sources and energy efficiency is merely included within the context of economic development and increasing the efficiency of the country's natural and economic resources.

Georgia is the only country that has developed and approved its Climate change strategy (2014), which is integrated in its third national communication report to the UNFCCC (2015a). Its main aim is to identify feasible ways to reduce the vulnerability of ecosystems and GHG emissions from the various emitting sectors. Its short-term strategy goals include the integration of climate change impacts in the national development plans and concepts, and the establishment of its national adaptation programme of action and low emission development strategy.

Agricultural activities are included, primarily with regard to assessing the impact of climate change on the sector, its land resources and forests. It also mentions the need to design and establish DRR strategies for arid areas, in collaboration with the local authorities and farmers, as well as recommendations for the highland regions, such as the establishment of an effective early warning system, an enhanced institutional coordination mechanism for all stakeholders involved and the identification of effective prevention and mitigation measures. The strategy also outlines: the reduction of forest degradation; monitoring of forest change trends within the context of forest carbon sinks; and increasing energy efficiency for oil products for agricultural transport and in irrigation systems. The latter is expected to result in an emission reduction of 2 tonnes of CO2 by 2030 compared with business as usual (BAU). In addition, Georgia is actively involved in the preparation and implementation of projects for nationally appropriate mitigation actions (NAMA), such as its first project focused on sustainable forest management with the objective of planting 40 ha of forest, which would annually absorb approximately 8 706 tonnes of CO2.

Georgia is also the only Caucasus country with a climate change adaptation action plan that also focuses specifically on agriculture. Its Climate change national adaptation plan for Georgia's agricultural sector (initiated by the Ministry of Agriculture within the "Agriculture modernization, market access and resilience" project) is currently being implemented with support from the International Fund for Agricultural Development (IFAD) and the Global Environment Facility (GEF) with the objective of supporting farmers to reduce climate-change-related risks, increase their incomes and thus their resilience to climate change, via the upgrading of climate-proof productive infrastructure and production systems to encourage inclusive growth of climate-smart agricultural value chains. In addition, some climate change adaptation strategies for certain regions in Georgia were developed separately or as part of the second and third national communication reports, including for the Lentekhi region, the Autonomous Republic of Adjara, and the Kakheti and Upper Svaneti regions.

CENTRAL ASIA

Climate change is mainstreamed in various policy documents and strategies in the Central Asian countries. In all countries, the emphasis is on energy efficiency improvement and low carbon growth; some countries also focus on mitigation and adaptation to climate change – an indirect reflection of the importance of certain sectors to the economy.

Mitigation and adaptation measures for the agricultural sector have been identified in Kazakhstan's law on introducing amendments and addenda to some legislative acts of Kazakhstan on the transition to green economy ("Law on the transition to green economy") – a key driving force to promote green transition in the country. The law aims to achieve rational use of agrochemicals and fuels that protect users, minimize harm to the environment, and reduce contamination of soil, air and water through the use of integrated plant protection from pests, the use of fertilizers based on the results of soil research and fuel efficiency of agricultural equipment. It also refers to application of CO2 capture by planting permanent crops, such as agro-amelioration plants, tree crops, perennial crops and permanent crops resistant to soil salinity.

In direct relation to mitigation measures for the energy sector, this law is expected to supplement the existing law on supporting the use of renewable energy sources, with amendments further supporting renewable electricity, the creation of a renewable energy reserve fund, and the improvement of mechanisms to connect renewable sources to the national electric grid. This effort has been supported by other legal frameworks, such as the laws on energy savings and about support of use of renewable sources of energy.

Climate change adaptation for the agricultural sector has been identified in various policy documents, such as Priorities for adaptation to climate change in the Kyrgyz Republic till 2017 (updated to 2020) and Programme on adaptation to climate change of agriculture and water resources for 2016–2020. As part of an optimization strategy to ensure that agricultural production is more climate resilient, the focus is on the following: specialization of agricultural production; selection for growing drought-resistant and salt-tolerant crops; introduction and strict observance of pasture rotation; development of pasture livestock; monitoring system improvement for food security, including crop yield forecasting.

In addition, Priorities for adaptation to climate change in the Kyrgyz Republic till 2017 (updated to 2020) underlines how important it is that Kyrgyzstan reduce the risks of climate emergencies through: improving its climate monitoring system and forecasting of extreme weather events (e.g. landslide, avalanche, mudflow); improving its early warning system in order to minimize loss of life and economic losses; developing a weather and climate risk insurance system; and developing the prevention capacities of the public, and of medical and social institutions. Some of these points are also described in the Climate change adaptation programme and action plan for 2015–2017 for the forest and biodiversity sector as an increased risk of natural hazards due to the increase in extreme weather events as a result of climate change and the weakening of forest functions. As in other countries, mitigation measures for energy are described in the National sustainable development strategy for the Kyrgyz Republic and supported by several legal mechanisms on energy efficiency and renewable energy sources.

Tajikistan's climate change laws and policies are comprehensive and cover all aspects, including mitigation measures for the energy sector, mitigation and adaptation measures for the agricultural sector, and disaster risk reduction/management (DRR/M) linkages to climate change adaptation, in particular in its National action plan for climate change mitigation. Although the action plan was adopted almost 15 years ago, it already indicated the need to develop

renewable energies (e.g. solar, wind, biogas and hydropower) in the country. This action plan also supported GHG emissions reduction through, for example: improvement of practices in the cattle breeding industry, rational feeding and regulation of the number of animals; use of agricultural biomass for energy generation and the recuperation of CH4 from manure; enhancement of rice cultivation technology; optimization of agricultural crops location combined with improvement of methods and norms of mineral and organic fertilizers application; and training of farmers on usage of new methods and technologies. It also referred to risk reduction of natural hazards for food security and included agriculture-related adaptation measures, such as crop rotation, agrotechnical development of forecasting, land and forest rehabilitation measures, and soil conservation practices to reduce drought, water and wind erosion.

Turkmenistan has a climate change policy, National climate change strategy of Turkmenistan, which covers mitigation measures for the energy sector and adaptation measures for the agricultural sector. The largest volumes of GHG emissions originate from the process of fuel production and combustion; therefore, energy efficiency and energy saving, sustainable utilization of natural gas and oil products and increased use of alternative sources of energy constitute the main priorities of the policy oriented towards reduction of GHG emissions. An adaptation package within the framework of this climate change strategy includes optimization of the spacing/allocation/distribution of agricultural production facilities; specialization of agricultural production; selection to breed drought-resistant and salt-resistant crops; and phytomelioration work.

At present, Uzbekistan does not have a focused and overarching climate change policy document providing a strategic framework for national climate change adaptation and mitigation actions (OECD, 2016). However, mitigation measures for the energy sectors have been outlined in policy documents regarding, for example: energy saving technologies and tools in the presidential decree on the programme of measures to reduce energy consumption, implement energy-saving technologies in the fields of economy and social sphere for 2015–2019; and renewable energy development (solar and biogas) in the resolution about measures for further development of alternative energy sources.

CIS

CIS countries have the largest number of climate change laws and policies per country, compared with other subregions; the main focus, with some exceptions, is on mitigation measures for the energy sector.

In Belarus, a recent climate change policy is the National programme on climate change mitigation measures for 2013–2020, which aims to implement measures to mitigate the effects of climate change, while unlocking the country's potential for sustainable development. Mitigation measures for the energy sector include: reductions in GHG emissions from the sector; use of energy-efficient lighting devices in design/operation of buildings and structures; resource-saving technologies in the production of metals and alloys; and use of renewable energy and adoption of innovative technologies for utilization of CH4 and biogas production. Mitigation measures for the agricultural sector are also described in the document, for example, improvement of waste management and optimization of work in agriculture and forestry.

The Russian Federation's main climate change document is the Climate doctrine of the Russian Federation. The doctrine was created by experts from relevant ministries and departments, in particular the Federal Service for Hydrometeorology and Environmental Monitoring of Russia and the Russian Academy of Sciences, and it has been recognized as the basic document for policy formulation with regard to political and economic decisions as well as sustainable development both internally and externally. The document describes the expected negative effects of climate change in the country, such as increased health risks (higher morbidity and death rates) among certain social groups, increased recurrence, intensity and duration of droughts in some regions, and extreme precipitation patterns (floods and soil saturation), which adversely impact agriculture. Although this doctrine refers to the importance of climate change adaptation in the agricultural sector, there are no concrete measures and action plans outlined. Rather, GHG emissions from the energy industry – the largest emitter of GHG in the country – and the application of energy efficiency and saving technologies in the process of production, processing and transportation are emphasized among the top priorities with regard to climate change mitigation, as supported by other climate change documents (e.g. State program on energy efficiency and energy development, and Energy strategy to 2030).

In Ukraine, various laws and policy documents on climate change have a strong focus on mitigation measures for the energy sectors, and most mention the decrease in energy intensity and renewable energy development in the country (as in other countries in the REU region). Ukraine's energy strategy (Energy strategy to 2030) emphasizes the importance of creating favourable conditions for meeting energy demand, increasing energy security, integrating Ukraine's energy system into the European energy system, and strengthening its position as an oil and gas transit nation by attracting the required investments for its energy sector. However, the linkages with the agricultural sectors and DRR/M are not clearly indicated in the documents.

In contrast, Republic of Moldova's National strategy on agriculture and rural development for the period 2014–2020 identifies adaptation measures for the agricultural sector and DRR/M linkages to climate change in the country. One of the strategic objectives is to "ensure sustainable management of natural resources in agriculture – support to adaptation

and mitigation of climate challenges effects on agricultural production",[8] which describes the required risk management tools, including agricultural insurance in order to mitigate the negative consequences of climate risks and the negative effects of natural disasters on agricultural production. As in other countries in the region, energy efficiency issues within the context of climate change are covered by the National program for energy efficiency 2011–2020.

SOUTHEASTERN EUROPE

National climate change strategies are currently absent in Albania and in The former Yugoslav Republic of Macedonia, although the Albanian Government is planning to finalize a new draft law on climate change in 2018, which will act as the legal foundation for establishing a climate change framework with clear responsibilities for all relevant ministries. In addition, the Ministry of Infrastructure and Energy aims to develop and adopt an integrated energy and climate plan in 2019. Other countries, including Bosnia and Herzegovina, Montenegro, Serbia and Turkey have extensive policy landscapes with regard to climate change and climate change adaptation.

Bosnia and Herzegovina's Climate change adaptation and low emissions development strategy (2014) addresses climate change mitigation and adaptation. The strategy advocates for climate risk management and assessment for agricultural production and food security, thereby linking climate change and DRR. It consists of a climate change adaptation and mitigation component, where agriculture, including crops, livestock and forestry, is identified as a priority sector.

Montenegro's National strategy with action plan for the transposition, implementation and enforcement of EU Acquis on environment and climate change 2016–2020 is mainly about the alignment of its policies with EU regulations. It is mentioned that there is the need to establish a legal basis for the biofuels market and the monitoring of CO2 from biofuels; in addition, there is reference to related national legislation, such as the new draft "Law on environment", which establishes the obligation to adopt the low carbon strategy and the national climate change adaptation plan as well as the inclusion of a national strategy on climate change until 2030. However, it is not clear whether these have already been developed and adopted.

Serbia initiated a national climate change strategy in 2016, with the collaboration and financial support of the EU, but it has not yet been adopted. The strategy's main aim is to define, every five years, a long-term framework to address climate change and identify activities to achieve this goal for the period 2020–2050, in addition to emission reduction projections until 2070, thereby ensuring the fulfilment of the Paris Agreement. Its National sustainable development strategy of the Republic of Serbia (2008) and its Action plan for 2009–2017 emphasize the interagency work required to reduce GHG emissions.

Turkey, has a National climate change strategy document 2010–2020, which includes mitigation, compliance, financing and technology policies, and a National climate change action plan 2011–2023, which incorporates the policies and measures for GHG reduction in line with the ninth development plan and the climate change strategy. The action plan provides actions for the control of GHG emissions and compliance studies within the context of the strategy.

With regard to adaptation and in particular ensuring that agriculture is prioritized, the Government of The former Yugoslav Republic of Macedonia is still preparing a national agriculture adaptation strategy, while Serbia has established its First national adaptation plan. The United Nations Development Programme (UNDP) is currently working on a new National Adaptation Plan through the Green Climate Fund (GCF); it outlines agriculture mitigation measures with regard to sustainable soil and forest management, including the control of fires.

Turkey has already developed the National climate change adaptation strategy and action plan 2011–2023. It includes the agricultural sector, with forestry and food security among the priority sectors. It also prioritizes natural disaster risk management, acknowledging the linkages between climate change adaptation (CCA) and DRR for agriculture and food security, as in Turkey's combating agricultural drought strategy and action plan 2008–2012.

EU-28

The EU-28 countries are taking action collectively as well as per country to reduce its GHG emissions progressively up to 2050, by cutting emissions, enhance its energy efficiency and increase the use of renewable energy. Different legislation and policy frameworks and strategies have been adopted by the EU countries. For instance, the 2020 Climate and Energy Package (2009), is a set of binding legal framework to make sure that the EU meets its climate and energy targets for 2020, which is aligned with the Europe 2020 Strategy, where key priorities include smart, sustainable and inclusive growth. Furthermore, a 2030 Climate and Energy Framework was established with as key targets for 2030:

- At least 40 percent reductions in GHG emissions compared to 1990 levels;
- At least 27 percent share for renewable energy;
- At least 27 percent enhancement in energy efficiency

The EU Strategy on Adaptation to Climate Change, adopted in 2013 by the European Commission, strives to make Europe more climate-resilient. Its three key objectives include:

- Promoting action by its Member States, through adopting comprehensive adaptation strategies (at present there are 22 strategies[9]) and supporting with financial resources to enhance countries' adaptation capacities and activities;

[8] In this document, mitigation refers not to GHG emissions, but to weather-related risk mitigation instruments, including limited access to irrigation, and a low rate of adoption of modern agronomic practices and technologies.

[9] See the European Climate Adaptation Platform (Climate-ADAPT): https://climate-adapt.eea.europa.eu/countries-regions/countries

- 'Climate-proofing' action at EU Level, via e.g. encouraging adaptation in key vulnerable sectors, such as agriculture and fisheries, as well as ensuring more resilient infrastructure and stimulating the use of insurance against natural and man-made disasters;
- Better informed decision-making, through addressing knowledge gaps regarding adaptation and further advancing the European climate adaptation platform (Climate-ADAPT).

As part of action 1 to adopt comprehensive adaptation strategies, the Commission will support adaptation, especially in the vulnerable areas, relevant to agriculture and natural resources management, of:

- transboundary flood management, encouraging collaborative agreements based on the EU Floods Directive;
- cross-border coastal management, with a focus on densely populated deltas and coastal cities;
- integrating adaptation into urban land use planning and natural resources management;
- mountain and island areas, with a stress on sustainable and resilient agricultural, forestry and tourism sectors;
- sustainable water management;
- combating desertification and forest fires in drought-prone areas.

Besides the adaptation strategies, the Commission will promote the establishment of (transboundary) vulnerability assessments as well as encourage awareness raising on adaptation, including indicators, risk communication and management. Additional commission staff working documents established in 2013, include a technical guidance on integrating climate change adaptation in programmes and investments of cohesive policy for the 2014-2020 period; Principles and recommendations for integrating climate change adaptation considerations under the 2014-2020 rural development programmes; Climate change adaptation, marine and coastal issues; Adapting to climate change impacts on human, animal and plant health

EFTA

Iceland, Liechtenstein and Switzerland have adopted climate change strategies and policies. Liechtenstein's national climate strategy entitled Climate protection strategy was launched in 2007. It is the country's core climate policy and is highly integrated in sectoral policies, including energy, agriculture, forestry and environment (Office of Environment, 2014). According to the 2015 INDC, the Liechtenstein Government plans to revise its climate-change strategy in 2015/16 to focus on the coordination of climate-relevant measures within its sectoral policies.

Iceland's Climate change strategy of 2007 is the third adopted by the country with regard to climate change and it is a framework for action. One of its five principal objectives is related to agriculture as the Government intends to enhance carbon sequestration from the atmosphere through afforestation, revegetation, wetland reclamation and changed land use. Besides mitigation, another principal objective is preparation for climate change adaptation. The strategy states, for example, that there is limited potential for the fishing industry to reduce emissions from its fishing vessels as the catch quota already provides an incentive to minimize expenses including fuel use. However, measures to reduce energy consumption and emissions include the Government's support for research and development projects on fuel savings and GHG emissions from fish processing, use of climate-friendly energy sources for fishing vessels, energy-saving fishing equipment and the potential replacement of HFCs with ammonia in refrigeration systems. For agriculture, measures are mainly related to assessing the potential for emission reduction from conventional agriculture as it is currently uncertain to what extent this is possible, for example, from livestock and fertilizer. Moreover, until 2004 emissions from agriculture had been considered fairly low, but a correction in calculation methods changed the perspective. Changes in land use are considered one way to reduce emissions and enhance sequestration, but more research is required.

Switzerland recently published its Climate policy, within the context of the implementation of the Paris Agreement, in which it states that it aims to reduce its national GHG emissions by 20 percent by 2020 compared with 1990 levels. As the CO2 Act is the current basis of Swiss climate policy, agriculture is not targeted as a climate-relevant sector.

Liechtenstein is currently developing a national adaptation strategy, with an action plan for sectors including water management, forestry, agriculture, energy, biodiversity management, natural hazards prevention, health, tourism and spatial planning, for which adaptation measures will be identified (EEA, 2016b).

Switzerland's national adaptation strategy entitled Adaptation to climate change in Switzerland was adopted in March 2012. It consists of two parts: the first focuses on the sectors most important for undertaking climate change adaptation action, such as water management, agriculture, forestry, natural hazard management, energy, tourism, biodiversity management, health and spatial development; the second is a plan of action for the 2014–2019 period, established in 2014. Linkages between disaster risk reduction and climate change adaptation are acknowledged; specifically for agriculture, risk prevention and reduction of damage and losses are cited, for example, use of risk analysis, adoption of fire-fighting services of the civil protection forces and development of a new and cost-effective insurance for farmers to reduce losses caused by drought. For adaptation, the soil and water management practices described include crop rotation, reduction of soil compaction and irrigation, as well as use of drought-resistant varieties, adoption of measures to reduce heat stress (e.g. shading, cooling), breeding, and prevention and control of pests and diseases.

Norway's White paper on climate change adaptation provides a framework for adaptation across different sectors and at various governmental levels. For effective adaptation, knowledge is considered essential to undertake future

climate projections; therefore, the Government plans to conduct regular assessments of vulnerability and adaptation needs (Grantham Research Institute on Climate Change and the Environment and Sabin Center for Climate Change Law, 2018). This is also reflected in the objectives of Norway's climate change adaptation plan, specifically, enhancing knowledge on climate change (objective 2), assessing the country's vulnerability and mainstream climate change into development planning (objective 1) and promoting coordination, information and capacity development (objective 3). The positive and negative impacts that climate change can have on Norway's agriculture, food production and forestry are mentioned: growing seasons might be prolonged and more carbon sequestration may occur; on the other hand, new pests and diseases may spread on plants and animals, requiring adjusted measures. Specific examples of these measures are not included, but the importance is stated of systematically establishing a monitoring and management system for agriculture research and for forestry to assess the design and implementation of long-term monitoring programmes and emergency preparedness plans for climate-related damage and losses.

Table 8. Climate change policy, strategy or plan and its reference to relevant issues in the ECA

COUNTRY	CLIMATE CHANGE LAWS AND POLICIES			
	MITIGATION MEASURES FOR ENERGY SECTOR IDENTIFIED	MITIGATION MEASURES FOR AGRICULTURAL SECTOR IDENTIFIED	ADAPTATION MEASURES FOR AGRICULTURAL SECTOR IDENTIFIED	DRR/M LINKAGES TO CC/CCA ACKNOWLEDGED
CAUCASUS				
Armenia	✓	-	✓	-
Azerbaijan	✓	-	-	-
Georgia	✓	✓	✓	✓
CENTRAL ASIA				
Kazakhstan	✓	✓	✓	-
Kyrgyzstan	✓	-	✓	✓
Tajikistan	✓	✓	✓	✓
Turkmenistan	✓	-	✓	-
Uzbekistan	✓	-	-	-
CIS				
Belarus	✓	✓	-	-
Republic of Moldova	✓	-	✓	✓
Russian Federation	✓	-	-	-
Ukraine	✓	-	-	-
SEE				
Albania	✓	-	-	-
Bosnia and Herzegovina	✓	-	✓	✓
Montenegro	✓	✓	✓	-
Serbia	✓	-	-	✓
The former Yugoslav Republic Macedonia	✓	-	-	-
Turkey	✓	✓	✓	✓
EU AND EFTA				
EU-28	✓	✓	✓	✓
EFTA				
Iceland	✓	✓	✓	-
Liechtenstein	✓	✓	-	-
Norway	-	-	-	-
Switzerland	✓	✓	-	✓

Source: Source: Compiled from various national policy reports (see Annex 2).

2.3.2 INSTITUTIONAL COORDINATION AND CAPACITY

Climate change is expected to adversely impact various sectors: in addition to the climate-sensitive agricultural sector, infrastructure, buildings, transport, energy, environment and health are among others likely to be affected. Since climate change is a cross-cutting issue, all relevant stakeholders need to have specific roles and responsibilities, which are often outlined in the national policy instruments, as analysed in the previous section. However, institutional coordination and capacity is very important to ensure not only that climate change is a priority on governments' agendas, but that longer-term cross-sectoral planning is encouraged so as to foster greater national policy coherence and integrated planning. Table 9 provides an overview of the various institutions that act as focal points for different areas, including national climate change policy, responsibilities with regard to the UNFCCC, national GHG inventory and projections, and the GCF.

Table 9. Overview of national focal points for climate change policy, UNFCCC, national GHG inventory and GCF in the ECA region

COUNTRY	POLICY LEADERSHIP	UNFCCC FOCAL POINT	NATIONAL GHG INVENTORY AND PROJECTIONS FOCAL POINT	GCF NATIONAL DESIGNATED AUTHORITY FOCAL POINT
CAUCASUS				
Armenia	Inter-Agency Coordination Council on UNFCCC	Ministry of Nature Protection	Ministry of Nature Protection	Ministry of Nature Protection
Azerbaijan	Ministry of Ecology and Natural Resources	Ministry of Ecology and Natural Resources	Division for Greenhouse Inventory of the Climate Change and Ozone Centre, Ministry of Ecology and Natural Resources	Ministry of Ecology and Natural Resources
Georgia	Ministry of Environmental Protection and Agriculture	Ministry of Environmental Protection and Agriculture	Ministry of Environmental Protection and Agriculture	Ministry of Environmental Protection and Agriculture
CENTRAL ASIA				
Kazakhstan	Green Economy Council under the President, Ministry of Energy	Ministry of Energy	Climate Change Department, Ministry of Energy	Ministry of Energy
Kyrgyzstan	Coordination Commission on Climate Change	State Agency on Environmental Protection and Forestry	Climate Change Centre	State Agency on Environmental Protection and Forestry
Tajikistan	Executive Office of the President, Committee for Environmental Protection	State Administration for Hydrometeorology; Committee for Environmental Protection	Committee for Environmental Protection	Committee for Environmental Protection
Turkmenistan	President, the Cabinet of Ministers and Ministry of Nature Protection	State Committee on Environment Protection and Land Resources	State Committee on Environment Protection and Land Resources	Ministry of Nature Protection
Uzbekistan	Shared responsibilities between Uzbek Hydrometeorological Service; Ministry of Economy and the Uzbek State Committee for Nature	Hydrometeorological Service	Hydrometeorological Service	Centre of Hydrometeorological Service at the Cabinet of Ministers of Republic of Uzbekistan
CIS				
Belarus	State Commission on Climate Change, Ministry of Natural Resources and Environmental Protection	Ministry of Natural Resources and Environmental Protection	Ministry of Natural Resources and Environmental Protection	–
Republic of Moldova	Climate Change Office, Ministry of Agriculture, Regional Development and Environment	Ministry of Agriculture, Regional Development and Environment	Ministry of Agriculture, Regional Development and Environment	Ministry of Agriculture, Regional Development and Environment
Russian Federation	Working Group under the supervision of President's advisor and special envoy	Russian Federal Service for Hydrometeorology and Environmental Monitoring	Department of International Cooperation, Ministry of Natural Resources and Environment	–
Ukraine	–	Ministry of Ecology and Natural Resources	–	–
SEE				
Albania	Ministry of Tourism and Environment	Ministry of Tourism and Environment	Ministry of Tourism and Environment	Ministry of Tourism and Environment
Bosnia and Herzegovina	Ministry of Foreign Trade and Economic Relations	Ministry of Planning, Civil Engineering and Ecology	Ministry of Foreign Trade and Economic Relations	Ministry of Physical Planning, Civil Engineering and Ecology
Montenegro	Directorate for Climate Change, Ministry of Sustainable Development and Tourism	Ministry of Sustainable Development and Tourism; Ministry of Foreign Affairs	Environmental Protection Agency	Ministry of Sustainable Development and Tourism

COUNTRY	POLICY LEADERSHIP	UNFCCC FOCAL POINT	NATIONAL GHG INVENTORY AND PROJECTIONS FOCAL POINT	GCF NATIONAL DESIGNATED AUTHORITY FOCAL POINT
Serbia	Climate Change Committee, Ministry of Environmental Protection	Ministry of Environmental Protection	Ministry of Environmental Protection	Ministry of Agriculture, Forestry and Water Management
The former Yugoslav Republic Macedonia	-	Ministry of Environment and Physical Planning	-	-
Turkey	Coordination Board on Climate Change, Ministry of Environment and Urbanization	Ministry of Environment and Urbanization	Turkish Statistical Institute	-
EU AND EFTA				
EU-28	European Commission (EC)	European Commission (EC)	European Commission (EC)	-
EFTA				
Iceland	Ministry for the Environment and Natural Resources	Ministry for the Environment and Natural Resources	Environment Agency of Iceland	-
Liechtenstein	Ministry of Environment; Office of Environment	Office of Environment	Office of Environment	-
Norway	Ministry of Climate and Environment	Ministry of Climate and Environment	Norwegian Environment Agency	-
Switzerland	Swiss Federal Office for the Environment	Swiss Federal Office for the Environment	Swiss Federal Office for the Environment	-

Sources: ZOI (2015); GCF (2018) ; UNFCCC, 2018 (https://unfccc.int/process/parties-non-party-stakeholders/parties/national-focal-point).

Due to the cross-sectoral nature of climate change, there a substantial number of different national stakeholders. In general, as is apparent in Table 9, climate change is the responsibility of the Ministry of Environment and there is usually a separate Ministry of Agriculture. There are exceptions in Georgia and Republic of Moldova, where environment and agriculture fall under one ministry. In some of the Central Asian countries, the Ministry of Energy is in charge, whereas in Tajikistan and Uzbekistan the hydrometeorological service is involved. The institutional structure for climate change can be complex, as different sectors at the various levels – national, regional/provincial and district/community – are involved. In order to effectively and efficiently implement climate-change-related activities, adequate institutional coordination is required.

The institutional landscape of actors can be quite substantial and complex; for example, Bosnia and Herzegovina consists of two entities, Republika Srpska and the Federation of Bosnia and Herzegovina (the latter further subdivided into ten cantons), and Brčko District. These two entities and Brčko District are responsible for managing environmental issues through laws, regulations and standards. The Ministry of Planning, Civil Engineering and Ecology is the focal point for the UNFCCC and the GCF. The Ministry of Foreign Trade and Economic Relations of Bosnia and Herzegovina is a state-level ministry in charge of coordinating activities as well as harmonizing plans of the entities' governmental institutions with regard to energy, environmental protection, agriculture, development and exploitation of natural resources, as well as climate change (adaptation) throughout the country. In addition, other relevant organizations include the Federal Ministry for Environment and Tourism and the entity ministries of Agriculture, Forestry and Water Management (Republika Srpska Ministry of Agriculture, Forestry and Water Management and Federal Ministry of Agriculture, Water Management and Forestry), as well as non-state actors, including international organizations and donors, non-governmental organizations (NGOs), such as associations of municipalities, chambers of commerce and civil society, and also the private sector, universities and research institutes.

Several countries have a dedicated governmental body in charge of climate change coordination for the implementation of the Convention and Protocol. For example, the Serbian Ministry of Environmental Protection is the national focal point and coordinator for the implementation of the Convention and Protocol as well as developing the national communication reports in collaboration with the other relevant ministries and organizations. In Armenia, the Ministry of Nature Protection is the designated national authority for all issues related to the UNFCCC and to ensure that the country fulfils all its obligations under the Convention.

In some countries, this coordination body for all issues related to the Convention is in charge of facilitating interinstitutional coordination as well as policies, measures and activities related to climate change and comprises all relevant stakeholders. Turkey, for example, underwent an institutional restructuring in 2001 and established the Coordination Board on Climate Change. As soon as Turkey become a Party to the Convention, the Board was restructured in 2004 and expanded with additional members in 2010. At present, it consists of the following members: Ministry of Science, Industry and Technology; Ministry of Environment and Urbanization (Coordinator); Ministry of Foreign Affairs: Ministry of Economy; Ministry of Energy and Natural Resources; Ministry of Food, Agriculture and Livestock; Ministry of Development; Ministry of Finance; Ministry of Forestry and Water Works; Ministry

of Health; Ministry of Transportation, Maritime Affairs and Communication; Under Secretariat of Treasury; Turkish Union of Chambers and Commodity Exchanges; and Turkish Industry and Business Association.

In some ECA countries, different institutions are involved and responsible for different tasks related to the implementation of climate change issues. In Serbia, a separate body, the Climate Change Committee, was established in 2014 to help oversee and monitor all relevant policies. The Committee includes all relevant representatives from ministries, governmental institutions, universities and research institutions in Serbia. The same is in the case in Kyrgyzstan, where the State Agency on Environmental Protection and Forestry is the national focal point for the UNFCCC, while the Climate Change Coordination Commission, established in 2012 and chaired by the vice prime minister, is responsible for ensuring multisector coordination of all climate-related activities in the country. In Montenegro, the Directorate for Climate Change of the Ministry of Sustainable Development and Tourism has core responsibilities with regard to climate change policies and regulations, while the national GHG emission inventory is prepared and maintained by the Environmental Protection Agency, which also implements climate change legislation.

Several governments in the ECA region indicated in their climate change strategies, policies and/or plans the importance of enhancing institutional coordination and capacity to adequately address the impacts of climate change on their economic sectors. One of the four identified priorities in the Climate change adaptation and low emission development strategy for Bosnia and Herzegovina is "effective institutions and regulatory frameworks", and the formulated outcome is "an effective institutional and regulatory framework supporting adaptation, coupled with delivery capacity, is addressing climate change risks and opportunities across sectors" (Radusin et al., 2014, p. 43). Enhancing institutional coordination and capacity is a priority, given the substantial challenges with regard to the existing capacities of government institutions and their ability to further develop as well as implement adaptation strategies, plans and programmes. This strategy outlines the need for a strong institutional policy and legislative framework for climate risk management in order to support sectoral and horizontal activities, capacity building and innovation. This framework should link institutions and clearly identify their roles, responsibilities, mandates and partnerships as well as enhancing their delivery capacities. Coordination between the Ministry of Foreign Trade and Economic Relations and the entity ministries needs to be strengthened, as does coordination among ministries for climate change.

The importance of interinstitutional coordination is also valued in Georgia's Climate change strategy, which mentions the need to enhance the national capacity for implementing the Convention and addressing climate change issues. It outlines various options, such as: establishing a coordination council/committee on climate change and expanding the existing Low Emission Development Strategy Committee as a relevant authority; setting up the Legal Entity of Public Law for the Ministry of Environment and Natural Resources to implement the UNFCCC and building up its technical capacity; and setting up a permanent national team to undertake the GHG inventory and the development of reports.

The National climate change strategy of Turkmenistan addresses climate change collectively as a society; it promotes innovative technologies, transfer of technology, scientific and technological progress in order to find a solution. As a result, identified priority areas include: enhancing the legal and institutional framework; developing financial instruments to encourage GHG emission reduction; establishing a national system for monitoring GHG emissions; and establishing information instruments to raise society's awareness of the scale of the issue as well as the impacts it may have on people's lives, the economy and the environment. The strategy specifically emphasizes the need for an intersectoral and interdisciplinary coordination mechanism, involving line ministries and other governmental bodies to improve intersectoral communication and coordination at all levels.

Azerbaijan acknowledges the challenges related to tackling climate change, given the shortage of national climate change specialists due to limited resources (e.g. lack of facilities, qualified staff, equipment and financial resources), the lack of scientific assessments and studies, the limited coordination and exchange of information among projects and programmes, and the relatively low awareness on climate change among decision makers, the private sector and the general public. With regard to forestry, it plans to address these institutional and technical capacity issues by mainstreaming them into forest management decisions and interventions, through institutional capacity enhancement (including promotion of forestry and research-related education opportunities and training of professional staff in relevant departments) and by conducting scientific research and exchanging findings with relevant international institutions and programmes on, for example, the assessment and increase of carbon storage volumes of the forests. Azerbaijan's Ministry of Agriculture is in charge of its agricultural policy development, regulating the economic activities in the sector with the aim of enhancing production capacity as well as playing a key role in increasing the climate resilience of the sector (OECD, 2016).

Kyrgyzstan includes enhancement of the legal and institutional framework and cross-sectoral integration among its primary adaptation activities. With regard to forestry, the system has vertical subordination and covers various levels: republican (Department of Forest Ecosystems and Protected Areas, Department of Forest Management); regional (territorial departments of the State Agency for Environmental Protection and Forestry); and local (approximately 50 forest enterprises or forest districts). As a result of this structure, enhancing and strengthening interagency cooperation and exchange of information on the monitoring of forest resources and biodiversity in a changing climate is very

important, as is the mechanism to involve the public and communities in planning and decision-making for the conservation and sustainable use of natural resources. This requires the awareness raising and capacity building of all relevant stakeholders, and Kyrgyzstan aims to achieve this through development of a professional training programme, regional awareness plans and campaigns. The Government has outlined expected results, responsible organizations (including potential international organizations) and specific timelines; however, cost estimates are not included, except for the identification of potential sources of funding.

Although Belarus does not mention the adaptation of its agricultural sector to climate change, establishment of the institutional framework is a prioritized area to be addressed. To promote organic farming, this includes, for example: establishment of relevant legislation; development of state programmes; development of training programmes for secondary and tertiary education; encouragement of scientific research; and setting up of a certification system and awareness raising campaigns for farmers and the general public, as well as an insurance programme to reduce agricultural-production-related risks and an institutional framework for involvement of international companies in reinsurance. In order to implement this, interaction among key agencies is required, including: the Ministry of Natural Resources and Environmental Protection, in charge of development and implementation of climate change policy, and the Ministry of Agriculture and Food, responsible for strategic and practical issues regarding development of the state's agro-industrial complex. Other national agencies that should be involved include the Ministry of Economy, Ministry of Forestry, Ministry of Emergency Situations, Ministry of Energy and the State Property Committee, as well as relevant territorial units of local organizations, such as oblast natural resources and environmental protection committees, agriculture and food committees, representatives of local authorities, private sector, (international) NGOs and agricultural producer organizations. Strengthening of research and development activities is very important for reducing the adverse impact on agriculture through: monitoring climate change and extreme weather events; analysing surface/groundwater and soil conditions; conducting applied research on ways to reduce emissions in agriculture, enhance productivity and increase resilience; and improving access to innovative technologies and (hydrometeorological) information and advice for smallholder farmers.

Georgia aims to promote the climate-smart agriculture (CSA) approach, endorsing CSA practices and technologies and strengthening the capacity of the Ministry of Agriculture staff and the municipal information-consultation centres by establishing a CSA training programme. The Ministry of Agriculture will also collaborate with the Ministry of Environment and Natural Resources on a policy document aimed at the prevention and management of forest fires, including clear institutional roles and responsibilities so that forest fires can be more effectively and efficiently prevented and controlled. However, there are still additional requirements to help reduce the adverse impacts of climate change and extreme weather events on agriculture in Georgia. For example, it is necessary to set up a database with agricultural damage and loss information as well as a system for agroclimatic monitoring, analysis, dissemination and communication of the data to help enhance informed decision-making and adequately assess the costs and benefits of climate-change-related investments.

2.4 IMPLEMENTATION, CHALLENGES AND GAPS OF NDC

2.4.1 IMPLEMENTATION OF THE NDCS

GHG EMISSION REDUCTION TARGETS

The establishment of emission targets differs from country to country, although all countries in the ECA region are faced with a drastically changing climate (Table 10). The majority of the ECA countries state in their first NDC that 1990 serves as the base year for calculation of their GHG emission reductions. The small number of exceptions include Georgia and Turkmenistan, which mention 2013 and 2000, respectively, as the base year. Albania, on the other hand, indicates that its business-as-usual scenario of emissions projections starts from 2016 and does not articulate a base year in its NDC.

The implementation period for all ECA countries is from 1 January 2021 to 31 December 2030 (or simply 2021–2030), with the exception of Turkmenistan (2020–2030). Adopting common time frames for NDCs is essential for the Paris Agreement to provide an effective and progressive framework to address climate change globally.

The NDCs indicate the emission reduction targets set by the ECA countries until 2030. While some countries differ in terms of the base year used, overall emission reduction levels will be assessed on the basis of 1990 levels. Table 10 gives an overview of these reduction targets, which show that eight countries set both unconditional and conditional targets.

Table 10. Overview of emission reduction targets by 2030 set by the ECA countries

REGION	COUNTRY	REDUCTION TARGETS BY 2030	INCLUDING/ EXCLUDING LULUCF	BASE YEAR	UNCOND-ITIONAL	CONDITIONAL
CAUCASUS	Armenia	Achieve ecosystem neutral GHG emissions in 2050 (2.07 tonnes/ per capita annual) (intensity target)	-	1990	-	With adequate support of (necessary and sufficient) international financial, technological and capacity building assistance
	Azerbaijan	35% (compared to base year)	-	1990	-	-
	Georgia	15% (reduction relative to BAU)	-	2013	✓	Up to 25% conditional, subject to a global agreement addressing importance of technical cooperation, access to low-cost financial resources and technology transfer
CENTRAL ASIA	Kazakhstan	15% (compared to base year)	-	1990	✓	Up to 25% conditional, subject to additional international investments, access to low carbon technologies transfer mechanism, green climate funds and flexible mechanisms
	Kyrgyzstan*	11.5-13.8% (reduction relative to BAU)	-	1990	-	29-30.9% with international support
	Tajikistan	10-20% (compared to base year)	-	1990	✓	25-35% conditional, subject to new substantial international funding and technology transfer
CENTRAL ASIA	Turkmenistan	0.0004 tonnes of CO2 eq./thousand USD GDP in PPP = 1.7 times less than 2000 level (intensity target)	-	2000	-	0 growth in emissions (or reductions up to 2030) if financial and technological support is provided
	Uzbekistan *	10% (intensity target)	-	2010	-	.
CIS	Belarus	28% (compared to base year)	Excluding LULUCF	1990	✓	-
	Republic of Moldova	64-67% (compared to base year)	-	1990	✓	Up to 78% conditional to global agreement, addressing topics, including low-cost financial resources, technology transfer and technical cooperation
	Russian Federation *	70-75% (compared to base year)	-	-	-	-
		1990	-	-	-	-
SEE	Ukraine	40% (compared to base year)	Excluding LULUCF	1990	-	-
	Albania	11.5% (reduction relative to BAU)		2016	-	-
	Bosnia and Herzegovina	2% (reduction relative to BAU)	Excluding absorption potential (emission sink) of forestry sector	1990	✓	3% with access to international support/development financial mechanisms
	The former Yugoslav Republic Macedonia	30% (reduction relative to BAU)	Excluding AFOLU	?	✓	36% with improved and additional measures
	Montenegro	30% (compared to base year)	-	1990	-	-
	Serbia	9.8% (compared to base year)	-	1990	-	-
EU-28	Turkey *	Up to 21% (reduction relative to BAU)	-	1990	-	-
EFTA	EU-28	40% (compared to base year)	-	1990	-	-
	Iceland	40% (compared to base year)	-	1990	-	-
	Liechtenstein	40% (compared to base year)	-	1990	-	-
	Norway	40% (compared to base year)	-	1990	-	-

Source: UNFCCC, 2018 interim NDC Registry (http://www4.unfccc.int/ndcregistry/Pages/Home.aspx)

Note: * INDCs. **: Reduction relative to business as usual (BAU): This relative target is used for reducing emissions below the business-as-usual level or compared to a scenario for the economy-wide mitigation targets. It is also called a Baseline scenario target.

Base year emissions target: Absolute emission reduction targets expressed as an emission reduction below the level in a specified base year.

Intensity target: Intensity target refers to reductions in GHG emissions per unit of GDP or per capita relative to base year or absolute level of per capita emissions by 2025 or 2030.

Five countries (Georgia, Kyrgyzstan, Albania, The former Yugoslav Republic of Macedonia and Turkey) have set their reduction target below the business-as-usual (BAU) level. For example, Georgia aims to reduce unconditionally its GHG emissions by 15 percent below the BAU for the year 2030 and Turkey by 21 percent below the BAU by 2030. Kyrgyzstan sets its target at a reduction of 11.49–13.75 percent and, if the country can receive finance from international sources and/or technical transfers, it aims for 29.00–30.89 percent below the BAU in 2030.

Bosnia and Herzegovina has also set the national goal below the BAU, but expects GHG emissions to increase in 2030 by 20 percent higher than the 1990 level, in line with the growth trend of consumption and energy production in the country. In short, the peak will occur in 2030 if the country receives no international support. With assistance, a significant reduction in emissions, accounting for 23 percent compared to the BAU scenario, will be possible.

In contrast, the three countries of Armenia, Turkmenistan and Uzbekistan set their INDCs/NDCs as intensity targets, i.e. the reduction of GHG emissions per unit of GDP and/or per capita. For instance, Armenia will try to achieve ecosystem neutral GHG emissions in 2050 (i.e. 2.07 tonnes per capita annually) if support from the international community is provided. Although Uzbekistan and Turkmenistan chose intensity target-setting, Uzbekistan aims to decrease specific emissions of GHGs per unit of GDP by 10 percent by 2030 compared to its 2010 level, while Turkmenistan has to date reported no concrete goals. Intensity target-setting can also be observed in emerging economies in Asia.

Among others, Republic of Moldova established a remarkably ambitious target to reduce GHG emissions by 64–67 percent. It expressed in its NDCs that "reduction above could be increased up to 78 percent below the 1990 level conditional to a global agreement addressing important topics including low-cost financial resources, technology transfer, and technical cooperation, accessible to all at a scale commensurate to the challenge of global climate change".

Four countries – Belarus, Ukraine, Bosnia and Herzegovina and The former Yugoslav Republic of Macedonia – indicate in their NDCs that they are excluding LULUCF, Forestry, and Agriculture, Forestry and Other Land Use (AFOLU) emissions. For example, the NDC of The former Yugoslav Republic of Macedonia states that 80 percent of all emissions originate from CO2, mainly from sectors like energy supply, buildings and transport, and that emissions from agriculture, forestry and other land uses were not analysed due to their relatively small proportion in the country's total GHG emissions.

Seven countries – Armenia, Bosnia and Herzegovina, Georgia, Kazakhstan, The former Yugoslav Republic of Macedonia, Republic of Moldova and Tajikistan – stated the need for additional international support, including financial, technological and capacity-building assistance. For example, Georgia requires support for the development and transfer of technologies to increase its adaptive capacity, while Tajikistan emphasizes the importance of international financial resources as well as the enhancement of scientific and technical assistance for the implementation of the governmental adaptation programmes and strategies. The former Yugoslav Republic of Macedonia indicates that during 2015–2030 it requires additional national investments of approximately EUR 4.2 billion to achieve 30 percent emissions reduction and around EUR 4.5 billion for 36 percent reduction. Furthermore, it states that it requires the involvement of the private sector (national and international) as well as new sources of finance and international assistance via climate finance mechanisms, such as the Green Climate Fund. Detailed specifications with regard to required financial, technology and capacity-building support from the international community are not described in these first NDCs, but in the country's national communications reports.

One of the challenges associated with the implementation of the NDCs is that the Paris Agreement states that each of the Parties will prepare, communicate and maintain successive NDCs that it intends to achieve. As a result, countries are outlining their "intentions" to reduce their GHG emissions, but their set targets are not legally enforceable, despite the fact that Parties are encouraged and expected to set realistic targets within the context of their national circumstances and capacities.

APPLICATION OF INTERNATIONAL MARKET MECHANISMS

Some ECA countries indicate in their NDCs that they may make use of international market mechanisms to achieve their 2030 targets. For instance, Republic of Moldova clearly states that it may use bilateral, regional and international market mechanisms to achieve its conditional emissions levels. Carbon credits, often called "carbon offsets", will be used by Albania, Montenegro, Turkey and Kazakhstan, as well as Switzerland (partly), to contribute to a low-emissions development pathway.

Among the EFTA countries, Iceland and Norway state that they will participate in the EU Emissions Trading Scheme also after 2020, which currently regulates around 40 percent of Iceland's emissions (2016). The former Yugoslav Republic of Macedonia, Switzerland and Ukraine also support the development of a framework for establishing a new market mechanism as well as non-market approaches under the Convention, which is overseen by the UNFCCC's Subsidiary Body for Scientific and Technological Advice.

While the EU-28 countries will not use any international credits, other countries did not report on their use or not of international market mechanisms, including all Caucasus countries, Tajikistan, Turkmenistan, Belarus, Bosnia and Herzegovina, Serbia and Liechtenstein.

ADAPTATION

The Paris Agreement also includes a global goal on adaptation, which aims to increase the ability to adapt, strengthen

resilience and reduce vulnerability to climate change within the context of sustainable development. Adaptation efforts by the Parties are needed to reduce the adverse impacts of climate change.

In total, eight ECA countries mention climate change adaptation in their first NDCs; they include the three Caucasus countries (Armenia, Azerbaijan, Georgia), two CIS countries (Belarus and Republic of Moldova), one SEE country (Serbia) and two Central Asian countries (Tajikistan and Turkmenistan) (Table 11).

Table 11. REU member countries referring to agricultural sectors in their adaptation targets

REGION	COUNTRY	REGION	COUNTRY
CAUCASUS	Armenia	CIS	Belarus
	Georgia		Republic of Moldova
CENTRAL ASIA	Tajikistan	EFTA	Norway
	Turkmenistan	SEE	Serbia

Source: UNFCCC, 2018 interim NDC Registry (http://www4.unfccc.int/ndcregistry/Pages/Home.aspx)

Turkmenistan mentions in its first NDC that it will develop and implement a National Action Plan for Adaptation, including measures to reduce the adverse impacts of climate change, particularly for the sectors of water, agriculture, soil and land resources, and ecosystems. Armenia is adopting an ecosystem approach for adapting to climate change, prioritizing the following sectors: natural ecosystems (aquatic and terrestrial, including forest ecosystems, biodiversity and land cover); agriculture, including fishery and forests; and, water resource management.

The agriculture and forestry sectors are also identified by the other countries as highly vulnerable to the adverse impacts of climate change. Within this context, Belarus is developing a national policy on adaptation, national strategies, and sector-specific regional programmes and plans for adaptation, while Serbia states the need for adaptation measures.

Republic of Moldova, Georgia and Tajikistan describe in more detail the activities for the prioritized sectors, combining risk management and climate change adaptation for agriculture and forestry. For instance, Republic of Moldova will conduct research on changes in temperature and precipitation and the impact on agriculture, as well as the interaction with hazards, such as flood, frost, drought, hail, heat waves and changes in pest and disease patterns. Georgia will research and develop emergency response plans for agriculture to reduce the adverse impacts of droughts and floods, introduce innovative irrigation management and water application techniques, apply different anti-erosion measures, and establish information centres providing guidance on adaptive management of agriculture to farmers.

Tajikistan specifically outlines that vulnerability reduction entails the integration of climate resilience and adaptation measures into the planning and development of, for example, agriculture, irrigation and water systems (focusing on resilience to hydrometeorological hazards and climate change and disaster risk reduction), and the promotion of adaptation of globally significant biological species and natural ecosystems to climate change. Furthermore, CCA measures will be implemented with the aim to ensure, among others, food security. Gender has a significant role to play in ensuring the active role of women and men with regard to issues of climate change and disaster risk reduction.

Azerbaijan includes mitigation measures for the agricultural sector, such as collecting methane gas from manure of livestock and poultry and using alternative energy sources and modern technologies. For the LULUCF sector, there are plans to plant new forest areas, water- and land-protecting forest strips (windbreaks), and urban and roadside greenery, as well as further improve the management of pastures and agricultural lands.

NATIONALLY APPROPRIATE MITIGATION ACTIONS NAMAS

Nationally appropriate mitigation actions (NAMAs) are voluntary actions undertaken by developing countries within the context of sustainable development; they may be entirely or partly supported by technology, financing and capacity building from developed countries. The development of NAMAs and the preparation of low-carbon development strategies was encouraged by the Cancun Agreement adopted during the 16th Conference of the Parties (COP) held in Cancun in December 2010. The UNFCCC has since established a NAMA registry, where NAMAs requiring international assistance are recorded.

According to the UNFCCC registry, a total of 30 NAMAs are included, proposed by eight developing countries in the ECA region, namely Armenia, Azerbaijan, Bosnia and Herzegovina, Georgia, Kazakhstan, Republic of Moldova, Serbia and Uzbekistan. The majority of the 30 NAMAs seek support for implementation; however, one seeks support for preparation (one of Azerbaijan's NAMAs, focusing on transport and its infrastructure, energy supply, and residential and commercial buildings) and one for recognition (one of Uzbekistan's NAMAs focuses on energy supply). As shown in Figure 11, the majority focus on energy supply (43 percent), followed by residential and commercial buildings (23 percent), transport and infrastructure (11 percent), and public buildings and social housing (7 percent). Only 7 percent and 5 percent of the NAMAs are aimed at agriculture and forestry, while industry and waste management account for 3 percent and 2 percent, respectively.

Figure 11. Overview of sectoral division of the 30 NAMAs included in the NAMA registry for the ECA region

Source: UNFCCC, NAMA registry http://www4.unfccc.int/sites/nama/SitePages/Home.aspx

The NAMAs related to the agricultural sector, including forestry and energy, of the ECA countries were identified by combining and compiling the data from the UNFCCC NAMA registry and the Ecofys NAMA database. This resulted in the description of ten NAMAs (of which two seem to be implemented and eight are under development) from six ECA countries (one from Caucasus, three from Central Asia, one from CIS, one from SEE) as outlined in Table 12.

Table 12. Identified NAMAs related to the agriculture sector, including forestry and energy in the ECA region

COUNTRY	TITLE NAMA	START OF INITIATIVE	STAGE	SECTOR NAME	PROPONENT(S)	INTERNATIONAL FUNDER(S)
Georgia	Adaptive sustainable forest management in Borjomi-Bakuriani Forest District	2014	Implementation	Forestry	National Forestry Agency of the Ministry of Environment and Natural Resources Protection of Georgia	Austrian Ministry of Agriculture and Forestry, Environment and Water Management
Georgia	Efficient use of biomass for equitable, climate-proof and sustainable rural development	2014	Under development	Agriculture, Forestry, Energy (subsector: Renewable energy)	Women in Europe for a Common Future	Seeking support for implementation
Kazakhstan	Nationally appropriate mitigation actions for low-carbon urban development in Kazakhstan	2014	Implementation	Buildings, Waste, Transport, Energy (subsectors: Renewable energy [biomass]; Energy efficiency)	Government of Kazakhstan	Seeking support for implementation
Republic of Moldova	Implementation of soil conservation tillage system in Republic of Moldova	Expected start: 2018	Under development	Agriculture	Ministry of Agriculture, Regional Development and Environment	Seeking support for implementation
Republic of Moldova	Use of energy willow for heat generation in Republic of Moldova	Expected start: 2018	Under development	Forestry, Energy supply	Ministry of Agriculture, Regional Development and Environment	Seeking support for implementation
Republic of Moldova	Afforestation of degraded land, riverside areas and protection belts in Republic of Moldova	Expected start: 2018	Under development	Forestry	Ministry of Agriculture, Regional Development and Environment	Seeking support for implementation
Republic of Moldova	Reducing GHG emissions from enteric fermentation by including dried grape marc in cattle rations	Expected start: 2018	Under development	Agriculture	Ministry of Agriculture, Regional Development and Environment	Seeking support for implementation
Serbia	Introduction of 1000 MW of small biomass boilers in Serbia	2015	Under development	Energy (subsector: Renewable energy [biomass])	Ministry of Energy, Development and Environmental Protection	Seeking support for implementation
Tajikistan	Tajikistan forestry NAMA	2015	Implementation	Forestry	Ministry of Economic Development and Trade; Agency of Forestry under the Government of the Republic of Tajikistan	Under appraisal of NAMA facility
Uzbekistan	Rainfed mountain belt reforestation	2009	Under development	Forestry, Agriculture	Main Department of Forestry; Ministry of Agriculture and Water Resources	n.a.

Source: UNFCCC, 2018 NAMA Registry (http://www4.unfccc.int/sites/nama/SitePages/Home.aspx)

2.4.2 CHALLENGES AND GAPS IN NDC IMPLEMENTATION

REPORTING, MONITORING, DATA COLLECTION AND USE

Every five years, each of the Parties is expected to submit another NDC to the UNFCCC outlining their GHG reduction targets. The majority of the ECA countries have already submitted their first NDC, except for Kyrgyzstan, the Russian Federation, Turkey and Uzbekistan, which also have not yet ratified the Paris Agreement (see Section 2.1). The second NDC report is due by 2024 and the third by 2029. Each report will be ahead of the start of the implementation periods for these

NDCs, which will cover 2020–2024, 2025–2029, 2030–2034 etc. Besides the NDC reports, countries also provide other reports to the UNFCCC, including national communication reports and biennial (update) reports, depending on whether the country belongs to the Annex I, Annex II or non-Annex I Parties.

Annex I Parties include industrialized countries that were members of the Organisation for Economic Co-operation and Development (OECD) in 1992 as well as Economies in Transition (EIT), such as the Russian Federation, the Baltic countries and several Central and East European states. The Annex II Parties consist of the OECD members of Annex I, but not the EIT countries, and must provide financial resources to help facilitate emission reduction activities in developing countries as well as encouraging development and transfer of environmentally friendly technologies to EIT and developing countries. Non-Annex I Parties, on the other hand, are primarily developing countries, some of which are acknowledged as highly vulnerable to the adverse impacts of climate change, and the Convention aims to address the specific needs of these vulnerable countries, for instance with regard to insurance, investment and technology transfer.

The national communication reports should be submitted to the UNFCCC secretariat by the Non-Annex I Parties within three years of the country entering the Convention and every four years thereafter, while Annex I Parties should have submitted their sixth national communication report (NCR6) by 1 January 2014. The six key components of a national communication report are as follows: 1) national circumstances; 2) national GHG inventory; 3) programmes including measures to facilitate adequate adaptation to climate change; 4) programmes consisting of measures for climate change mitigation; 5) other information relevant to the achievement of objectives of the Convention; and 6) constraints and gaps as well as financial, technical and capacity-building needs. Table 13 shows the submission years of the different national communication reports that the Non-Annex I Parties in the ECA region have submitted to date. The majority have submitted three reports, with the exception of Republic of Moldova, which provided the fourth national communication report in 2018.

Table 13. Submission years of the national communication reports by Non-Annex I countries in the ECA region

COUNTRY	SUBMISSION YEAR OF 1ST NATIONAL COMMUNICATION REPORT	SUBMISSION YEAR OF 2ND NATIONAL COMMUNICATION REPORT	SUBMISSION YEAR OF 3RD NATIONAL COMMUNICATION REPORT
Albania	2002	2009	2016
Armenia	1998	2010, revised in 2011	2015
Azerbaijan	2001	2010	2015
Bosnia and Herzegovina	2009	2013	2016
Georgia	1999	2009	2015
Kyrgyzstan	2003	2009	2016
The former Yugoslav Republic Macedonia	2003	2008	2014
Republic of Moldova	2000	2009	2013 (4th NC report, 2018)
Montenegro	2010	2015	-
Serbia	2010	2017	-
Tajikistan	2002	2008	2013
Turkmenistan	2000	2010	2016
Uzbekistan	1999	2008	2016

Source: UNFCCC (https://unfccc.int/process-and-meetings/transparency-and-reporting/reporting-and-review-under-the-convention/national-communications-and-biennial-update-reports-non-annex-i-parties/national-communication-submissions-from-non-annex-i-parties).

Annex I Parties should submit national communication reports every four years and in addition, are requested to submit the first biennial report (BR1) to the secretariat by 1 January 2014, according to Decisions 2/CP.17 and 19/CP.18 of the COP; BR1 may be submitted in the form of a report, as an annex to the national communication report or as a separate report. An electronic reporting application for the common tabular format – the biennial reporting common tabular format (BR CTF) application – was also developed; the submission years of the six most recent national communication reports, BR1 and BR CTF are shown in Table 14. The first biennial reports include information on GHG emissions and trends, a quantified economy-wide emission reduction target, progress achieved regarding these emission reduction targets, GHG emission projections and a section on the provision of financial, technological and capacity-building support to developing countries.

Table 14. Overview of the submission dates of the national communication reports by the Annex I countries in the ECA region

COUNTRY	SUBMISSION YEAR OF 6TH NATIONAL COMMUNICATION REPORT	SUBMISSION YEAR OF 1ST BIENNIAL REPORTS	COUNTRY	SUBMISSION YEAR OF 6TH NATIONAL COMMUNICATION REPORT	SUBMISSION YEAR OF 1ST BIENNIAL REPORTS
AUSTRIA	2013	2014 (BR1 and BR1 CTF)	Latvia	2013	2013, revised in 2014 (Annex to NCR6 and BR1 CTF)
BELARUS	2013 / revised in 2015	2013 (BR1 CTF) 2014 (BR1)	Liechtenstein	2014	2013 (Annex to NCR6 and BR1 CTF)
BELGIUM	2013 / revised in 2014	2014 (BR1 and BR1 CTF)	Lithuania	2014	2014 (Annex to NCR6 and BR1 CTF)
BULGARIA	2013 / revised in 2014	2013, revised in 2014 (Annex to NCR6 and BR1 CTF)	Luxembourg	2014	2014 (Annex to NCR6 and BR1 CTF)
CROATIA	2014	2014, revised in 2014 (Annex to NCR6 and BR1 CTF)	Malta	2014	2014 (BR1 and BR1 CTF)
CYPRUS	2013	2013 (Annex to NCR6 and BR1 CTF)	Netherlands	2013	2013, revised in 2014 (BR1 and BR1 CTF)
CZECHIA	2014	2014 (BR1 and BR1 CTF)	Norway	2014	2014 (Annex to NCR6 and BR1 CTF)
DENMARK	2013	2014 (Annex to NCR6 and BR1 CTF)	Poland	2013	2014 (Annex to NCR6 and BR1 CTF)
ESTONIA	2013 / revised in 2014	2013, revised in 2014 (BR1 and BR1 CTF)	Portugal	2013 /revised in 2014	2013, revised in 2014 (Annex to NCR6 and BR1 CTF)
EU	2014	2014 (Annex to NCR6 and BR1 CTF)	Romania	2013	2013 (BR1 and BR1 CTF)
FINLAND	2013	2013 (BR1 and BR1 CTF)	Russian Federation	2013	2014 (BR1 and BR1 CTF)
FRANCE	2013	2013 (BR1 and BR1 CTF)	Slovakia	2013	2014 (BR1 and BR1 CTF)
GERMANY	2013	2013, revised in 2014 (BR1 and BR1 CTF)	Slovenia	2014	2014 (BR1 and BR1 CTF)
GREECE	2014	2013, revised in 2014 (Annex to NCR6 and BR1 CTF)	Spain	2013	2013 (BR1 and BR1 CTF)
HUNGARY	2013	2014 (Annex to NCR6 and BR1 CTF)	Sweden	2014	2013, revised in 2014 (BR1 and BR1 CTF)
ICELAND	2014	2014 (Annex to NCR6 and BR1 CTF)	Switzerland	2014	2014 (Annex to NCR6 and BR1 CTF)
IRELAND	2014	2014 (Annex to NCR6 and BR1 CTF)	Turkey	2016	-
ITALY	2013 / revised in 2014	2014 (Annex to NCR6 and BR1 CTF)	Ukraine	2012	2013 (Annex to NCR6 and BR1 CTF)
KAZAKHSTAN	2013	2014, revised in 2015 (BR1 and BR1 CTF)	United Kingdom	2013	2013, revised in 2014 (Annex to NCR6 and BR1 CTF)

Source: UNFCCC, 2018 (https://unfccc.int/process/transparency-and-reporting/reporting-and-review-under-the-convention/national-communications-and-biennial-reports-annex-i-parties/national-communication-submissions/sixth-national-communications-annex-i).

In addition, Non-Annex I Parties are to submit biennial updated reports (BURs), consisting of updates of national GHG inventories, including a national inventory report and information on mitigation actions as well as identified financial, technical and capacity needs and received support. These reports provide updates on actions undertaken by a Party to implement the Convention, including the status of its GHG emissions and removals by sinks, also regarding activities to reduce emissions or enhance sinks. At present, eight Non-Annex I Parties in the ECA region have submitted their biennial updated reports. National inventory reports (NIRs) on GHG emissions and removals should be submitted by all Annex I Parties; however, four Non-Annex I Parties in the ECA region have also submitted these (see Table 15).

Table 15. Overview of submission years of first and second BUR and NIRs in the ECA region

COUNTRY	SUBMISSION YEAR OF FIRST BUR (NIR)	SUBMISSION YEAR OF SECOND BUR (NIR)
ARMENIA	2016 (NIRs in 2014 and 2015)	2018 (NIR in 2018)
AZERBAIJAN	2014	-
BOSNIA AND HERZEGOVINA	2015	2017
GEORGIA	2015 (NIR in 2016)	-
MONTENEGRO	2016	-
REPUBLIC OF MOLDOVA	2016 (NIRs in 2010, 2014, 2017)	-
SERBIA	2016	-
THE THE FORMER YUGOSLAV REPUBLIC MACEDONIA	2015	2018 (NIR in 2018)

Source: UNFCCC, 2018 (https://unfccc.int/process-and-meetings/transparency-and-reporting/reporting-and-review-under-the-convention/national-communications-and-biennial-update-reports-non-annex-i-parties/biennial-update-report-submissions-from-non-annex-i-parties).

As Non-Annex I Parties have certain constraints in terms of available financial resources, the Global Environment Facility (GEF) can help to cover costs related to preparation of the various reports under their commitments to the UNFCCC, such as the national communication reports. These resources are channelled through the National Communication Support Programme (NCSP) as a UNDP/UNEP project to provide technical and policy support to Non-Annex I Parties to enable the preparation of the national communications as well as facilitate timeliness of submissions and the integration of climate change into their national development policies. So far, the Swiss and United States Governments have cofinanced NCSP activities.

From a NCSP initiation workshop in October 2005, where support was provided for the Non-Annex I Second National Communications, emphasis was placed on the importance of developing countries having an appropriate implementation strategy for preparation of the reports, including:

- technical elements and reporting obligations identified under each reporting component;
- strategies to integrate the identified priorities from the stakeholder stocktaking exercises and consultations;
- developed plans and action points on how data gaps will be addressed and resources allocated to enhance data collection;
- identified methodologies and available tools to help facilitate the necessary technical research;
- defined linkages between the national communication process and national development priorities; and
- improved institutional coordination and collaboration mechanisms and ways to help create a sustainable national communication process for the future (for example, the roles and responsibilities of the different actors involved in the process were outlined and recommended in the UNDP/UNEP/GEF's NCSP Resource Kit [2006]).

In order to meet their reporting obligations under the Convention, all Parties are required to establish their national GHG inventories, which provides the foundation for mitigation. Inventories can help to: identify trends in a country's GHG emissions over a certain period and the sectors that are largest contributors; address causes and formulate emission reduction actions; facilitate national development and sectoral planning; and inform decision-making with regard to resources allocation. Non-Annex I Parties are encouraged to estimate their anthropogenic emissions of CO2, CH4 and N2O by sources and removal by sinks, and are encouraged to report HFCs, PFCs and SF6; Annex I Parties, on the other hand, should report all GHGs. An overview of the scope and coverage of the GHGs by the ECA countries was provided in Table 6 (Section 2.1).

The Intergovernmental Panel on Climate Change (IPCC) has published various guidelines and guidance documents to facilitate the establishment of annual GHG inventories for all sectors, including energy, IPPU, agriculture, LULUCF and waste. The 2006 IPCC Guidelines for national GHG inventories – compared with the 1996 Guidelines – reflect the elaborations of the 2000 Good practice guidance and uncertainty management in national GHG inventories and the 2003 Good practice guidelines for LULUCF. The changes included: use of six land-use categories for LULUCF (forest land, cropland, grassland, wetlands, settlements and other land); integration of methods for non-CO2 emissions from managed soils and biomass burning; methods to estimate CO2 emissions from flooded lands; and inclusion of analysis of key categories for land-use categories, C pools, and CO2 and non-CO2 GHG emissions.

The 2013 IPCC Revised supplementary methods and good practice guidance arising from the Kyoto Protocol provides additional methods and good practices for estimating anthropogenic GHG emissions by sources and removals by sinks from LULUCF activities under Article 3, paragraphs 3 and 4 of the Kyoto Protocol for the second commitment period. This document – particularly helpful for Annex I Parties – revises and updates Chapter 4 of its 2003 publication and builds on the methods and guidance provided in the 2006 Guidelines.

The IPCC's 2013 Supplement to the 2006 IPCC guidelines for national GHG inventories: wetlands expands and updates information, such as emission factors. In addition, the Guidelines are not restricted to, for example, drained peatlands and peat extraction management (as in the 2006 publication), but also cover inland organic soils and wetlands on mineral soils, coastal wetlands, including mangrove forests, tidal marshes and seagrass meadows, among others.

According to the analysis of each of the ECA countries' NDCs, different countries reported use of different methodology documents. The majority of the countries use the updated 2006 Guidelines as well as the supplementary Kyoto Protocol and/or wetlands documents. Other countries, such as Belarus, Liechtenstein and Bosnia and Herzegovina, use the 1996, 2000 and 2003 publications, while Azerbaijan reports that it is only using the 1996 Guidelines (see Table 16). As a result of updating certain reporting and accounting methods in the various different documents, differences may arise among countries, producing in turn inconsistencies and inaccuracies that make comparison more difficult.

Table 16. Overview of guidelines used for estimating GHG emissions as reported by ECA countries in their NDCs

REGION	COUNTRY	IPCC (1996) REVISED GUIDELINES FOR NATIONAL GHG INVENTORIES	IPCC (2000) GP GUIDANCE FOR NATIONAL GHG INVENTORIES	IPCC (2003) GP GUIDANCE FOR LULUCF	IPCC (2006) GUIDELINES FOR NATIONAL GHG INVENTORIES	IPCC (2013) REVISED KP SUPPLEMENT	IPCC (2013) WETLANDS SUPPLEMENT
CAUCASUS	Armenia	-	-	-	-	-	-
	Azerbaijan	✓	-	-	-	-	-
	Georgia	✓	✓	-	✓	-	-
CENTRAL ASIA	Kazakhstan	-	-	-	✓	✓	✓
	Kyrgyzstan*	✓	-	-	-	-	-
	Tajikistan	-	-	-	-	-	-
	Turkmenistan	✓	✓	✓	✓	-	-
	Uzbekistan *	✓	-	-	✓	-	-
CIS	Belarus	✓	✓	-	-	-	-
	Republic of Moldova	-	-	-	✓	-	-
	Russian Federation *	-	-	-	✓	✓	✓
	Ukraine	-	-	-	✓	✓	-
SEE	Albania	-	-	-	✓	-	-
	Bosnia and Herzegovina	✓	✓	✓	-	-	-
	The former Yugoslav Republic Macedonia	-	-	-	✓	-	-
	Montenegro	-	-	-	✓	-	-
	Serbia	-	-	-	✓	✓	-
	Turkey *	-	-	-	✓	✓	-
EU-28	EU-28	-	-	-	✓	✓	-
EFTA	Iceland	-	-	-	✓	✓	-
	Liechtenstein	✓	✓	✓	-	-	-
	Norway	-	-	-	✓	-	-
	Switzerland	-	-	-	✓	✓	-

Source: UNFCCC interim NDC Registry (http://www4.unfccc.int/ndcregistry/Pages/Home.aspx)

Note: * INDCs.

As mentioned above, the methodologies for calculating GHG emissions, in particular from the agricultural and land use, land-use change and forestry sectors, are highly complex, and different countries use different IPCC guidelines and guidance documents. Some are older, while others are more updated. As a result, differences may arise between countries due to the accounting methods adopted and/or the reporting structure, leading to inconsistencies and inaccuracies, and making comparisons less reliable and more difficult.

In addition, the collected emissions data are self-reported by the countries, although specific IPCC guidelines exist for managing uncertainty and assessing quality through the implementation of quality assurance (QA) and quality control (QC) procedures, verification and QC forms and checklists as integral parts of inventory development. The application of Tier 1 (general procedures) and/or Tier 2 (source-specific procedures) – designed to help standardize the implementation of QA and QC activities – helps ensure the quality of the inventory and/or peer review undertaken by external experts not directly involved in the inventory assessment. Furthermore, Parties should provide all relevant information required for clarity, transparency and understanding (Article 4, paragraph 8) and should promote environmental integrity, transparency, accuracy, completeness, comparability and consistency and avoid double counting (Article 4, paragraph 13).

There are various data-related issues for the agricultural, forestry and land-use sectors resulting from the complexity of assessing GHG emissions, due to lack of or limited available data, absence of inventories (e.g. of forests, wetlands or croplands), resulting in inaccuracies and uncertainty of GHG emission estimations. The uncertainty assessment undertaken by the ECA countries, indicates that uncertainty in their data varies from > 10 percent to > 50 percent in the overall inventory, with significant uncertainty for agriculture-related GHG (e.g. CH4, N2O) as well as for the agricultural, forestry and land use and land-use change subsectors (see Annex 3). For instance, in Armenia the generic uncertainty is estimated at 3.6 percent without forestry data and 7.8 percent with forestry data with uncertainty in CH4 and N2O emissions estimated at 24.4 percent and 21.9 percent, respectively. Another example is Uzbekistan, where overall uncertainty is 8.4 percent, but with emissions from agriculture uncertainty likely to range between 65.7 percent and 71.9 percent.

Issues related to data may include lack of available data and uncertainty associated with the use of estimates (e.g. with regard to forest carbon accounting estimates) or the use of proxy data in case of data gaps (e.g. due to lack of emissions factors). In Azerbaijan, uncertainties in forestry data are the result of lack of: an up-to-date forestry inventory (the most recent was conducted in 1988); an inventory manure storage system; and records on manure management in Kyrgyzstan. Other issues include the lack of national emission facts and

activity data, leading to underestimation of livestock on private farms in Turkmenistan and use of default emission factors with regard to LULUCF in The former Yugoslav Republic of Macedonia.

Recommendations for future enhancements were extracted from the ECA countries' national communication reports or derived from the identified data collection- and use-related issues. In Tajikistan and Turkmenistan, the establishment of a national inventory system is recommended, including the setting up of a forestry inventory system in Azerbaijan and an inventory for manure storage systems in Kyrgyzstan. Further research and studies are promoted in Armenia, especially regarding organic carbon deposits in soil, enhancing accuracy of indirect N2O emissions and quality of data from agricultural soils in Republic of Moldova and soil humus content in Kyrgyzstan. Some recommendations also aim to address issues related to ensuring accuracy and consistency in data use with regard to categorization of cropland in Georgia, in particular the recording of perennial crops, ensuring that poultry is divided into subcategories and applying the same categorization methodology for cattle, swine, sheep and goats.

Capacity-related activities, including training and awareness raising, are encouraged in Armenia, with regard to soil monitoring by land users, and in Serbia, with regard to building the overall capacity of the Environmental Protection Agency and related institutions for the collection of activity data to enhance data quality and reduce uncertainties, and for the development of training programmes for forestry staff to facilitate the monitoring of forest burned areas, as its cadastres do not currently include qualitative and quantitative data for these areas.

In general, it is important to minimize uncertainty, although to a certain extent it is inherent in, for example, accounting for carbon stocks, emissions or project emission reductions. Nevertheless, it is important to identify this uncertainty, reducing and quantifying it when possible; it needs to be explicitly mentioned in order to give confidence to the figures reported and communicated.

2.5 CLIMATE FINANCE FLOW

In the context of global climate action and implementation of nationally determined contributions, the availability of financial resources to support urgent mitigation and adaptation measures is of great relevance to ensure the achievement of the overall objective of the UNFCCC.

This section provides a brief analysis of the trends in climate finance flows, to better understand through which channels countries access resources for climate action in this region and what type of actions are financed, keeping in mind the global trends.

In addition, a summary on the main bilateral and multilateral partners providing resources for climate change adaptation and mitigation in the region is provided. Special attention is given to the growing support provided by the Green Climate Fund as operating entity of the financial mechanism under the Convention and as the most important dedicated multilateral climate finance provider globally.

CLIMATE FINANCE TRENDS IN ECA

It is important to highlight that – according to what is established by the UNFCCC in Article 4, paragraph 3 – climate finance under the Convention is defined as follows (this definition has important implications for the way financial resources for climate action are provided globally by developed country Parties under the Convention):

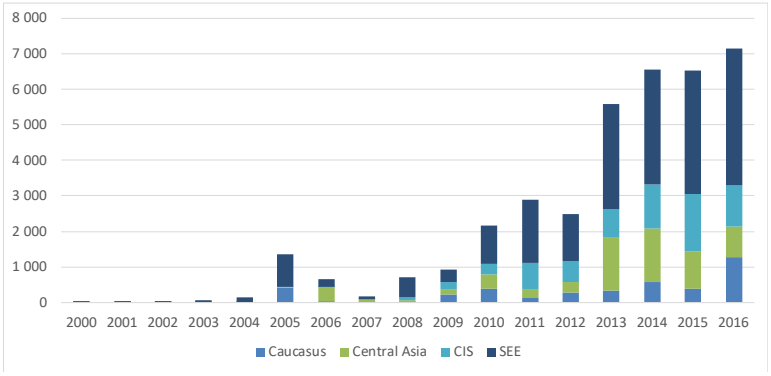
> *The developed country Parties and other developed Parties included in Annex II shall provide new and additional financial resources to meet the agreed full costs incurred by developing country Parties in complying with their obligations under Article 12, paragraph 1 (United Nations Convention on Climate Change, 1992).*

In the case of ECA countries, bilateral and multilateral development cooperation partners committed USD 3.3 billion of development finance per year over 2013 and 2014 to climate actions in 11 countries in Eastern Europe, the Caucasus and Central Asia (OECD, 2016), representing a relatively fair share of development finance dedicated to climate actions.

This trend of a growing climate-related finance (see Figure 12) is similar to other regions around the world, where development cooperation is being re-allocated to finance climate investments. However, it is worth highlighting that while significant amounts of climate-related development finance were committed to the ECA countries, the scale of finance directed to each country is considerably different: SEE countries have accessed the most resources, followed by CIS, Central Asian and the Caucasus.

Multilateral climate funds also support countries of Central, Eastern and Southeastern Europe, the South Caucasus and Central Asia. Eleven funds approved USD 1.8 billion between 2003 and 2017 across 196 projects. Turkey (USD 466 million), Ukraine (USD 464 million) and Kazakhstan (USD 270 million) are the biggest receivers of multilateral climate fund approvals; together these three countries receive two-thirds of approved funds in the wider region.

Figure 12. Regional trends in climate-related development finance in the ECA region (USD million, constant prices)

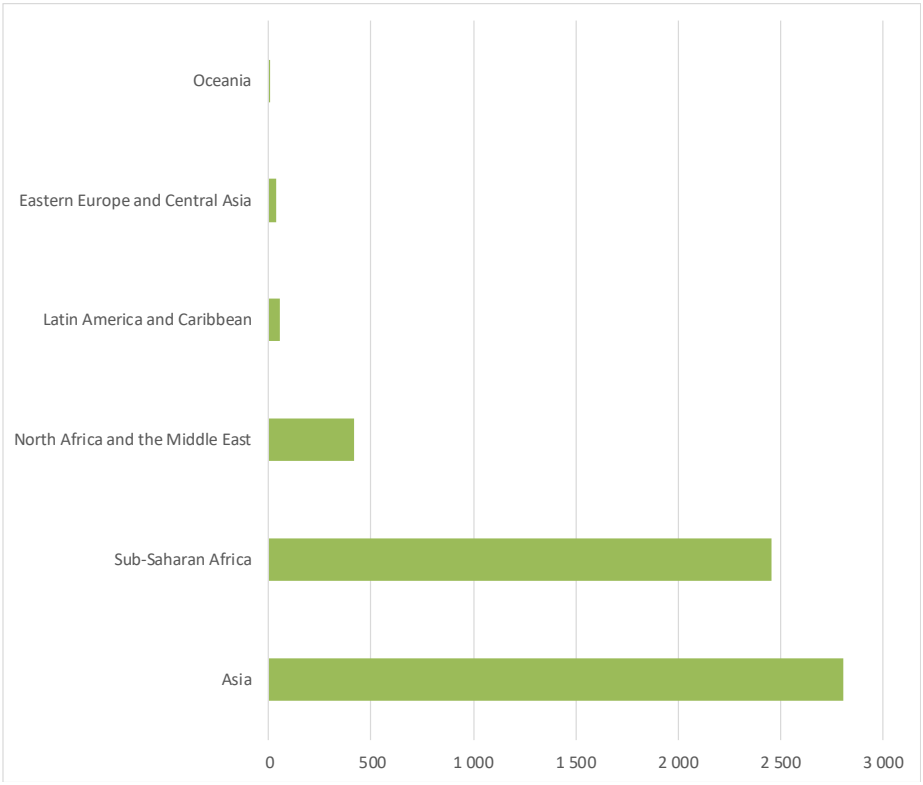


Source: OECD (2018).

Nevertheless, despite all the resources committed and allocated by bilateral and multilateral partners in the region, all the ECA countries still need scaled-up finance from international and domestic sources to achieve their mitigation and adaptation targets under their INDCs and other policy documents. At the global level, according to the information and references reported by developing countries, initial calculations of the support needed for the implementation of INDCs/NDCs totals around USD 5 475.1 billion.

With regard to the geographical distribution of countries where financial need originate, Figure 13 shows that countries from some regions express more financial needs than countries in other regions. Indeed, most of the quantified financial needs expressed in INDCs originate from countries in Asia and sub-Saharan Africa, for 47 percent (USD 2 567 billion) and 45 percent (USD 2 456.9 billion), respectively. Other regions account for the following share: 6 percent (USD 356.7 billion) from North Africa and the Near East, 0.6 percent (USD 34.8 billion) from Eastern Europe and Central Asia, 1 percent (USD 58.2 billion) from Latin America and the Caribbean, and 0.02 percent (USD 1.5 billion) from Oceania (IGES, 2018)

Figure 13. Financial requirements expressed in INDCs/NDCs by region (USD billion)



Source: IGES (2016).

Comparing the estimated financial needs of the region (equal to USD 34.8 billion), with the reported average climate related development finance received by ECA countries in 2013 and 2014 (which amounted US 283 million), and the resources approved by multilateral climate funds in the same period (totaling US 1.8 billion), it's evident that there's an important gap of resources that needs to be leveraged and scaled-up, from domestic and international sources, to allow countries to fully comply with GHG emissions reductions and adaptation commitments in ECA.

WHAT IS BEING FINANCED?

After the initial analysis on the resources provided to the region and the needs reported by developing countries in ECA, it is important to understand the commitments with regards to financial resources for adaptation and mitigation under the Convention, which – according to Article 4, paragraph 4 – establishes that:

The developed country Parties and other developed Parties included in Annex II shall also assist the developing country Parties that are particularly vulnerable to the adverse effects of climate change in meeting costs of adaptation to those adverse effects.

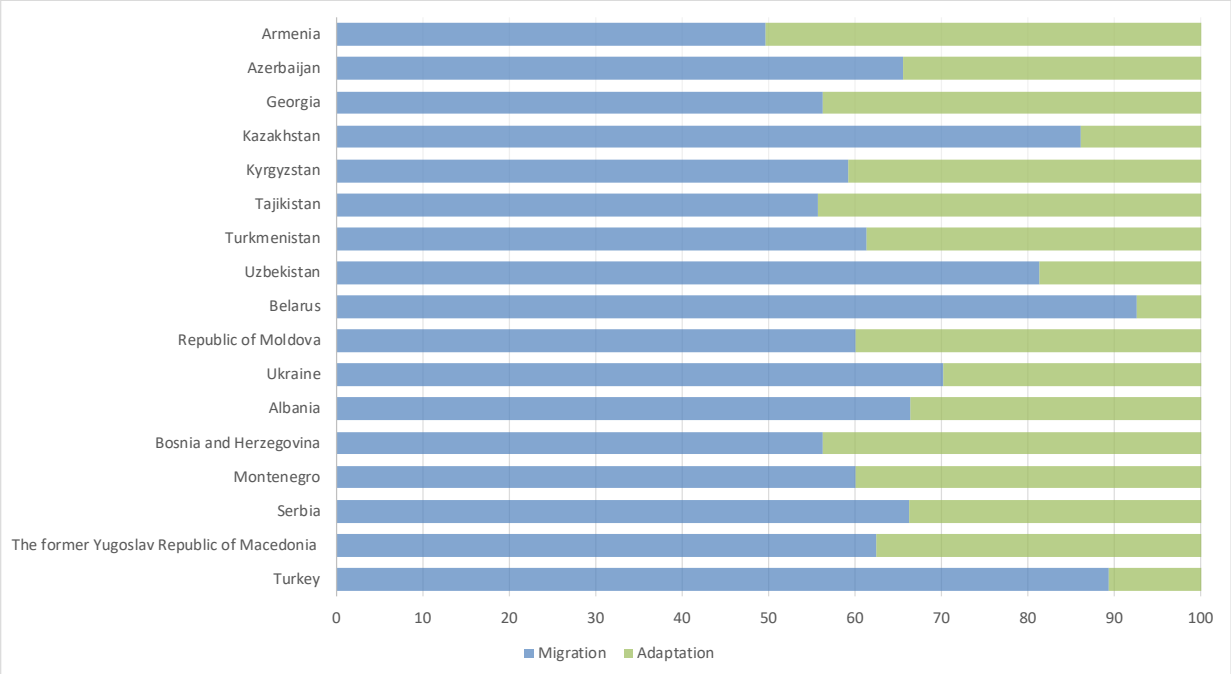
This provision is particularly important to understand climate finance flows in the region, in light of high exposure to extreme weather events and vulnerability to various natural hazards, including droughts, floods, earthquakes, landslides and storms in the context of climate change.

The need for available resources for urgent adaptation measures has been a growing concern for developing countries, considering that the global trend shows that there are considerably more resources for mitigation than for adaptation.

The ECA region also follows the global trends of other regions with regards to the availability of resources for mitigation versus adaptation: almost 81 percent of the overall climate-related development cooperation was committed for mitigation in the region in the years 2013–2014, while adaptation finance in the region in those same years accounted for only 11 percent of the committed resources.

Figure 14 provides a clear picture of the ratio of mitigation–adaptation resources provided to countries in the ECA region in 2016, and serves to document the global trend concerning more resources being made available for mitigation actions in developing countries, vis-à-vis the growing need for adaptation finance.

Figure 14. Ratio mitigation vs adaptation resources in ECA countries, 2014–2016 (%)



Source: OECD (2018).

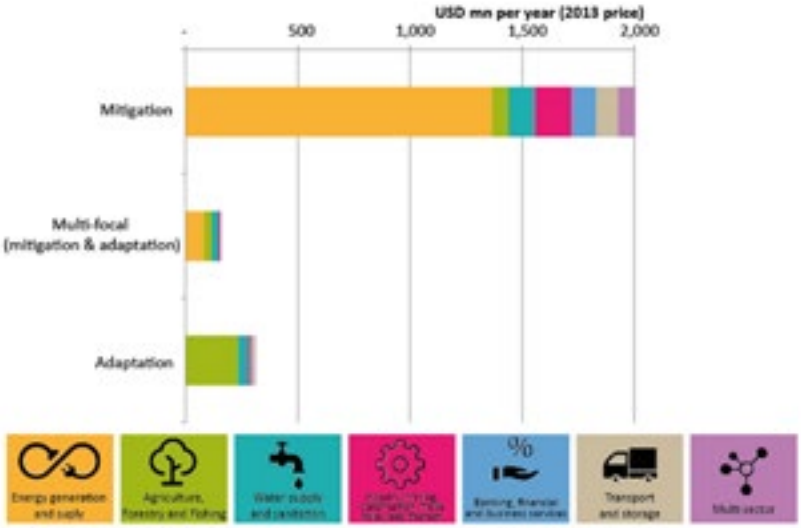
Additionally, climate finance flows are consistent with the target sectors as included in most of the INDCs/NDCs in the region, where energy and agriculture are the main sectors in which countries have committed to reduce emissions, followed by industrial processes and waste.

It is important to highlight that in view of the important impacts of climate change in the region, some countries have also included adaptation targets in their INDC/NDC documents, requiring scaled-up financing for adaptation.

Figure 15 describes the destination of the received climate-related finance in ECA in 2013, where GHG reductions in sectors such as energy and agriculture are not only a priority for developing countries, but are also target sectors for climate finance partners.

Even when climate finance has traditionally been allocated to either mitigation or adaptation, there is a growing understanding of the benefits of cross-cutting investment projects, which have both mitigation and adaptation actions and can provide a more articulated and holistic response to challenges related to climate change.

Figure 15. Annual climate-related development finance to the ECA region by sector, 2013–2014 (USD million)



Source: OECD (2016).

For this analysis, it is also important to highlight that climate finance can flow in the form of different financial instruments, which usually include grants and concessional loans. In the particular case of ECA, around 60 percent of resources are usually in the form of concessional loans, while 40 percent are grant finance (Watson et al., 2017); this is relevant for highly indebted countries with little capacity to absorb more debt.

WHO IS INVESTING IN THE ECA REGION?

On the basis of the information analysed herein, it is possible to understand the different channels for climate finance flows and climate-related development finance, usually provided in the form of bilateral support and climate finance or green investments from multilateral partners. However, the figures below provide additional details on concrete partners investing in and supporting climate action in ECA.

It is important to highlight that Germany, Japan, France, Switzerland, the United States of America, the Republic of Korea and other developed countries have provided important bilateral resources for climate investments in ECA. These resources are usually channelled through their respective development cooperation agencies and respond to multi-year work plans mutually agreed with recipient countries.

In addition, there are a number of multilateral partners with presence and important collaboration on climate-related investments. Table 17 provides a summary of the most important multilateral partners for Eastern Europe and Central Asia and an indication of their geographic and strategic focus areas.

Table 17. Main multilateral climate finance partners in Eastern Europe and Central Asia

SOURCE	GEOGRAPHIC AREA OF WORK	STRATEGIC AREA OF WORK
European Investment Bank (EIB)	Caucasus Central Asia CIS SEE	The EU is an important partner for the region, mobilizing resources through different channels including the EIB, which has committed more than 25% of its total financing for adaptation and mitigation, and supporting low-carbon and climate-resilient growth. The EIB has set a target to increase climate investments in developing countries to 35% of its overall portfolio in 2020 (European Investment Bank, n.d.).
European Bank for Reconstruction and Development (EBRD)	Caucasus Central Asia CIS SEE	The EBRD has developed an important portfolio of projects in countries in the region, based on its Green Economy Transition approach, aimed at protecting people and their livelihoods from environmental hazards. The EBRD also provides important resources in ECA to finance actions targeting the technological gap to tackle climate change.
Asian Development Bank (ADB)	Caucasus Central Asia	The ADB has developed a Climate Change Operational Framework 2017–2030, positioning the bank to facilitate a regional shift towards a low GHG emissions and climate-resilient development path. The ADB has a commitment to provide at least USD 6 billion per year in climate change financing from its own resources by 2020. A key element of the ADB's work in the region is the support provided for private sector participation within its portfolio for the Climate Investment Funds, leveraging concessional public funds to mobilize private sector investments for climate action.

International Finance Corporation (IFC)	Caucasus SEE	Globally the World Bank Group aims to eradicate extreme poverty and increase shared prosperity through economic growth, inclusion and sustainable development. In ECA, the IFC furthers these objectives with a strong focus on mitigating climate change and strengthening agribusiness and financial markets. The IFC in Eastern Europe and Central Asia works to open markets for private sector participation, investing in renewable energy, energy and other resource efficiency, and green buildings.
World Bank (WB)	Caucasus Central Asia CIS SEE	The WB supports countries to meet their climate change commitments under the Paris Agreement, working with countries to help them deliver on their NDCs by translating their pledges into specific policies and providing knowledge sharing, technical assistance and financing. The WB has a commitment to increase climate financing to 28% of the Bank Group's portfolio by 2020. In Eastern Europe and Central Asia, the WB focused on building resilience to climate change and natural disasters with investments across the region in three areas: low-carbon energy transition, sustainable land-use management and climate resilience (World Bank Group, 2018).
Climate Investment Funds (CIF)	Caucasus Central Asia	The CIF is the only multilateral climate fund to work exclusively with multilateral development banks (MDBs) as implementing agencies. The resources of the CIF are provided to countries in the form of grants, highly concessional loans, and risk mitigation instruments to recipient countries through MDBs. Through three of its core four programmes, CIF has provided financial resources for Central Asian and Caucasus countries to access clean technologies, scale up renewable energies and strengthen climate resilience.
Global Environment Facility (GEF)	Caucasus Central Asia CIS SEE	The GEF is an operating entity of the financial mechanism for the UNFCCC. As such, its resources serve as a catalyst large-scale investments necessary for the creation of a low-carbon, climate-resilient economy. GEF funds are available to developing countries and countries with economies in transition to meet the objectives of the international environmental conventions and agreements. GEF support is provided to government agencies, civil society organizations, private sector companies, research institutions, among the broad diversity of potential partners, to implement projects and programmes in recipient countries. The GEF invests in energy efficiency, renewable energy, sustainable transport and climate-smart agriculture projects to support the mitigation of GHG. The GEF supports countries to reduce the vulnerability of people, livelihoods, physical assets and natural systems to the adverse effects of climate change, through a number of adaptation projects. The work of the GEF is known to be cross-sector, including agriculture, water resources management, infrastructure and health.4
Green Climate Fund (GCF)	Caucasus Central Asia CIS SEE	The GCF is a new global fund created to support the efforts of developing countries to respond to the challenge of climate change. GCF as an operating entity of the UNFCCC helps developing countries limit or reduce their GHG emissions and adapt to climate change. The GCF seeks to promote a paradigm shift to low-emission and climate-resilient development, taking into account the needs of nations that are particularly vulnerable to climate change impacts.5 It's important to highlight that the GCF's operations respond to three main specific premises or principles, as follows: GCF's investments aim at building a balanced portfolio by aiming for a 50:50 balance between mitigation and adaptation investments over time. Additionally, the GCF aims for a floor of 50% of the adaptation allocation for particularly vulnerable countries (least developed countries, small island developing states and African states. Leveraging and crowding in private sector participation by bearing significant climate-related risk; offering a wide range of financial products, attractive to private sector stakeholders. Ensuring developing countries exercise ownership of climate change response and available financing for it. The region accounts for only 4% of the GCF approved portfolio; the GCF has invested a total of USD 264 million in Eastern Europe and Central Asia, through a number or projects and other resources through the Readiness and Preparatory Support Programme.

Source: FAO, 2018.

As conclusion to this analysis on climate finance flows in ECA, it is important to close this section by highlighting that this is a region with growing climate ambition, with important opportunities to expand the support network with bilateral and multilateral partners towards climate action to fully comply with its commitment under the Convention.

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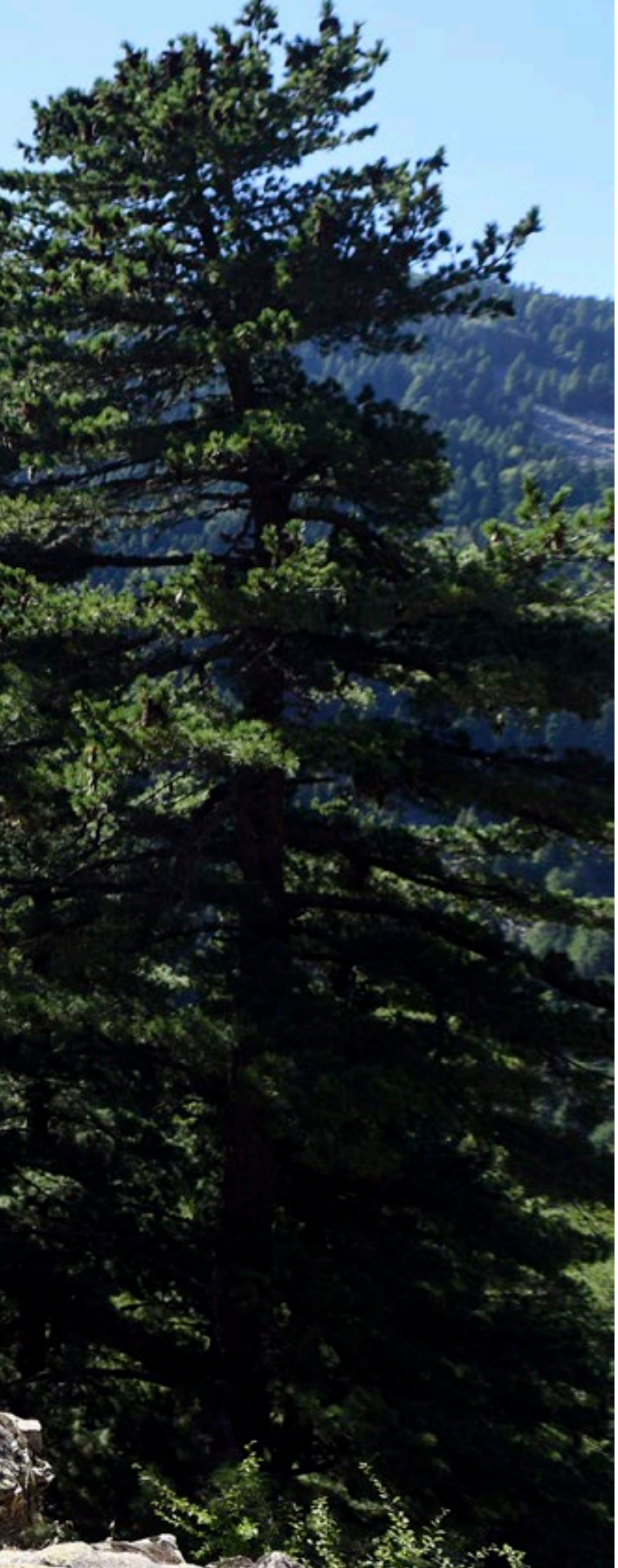

CONCLUSIONS

CONCLUSIONS

The Europe and Central Asia (ECA) region is highly diverse in terms of its physical geography, economic development, agricultural production and productivity and climatic characteristics. The impact of natural hazards, including floods, storms and droughts, has already adversely affected the agricultural sector in recent decades, causing extensive losses to crops, livestock, forests and fisheries as well as substantial damage to storage facilities, machinery and equipment.

Climate change is likely to challenge the region's ability to ensure food and nutrition security. Drivers, such as population growth, increasing incomes and urbanization, combined with limited resources, including land, water and energy, may undermine the sustainability of agricultural production systems, poverty alleviation and sustainable development in the coming decades. In particular, developing countries and especially smallholder farmers and their families, are among the most vulnerable to natural hazards and climate change due to the high climate sensitivity of agriculture and their dependence on the sector and its activities for their livelihoods.

Agriculture is one of the drivers of climate change, due to the emittance of greenhouse gases (GHG), including: CO2, through use of fossil fuels for agricultural machinery and equipment; CH4, via enteric fermentation by small ruminants and rice farming; and N2O, via the application of chemical fertilizers. However, the sector can also contribute to reducing GHG emissions through the implementation of various agricultural practices aimed at minimizing emissions through enhancing energy efficiency or using renewable energy sources as well as further enhancing carbon storage in soils and forests among others.

The majority of the ECA countries have ratified the Paris Agreement and submitted their first nationally determined contributions and have also adopted other related international agreements, including the Sendai Framework for Disaster Risk Reduction 2015–2030 and the Sustainable Development Goals (SDGs) by 2030. As a result, the focus will be on the implementation of these frameworks in the coming years.

However, in order for most countries to fulfil their obligations and make progress, several issues that need to be addressed, including enhancing the mainstreaming of climate change throughout national planning instruments, strengthening institutional coordination and technical capacity with regard to developing climate change policies, and implementing activities throughout the relevant sectors.

In general, the developed countries, including the EU-28 and EFTA countries, have legislative, policy and institutional frameworks in place that are linked to the international and EU agreements; where climate change is mainstreamed throughout these various national development and sectoral instruments and detailed activities, cost estimates and funding sources, responsible and contributing organizations, detailed timelines are identified.

On the other hand, some middle income countries are still in the process of developing and establishing their regulatory, policy and institutional structures for promoting low emission growth and building climate-resilient societies. An in-depth analysis was undertaken of countries' existing climate change, low emission development/energy, agriculture, climate change adaptation and disaster risk reduction strategies, policies or plans and the extent to which climate change, emissions reduction and agriculture were systematically mainstreamed throughout these documents.

Addressing climate change implies the implementation of both mitigation and adaptation activities. The majority of ECA countries included these activities for the agricultural and related sectors in their national planning documents, for example, the implementation of activities aimed at reducing GHG emissions through various agricultural practices, such as organic farming, increasing the efficiency of fertilizer and pesticide use, sustainable pasture management and the use of renewable energy sources, such as biogas from agricultural residues and waste. In addition, countries further strive to enhance carbon storage through, for example, afforestation/reforestation, agroforestry, mulching and minimized tillage, as well as the preservation of forests, wetlands and peatlands.

In order to assess whether a country has fulfilled its emission reduction set targets and commitments within the context of the Paris Agreement, the majority of the ECA countries need to address current data gaps and improve their methodologies for assessing the impacts of climate change on agricultural and related sectors. There is also a need to enhance the collection of accurate and up-to-date data and information on agricultural damage and losses as well as climate. In addition, GHG emission data for agriculture, land use, land-use change and forestry should ensure coherence and consistency with regard to the methodological assessment and reporting requirements, including the formats and templates used; GHG emissions databases need to be established and regularly updated.

Given that most of the countries face major constraints in terms of funds, access to financial resources is crucial. Various climate funds, such as the Green Climate Fund, are currently available to the most vulnerable countries in need of support in terms of capacity development, technology transfer and investments. It is also crucial to increase people's understanding and awareness of climate change and the need for regional and transboundary cooperation in the areas

of mitigation and adaptation as well as within the context of sustainable production and consumption, reduction of losses and waste along the food value chain, and increase in energy efficiency and use of renewable energy.

Partnerships are needed to tackle the challenges and constraints faced by the ECA countries in order to promote low emissions growth and build climate-resilient societies. This should be addressed through the provision of technical support with regard to capacity development, technology transfer and investments, by FAO and other international organizations as well as through public–private partnerships.

Access to finance through multilateral funds, such as the Green Climate Fund, should be further enhanced to ensure the implementation of effective adaptation and mitigation activities in the agricultural and related sectors, thereby contributing to promoting food and nutrition security, poverty alleviation and sustainable development within the context of a changing climate and in a cross-sectoral and coherent manner.

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ANNEX 1 NDC IN AGRICULTURAL SECTOR OF ECA COUNTRIES

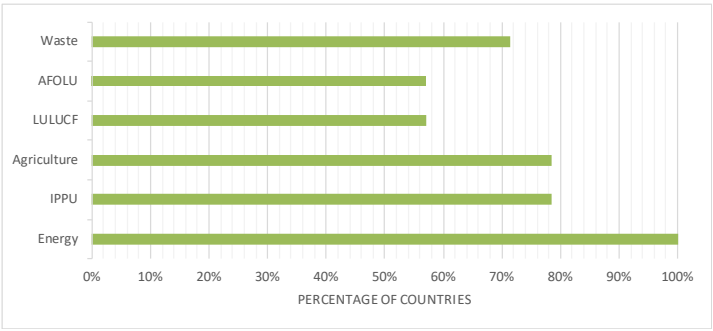
MITIGATION

GHG TARGETS

All 14 countries communicated their domestic mitigation contribution to stabilize the global climate under Article 2 of the Paris Agreement. Thirteen countries set a GHG target, while one country (Turkmenistan) qualifies its general mitigation contribution in terms of "Action-only."

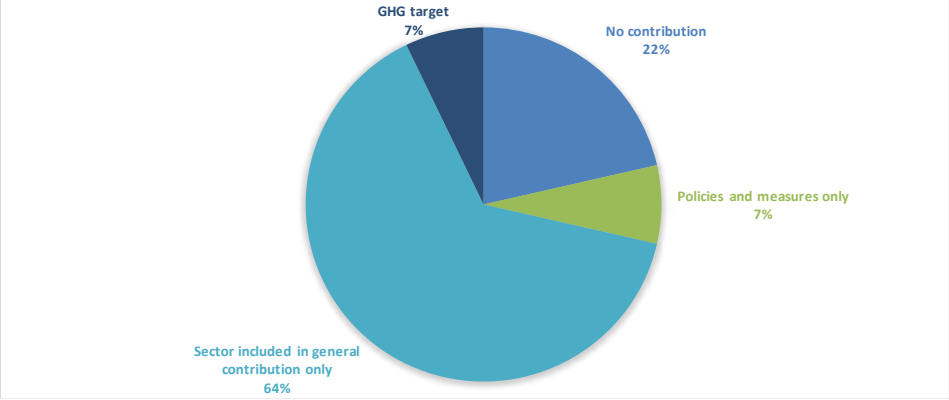
Eleven countries (Belarus, Bosnia and Herzegovina, Kazakhstan, Kyrgyzstan, Republic of Moldova, Montenegro, the Russian Federation, Serbia, Tajikistan, Turkmenistan and Ukraine) include the agricultural sector (79 percent), eight countries (Bosnia and Herzegovina, Kazakhstan, Kyrgyzstan, Republic of Moldova, the Russian Federation, Serbia, Tajikistan and Ukraine) include the LULUCF sector (57 percent) and eight countries (57 percent) include both sectors (i.e. AFOLU) in their general mitigation contributions (Figure A1.1).

Figure A1.1 Share of countries with a general mitigation contribution, by sector included



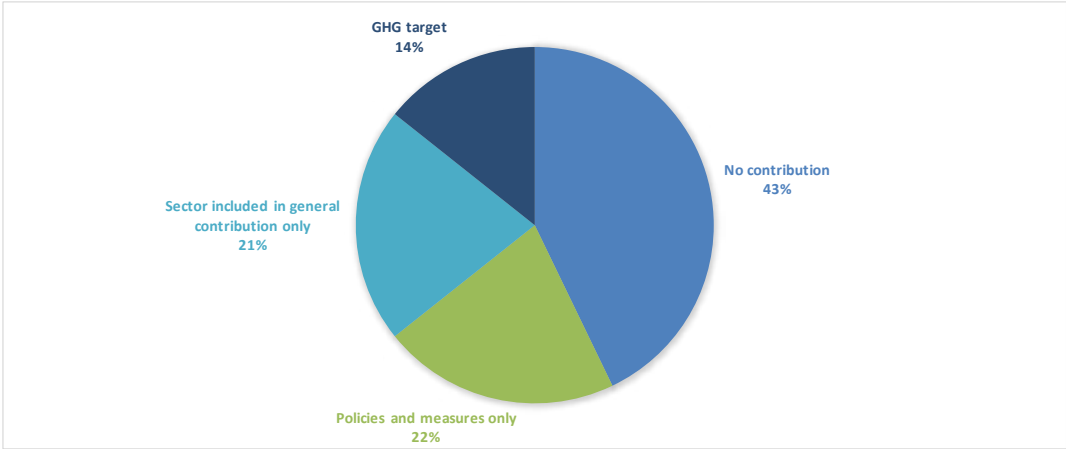
Of the 11 countries that include the agricultural sector in their general mitigation contribution (Figure A1.2), only one (Republic of Moldova) sets a sectoral GHG target, expressed as an absolute reduction of net emissions compared to a base year level, one (Tajikistan) includes a set of mitigation policies and measures and the remaining nine countries (Belarus, Bosnia and Herzegovina, Kazakhstan, Kyrgyzstan, Montenegro, the Russian Federation, Serbia, Turkmenistan and Ukraine) include the sector only as part of their general mitigation contribution.

Figure A1.2 Share of countries with a mitigation contribution in the agricultural sector, by type



Of the eight countries that include the LULUCF sector in their general mitigation contribution (Figure A1.3), two (Bosnia and Herzegovina and Republic of Moldova) set sectoral GHG targets, both expressed as an absolute reduction of net emissions compared to a base year level. Three countries (Kazakhstan, Tajikistan and the Russian Federation) include a set of mitigation policies and measures, and the remaining three countries (Kyrgyzstan, Serbia and Ukraine) include the sector only as part of their general mitigation contribution.

Figure A1.3 Share of countries with a mitigation contribution in the LULUCF sector, by type



POLICIES AND MEASURES

Countries often qualify their sectoral mitigation contribution by a number of policies and measures that aim to reduce net emissions or emission intensity, or enhance carbon sinks, from a particular agriculture activity and/or land use.

Overall, the majority of policies and measures have quantified targets (57 percent of measures), most in terms of GHG emission reductions.

Around three-quarters of policies and measures require a combination of domestic and international financial support; only a small share of policies and measures are unconditional, and an even smaller share are fully conditional.

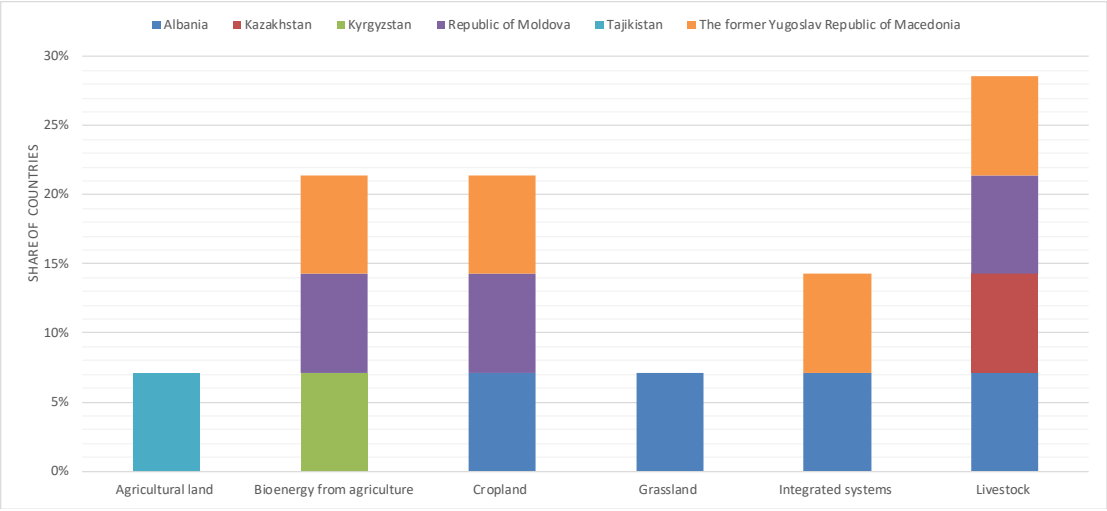
Of all mitigation policies and measures, the majority concern production (supply oriented) (93 percent of measures), with a small share of demand-oriented interventions.

Of all mitigation policies and measures, the majority target the production phase of agriculture and food value chains (88 percent of measures), followed by small shares of waste, consumption and full value chain phases.

POLICIES AND MEASURES IN THE AGRICULTURAL SECTOR

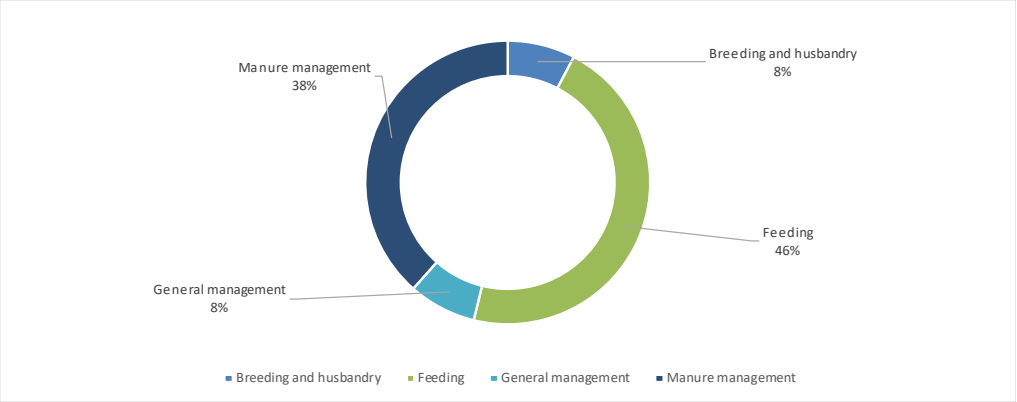
Six countries in the region (43 percent) include at least one policy and measure in the agricultural sector. The majority of these countries have one or more policies and measures targeting livestock management (29 percent of countries), followed by bioenergy production from agriculture and cropland management (21 percent), integrated systems (14 percent) and grassland and agriculture land management (7 percent, respectively). Figure A1.4 illustrates the share of countries in the region with one or more policies and measures in the agricultural sector per land-use category or subsector to avoid bias of representation.

Figure A1.4 Share of countries with policies and measures in the agricultural sector, by country and land-use/subsector



Among mitigation policies and measures in the livestock subsector, the majority refer to improved feeding practices (46 percent of measures), followed by improved manure management (38 percent), breeding and husbandry (8 percent) and general livestock management (8 percent). Figure A1.5 indicates the distribution of all mitigation policies and measures in the livestock subsector for all countries.

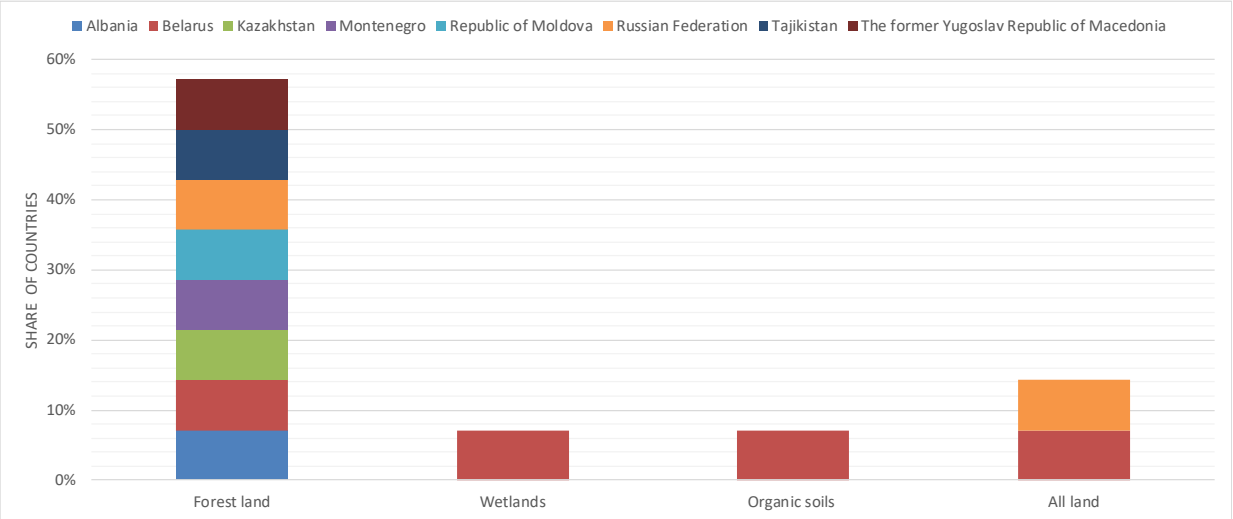
Figure A1.5 Share of mitigation policies and measures in the livestock subsector, by management activity



POLICIES AND MEASURES IN THE LULUCF SECTOR

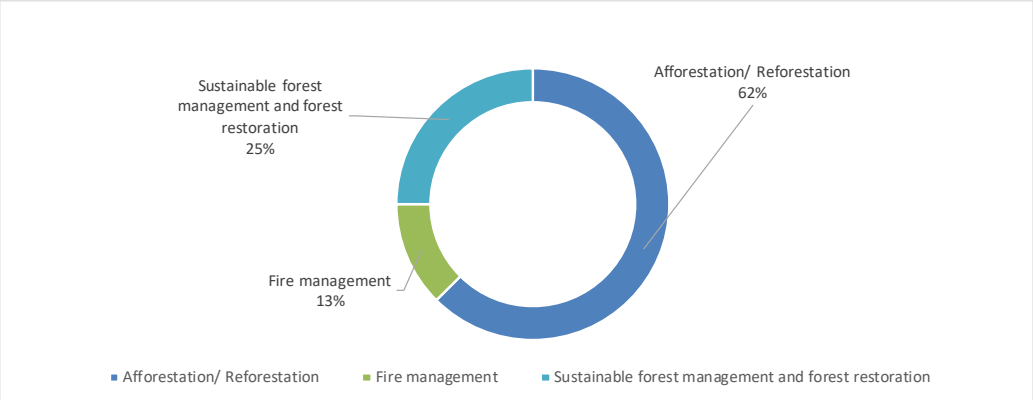
Eight countries (57 percent) include at least one policy and measure in the LULUCF sector. The majority of countries have one or more policies and measures aimed at reducing sectoral emissions or enhancing sinks through management activities on forest land (57 percent of countries), followed by all land types (14 percent), wetlands (7 percent) and organic soils (7 percent). Figure A1.6 illustrates the share of countries in the region with one or more policies and measures in the LULUCF sector per land-use category to avoid bias of representation.

Figure A1.6 Share of countries with policies and measures in the LULUCF sector, by country and land use



Among mitigation policies and measures on forest land, the majority refer to afforestation/reforestation (62 percent of measures), followed by sustainable forest management and forest restoration (25 percent) and fire (13 percent). Figure A1.7 indicates the distribution of all mitigation policies and measures on forest land for all countries.

FIGURE A1.7 Share of mitigation policies and measures on forest land, by management activity



BIOENERGY POLICIES AND MEASURES FROM AGRICULTURE AND FORESTS

Overall, five countries (36 percent of countries) include at least one policy and measure related to bioenergy from the agriculture and LULUCF sectors. The majority of bioenergy-related policies and measures from agriculture and/or forest biomass relate to liquid biofuel production (33 percent of measures). The majority of policies target bioenergy production from agriculture biomass rather than from forest biomass.

ADAPTATION

Climate change directly affects the natural resources and ecosystems on which agricultural production, food systems and rural livelihoods rely. Climate change impacts on food security and nutrition are transmitted through different pathways, and the severity of the impact is determined by climate drivers and risks, and by the underlying vulnerability of ecosystems, agro-ecosystems, rural economies and households (FAO, 2016c). A key way to moderate, reduce and/or avoid climate-related impacts is to reduce a system's underlying vulnerabilities, strengthen its adaptive capacity and increase its resilience (FAO, 2016d).

CLIMATE-RELATED HAZARDS, IMPACTS AND VULNERABILITIES

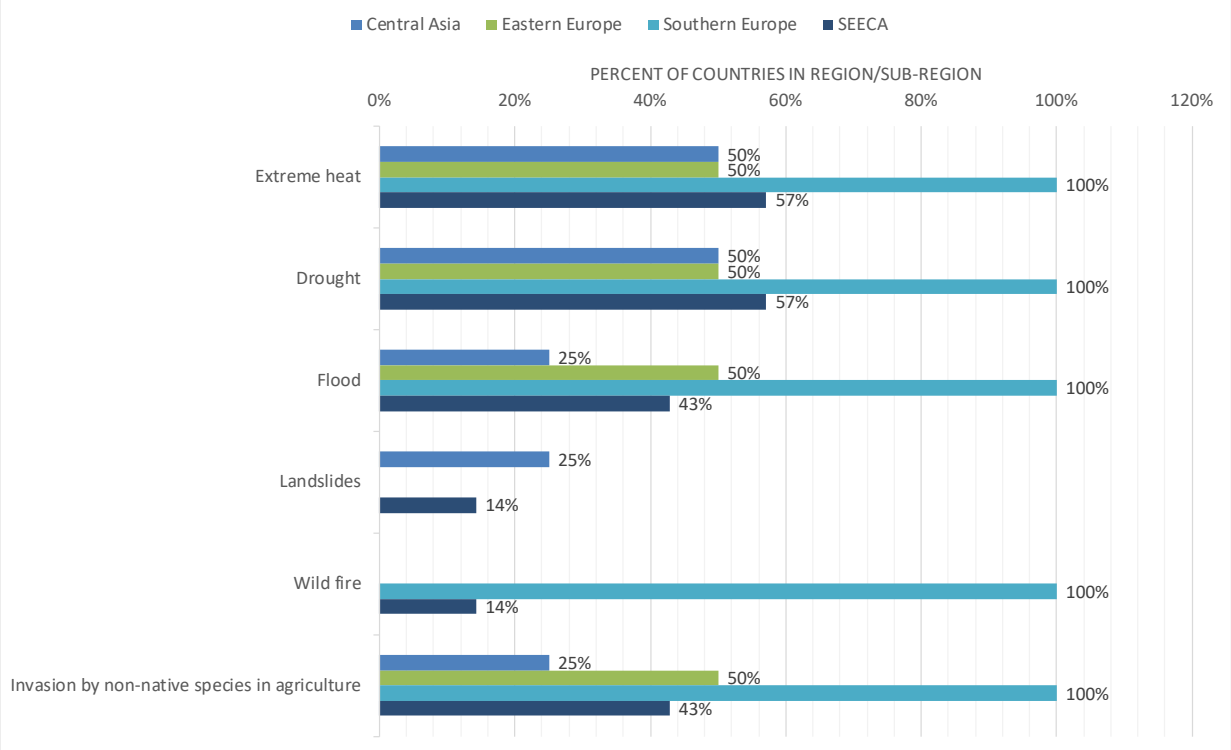
Seven countries (Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan, Belarus, Republic of Moldova, and Serbia) in the region (50 percent) include observed and/or projected climate-related hazards, impacts and vulnerabilities in ecosystems and/or social systems in order to inform or contextualize the need for adaptation to climate change.

CLIMATE-RELATED HAZARDS AND SLOW ONSET EVENTS

Of those seven countries, five (71 percent) report observed and/or projected changes in meteorological variables, namely variations in mean annual precipitation and surface air temperature and the frequency and intensity of climate extremes.

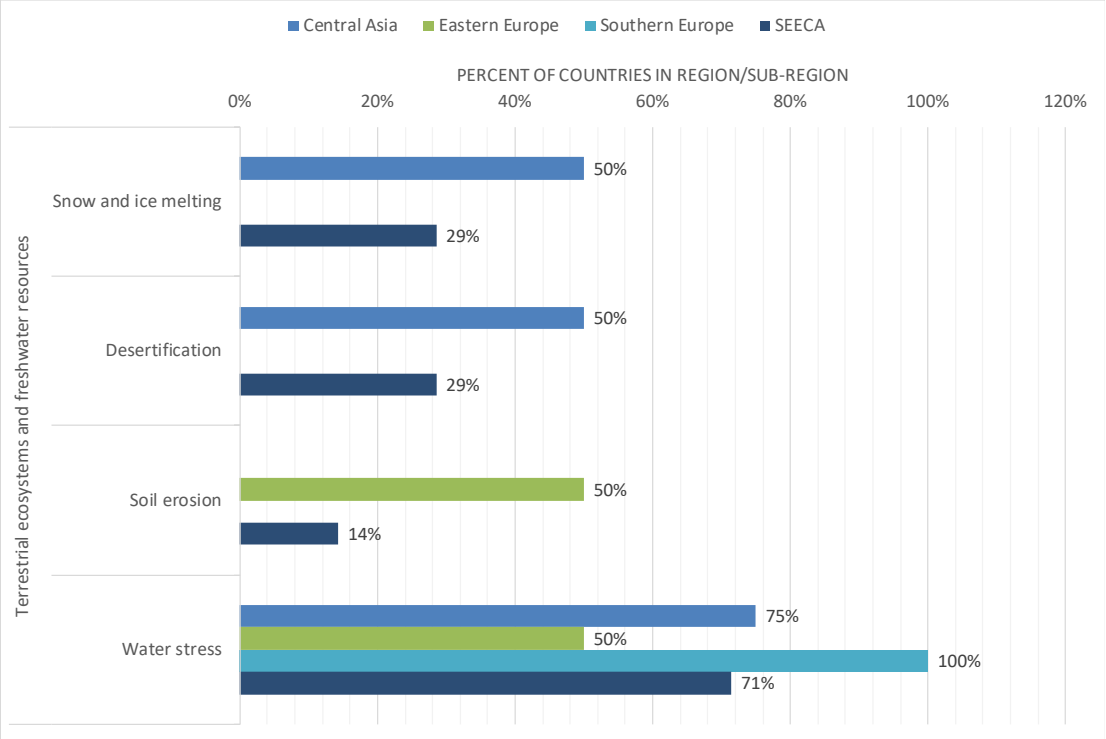
The majority of those countries report the occurrence of extreme heat and drought (57 percent of countries with climate impacts) among observed and/or projected climate-related hazards, followed by floods (43 percent), invasion by non-native species (43 percent), wild fire (14 percent) and landslides (14 percent). Figure A1.8 illustrates the share of countries, at the subregional and regional level, that report observed and/or projected climate-related hazards by type of hazard.

Figure A1.8 Share of countries reporting observed and/or projected climate-related hazards, by hazard type



Water stress is most frequently reported among observed and/or projected climate-related slow onset risks and events in terrestrial ecosystems and for freshwater resources (71 percent of countries with climate impacts), followed by desertification (29 percent) and snow and ice melting (29 percent). Figure A1.9 illustrates the share of countries, at the subregional and regional level, that report observed and/or projected climate-related risks and slow onset events by type of risk.

Figure A1.9 Share of countries reporting observed and/or projected climate-related risks and slow onset events, by risk type



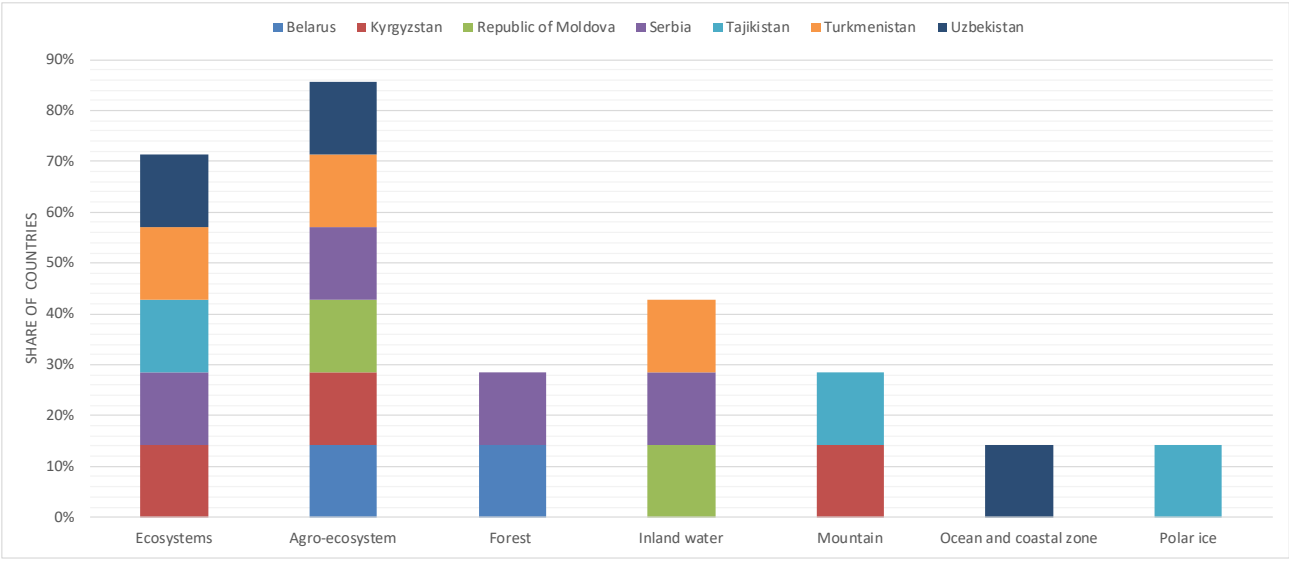
Of the five countries that reference non-climatic drivers of vulnerability, the majority indicate poverty and low levels of human development (60 percent of countries), followed by geography and topography, economic dependence on agriculture and natural resources and political instability and civil conflict (40 percent each) as the main stressors of vulnerability.

CLIMATE-DRIVEN IMPACTS, VULNERABILITIES AND RISKS IN ECOSYSTEMS

Seven countries in the region (50 percent) identify at least one observed and/or expected impact, vulnerability and risk induced by climate change in ecosystems. Figure A1.10 illustrates the share of countries that report one or more observed and/or expected climate-related impact, vulnerability and risk in ecosystems by type of ecosystem.

Of those seven countries, the majority indicate agro-ecosystems as the most vulnerable ecosystems to climate change (86 percent of countries), followed by all ecosystems in general (71 percent), inland water (43 percent), mountain (29 percent), forest (29 percent), polar ice (14 percent) and ocean and coastal zones (14 percent).

Figure A1.10 Share of countries reporting observed and/or projected climate-driven impacts, vulnerabilities and risks in ecosystems, by country and ecosystem type



Water is reported as the most vulnerable natural resource to climate change (39 percent of impacts), in all ecosystems and particularly inland water ecosystems, followed by genetic resources (23 percent), all natural resources (23 percent), primarily in mountain and forest ecosystems, and land and soil resources (15 percent).

Among impacts on ecosystem services, the loss of ecosystem, biodiversity and ecosystem goods, functions and services is reported the most (43 percent of impacts), primarily in forest and mountain ecosystems.

In agro-ecosystems, the majority of countries indicate forestry (71 percent of countries) and crops (71 percent) as the most vulnerable subsectors to climate change, followed by the agricultural sector in general (43 percent).

In agro-ecosystems, genetic resources are considered the most vulnerable natural resource to climate change (79 percent of impacts), primarily in the forestry subsector.

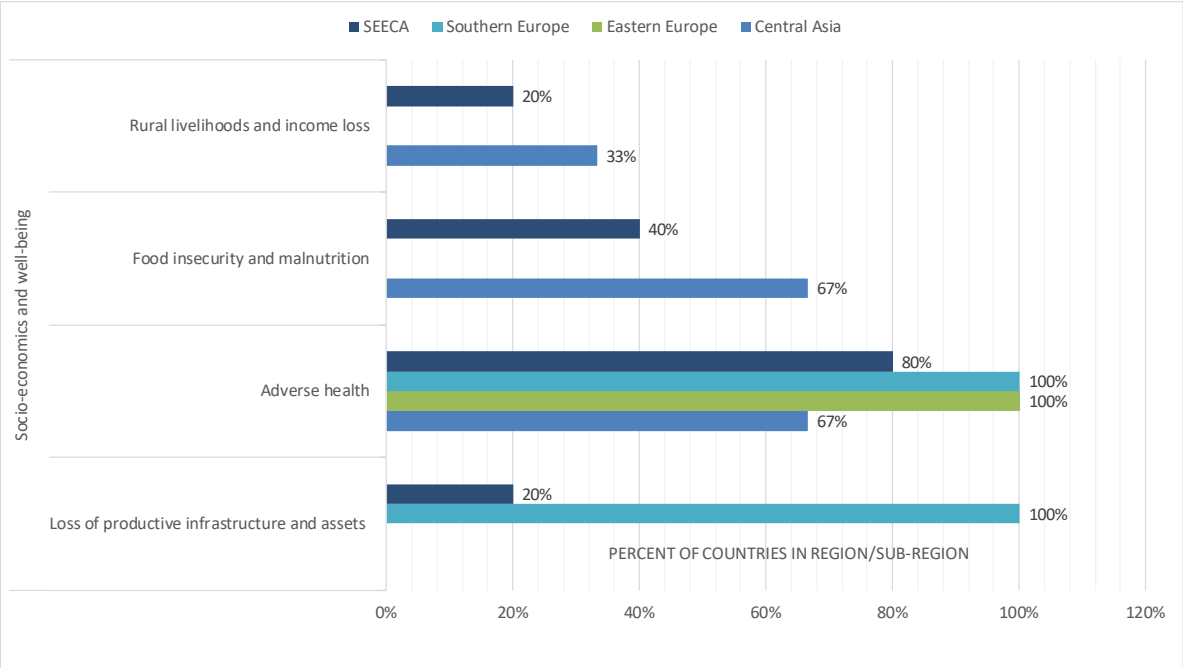
Among impacts on ecosystem services in agro-ecosystems, loss of primary production and productivity (86 percent of impacts) is most frequently reported, primarily in forestry and the agricultural sector in general, followed by pest and disease incidence in forestry and changes in water availability in the crop subsector.

CLIMATE-DRIVEN IMPACTS, VULNERABILITIES AND RISKS IN SOCIAL SYSTEMS

Five countries in the region (36 percent) identify at least one observed and/or expected impact, vulnerability and risk, induced by climate change in social systems. Figure A1.11 illustrates the share of countries that report one or more observed and/or expected climate-related impact, vulnerability and risk in social systems by type of intervention area.

Overall, the majority of countries report health as the social dimension most at risk under climate change (80 percent of countries), followed by food insecurity and malnutrition (40 percent).

Figure A1.11 Share of countries reporting observed and/or projected climate-driven impacts, vulnerabilities and risks in social systems, by type

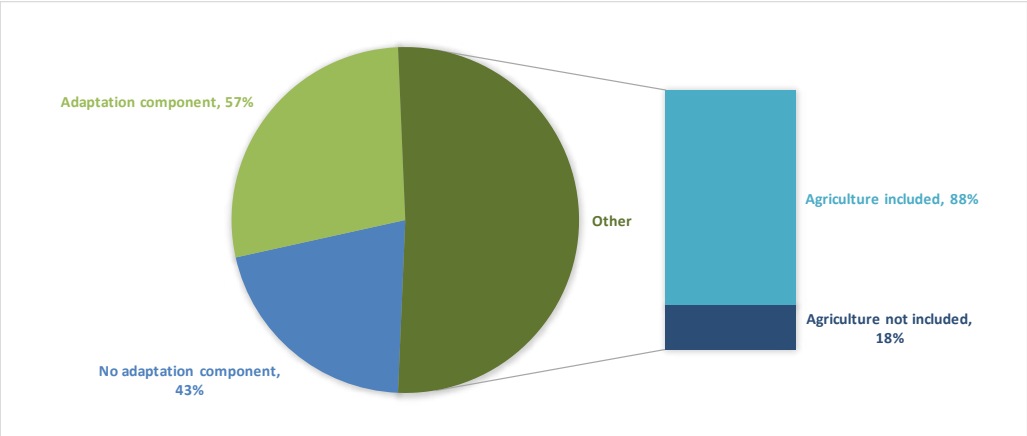


ADAPTATION PRIORITIES AND MEASURES

Eight countries (Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan, Belarus, Republic of Moldova, Ukraine and Serbia) in the region (57 percent) communicated an adaptation component in their respective NDCs to the UNFCCC in line with the global goal to enhance adaptive capacity and resilience, and reduce vulnerability to climate change, set under Article 7.10 of the Paris Agreement.

Of the eight countries with an adaptation component, seven (Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan, Belarus, Republic of Moldova and Serbia) (88 percent) include priority sector(s) and/or measures in the agricultural sectors, characterized by varying degrees of detail and breadth (Figure A1.12). Four of those countries (50 percent) include a set of priority sector(s) and measures, three (38 percent) include a set of priority sector(s), and only one country (18 percent) does not include agriculture in their adaptation component. Twenty-five percent of countries with adaptation include a long-term adaptation goal.

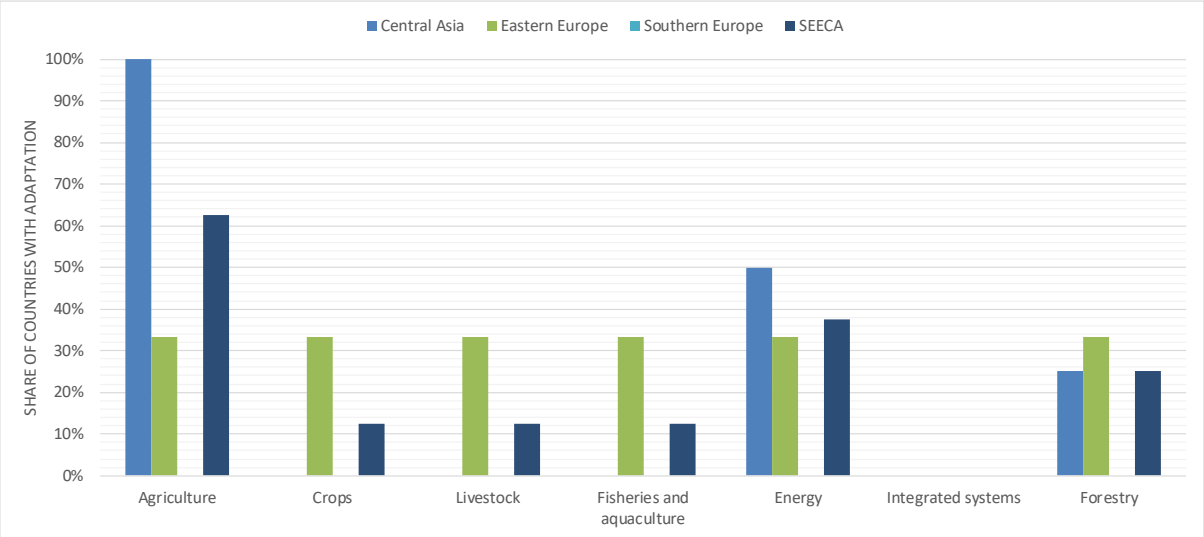
Figure A1.12 Share of countries with agriculture in the adaptation component



PRIORITY SECTORS AND CROSS-CUTTING PRIORITIES

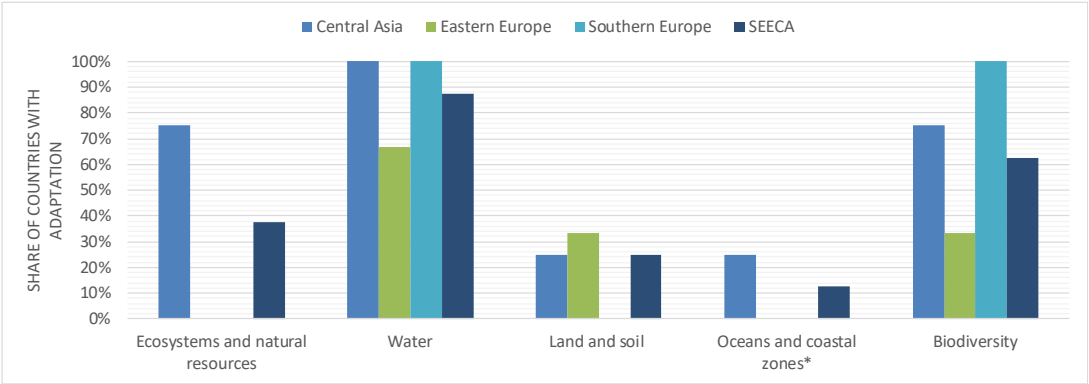
Among priority sectors for adaptation, the majority of countries prioritize the agricultural sector in general (63 percent of countries with adaptation) and the energy subsector (38 percent), followed by forestry (25 percent), and crops, livestock and fisheries and aquaculture (13 percent each). Figure A1.13 illustrates the share of countries with adaptation that include priorities in the agricultural sectors by subsector.

Figure A1.13 Share of Southeastern Europe and Central Asia (SEECA) countries with adaptation priorities in the agricultural sectors, by (sub-) sector



Overall, the majority of countries include water resources among cross-sectoral adaptation priorities (88 percent of countries with adaptation), followed by biodiversity (63 percent), ecosystems and natural resources (38 percent), land and soil (25 percent) and oceans and coastal zones (13 percent). Figure A1.14 illustrates the share of countries with adaptation that include cross-sectoral adaptation priorities by type of natural resource or ecosystem.

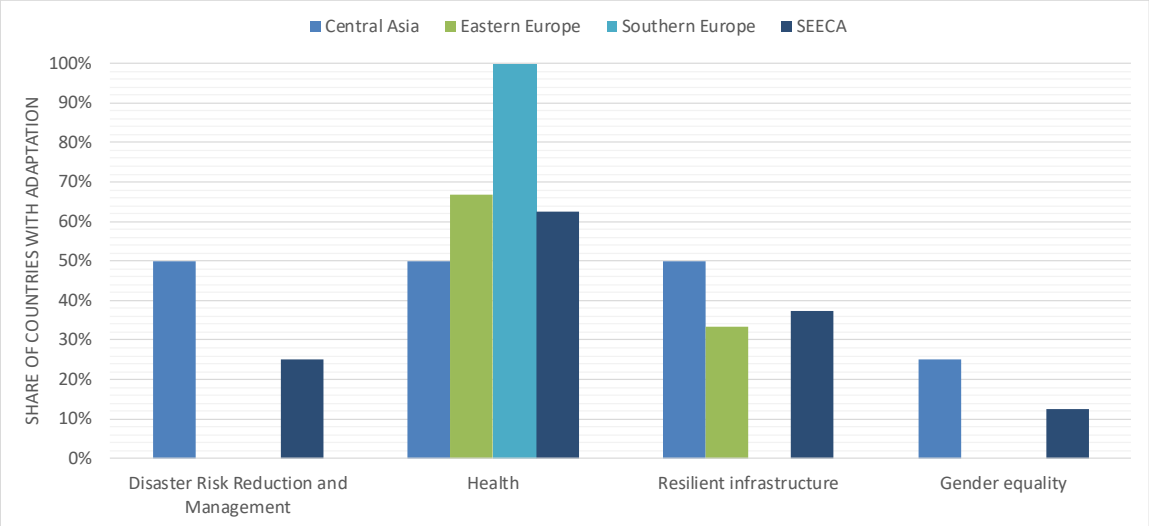
Figure A1.14 Share of countries with cross-sectoral adaptation priorities in ecosystems, by natural resource and ecosystem type



Note: Seven countries in the SEECA region are classified as landlocked developing countries.

Health represents the greatest cross-cutting adaptation priority in social systems among countries in the region (63 percent of countries with adaptation), followed by resilient infrastructure (38 percent), disaster risk reduction and management (DRR/M) (25 percent) and gender equality (13 percent). Figure A1.15 illustrates the share of countries with adaptation that include cross-cutting adaptation priorities in social systems by type.

Figure A1.15 Share of countries with cross-cutting adaptation priorities in social systems, by type

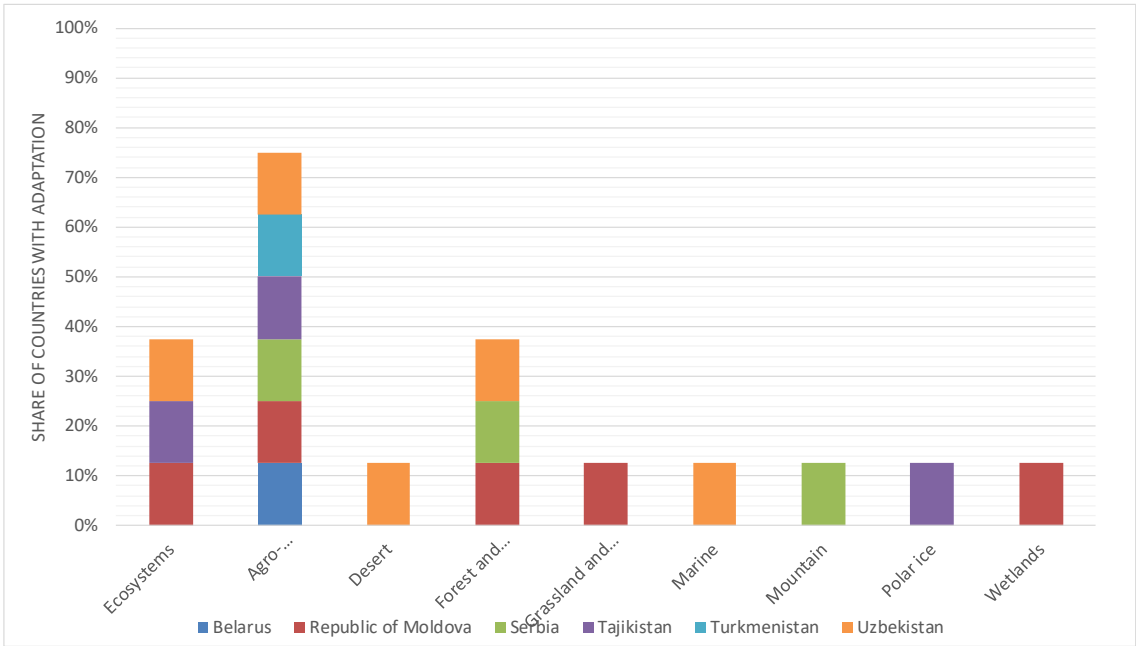


ADAPTATION MEASURES IN ECOSYSTEMS

Overall, only one percent of adaptation measures have quantified targets, likely due to the challenges related to measuring adaptation baselines and outcomes at the local and national level. The majority of measures require a combination of domestic and international financial support (90 percent of measures), while only a small share of policies and measures are fully conditional and an even smaller share are unconditional. Of all adaptation measures, the majority are either supply-oriented (focusing on production) (50 percent of measures), with a small share of demand-oriented interventions.

Of those countries with an adaptation component, six (75 percent) identify at least one adaptation measure in ecosystems. The majority of countries prioritize adaptation in agro-ecosystems (75 percent of countries with adaptation), followed by forest and woodlands and ecosystems in general (38 percent each), and grassland and savanna, marine, mountain, polar ice, wetlands and desert ecosystems (13 percent each). Figure A1.16 illustrates the share of countries with adaptation that include one or more adaptation measures in ecosystems by type of ecosystem to avoid bias of representation.

Figure A1.16 Share of countries with adaptation measures in ecosystems, by country and ecosystem type

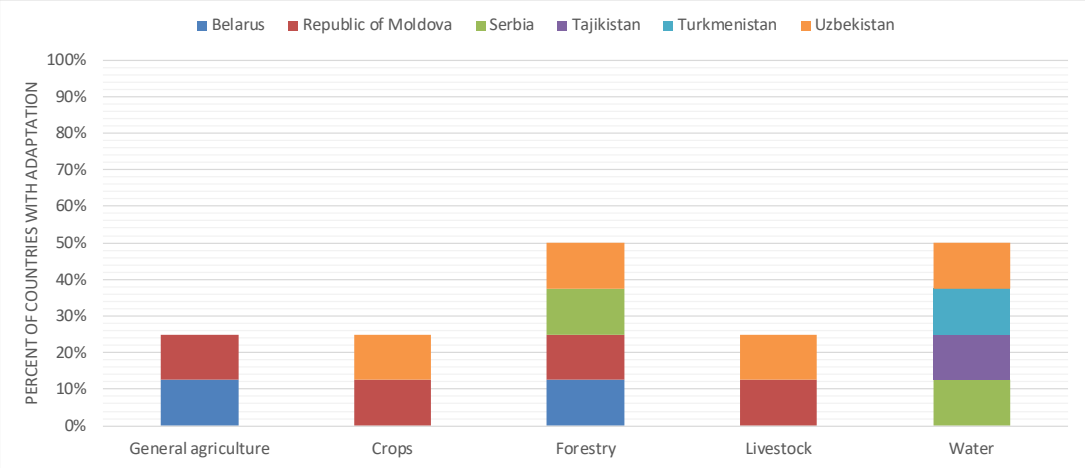


Among adaptation measures, ecosystem management, conservation and restoration activities are most frequent (30 percent of measures), primarily in forest and woodland ecosystems, followed by biodiversity protection, conservation and restoration

(22 percent), in desert, forest and woodlands, marine and mountain ecosystems, and land/soil management, restoration and rehabilitation (19 percent), in ecosystems in general as well as in forest and woodlands ecosystems.

Within agro-ecosystems, the majority of countries prioritize adaptation in the forestry subsector (50 percent of countries with adaptation) and water subsector (50 percent), followed by livestock, crops and agriculture in general (25 percent each). Figure A1.17 illustrates the share of countries with adaptation that include one or more adaptation measure in agro-ecosystems by subsector to avoid bias of representation.

Figure A1.17 Share of countries with adaptation measures in agro-ecosystems, by country and subsector

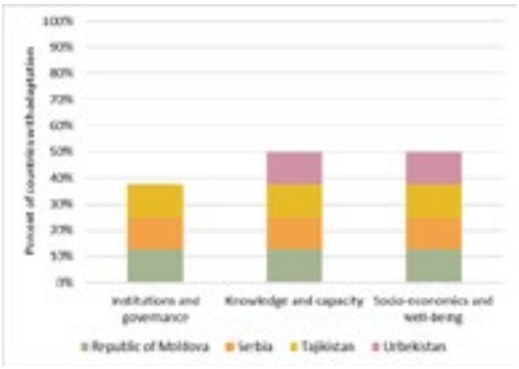


Among adaptation measures in agro-ecosystems, the majority promote irrigation and drainage (15 percent of measures), followed by afforestation/reforestation and plant management (12 percent each).

ADAPTATION MEASURES IN SOCIAL SYSTEMS

Of those countries with an adaptation component, four (50 percent) identify at least one adaptation measure in social systems. The majority of countries prioritize options related to socio-economics and well-being (50 percent of countries) and knowledge and capacity (50 percent), followed by institutions and governance (38 percent). Figure A1.18 illustrates the share of countries with adaptation that include one or more adaptation measure in social systems by dimension to avoid bias of representation.

Figure A1.18 Share of countries with adaptation measures in social systems, by pillar and intervention area



Among adaptation measures along the socio-economics and well-being pillar, gender equality and women empowerment is the most prioritized (22 percent of measures), followed by food security and nutrition and health information and services (14 percent each).

Among adaptation measures along the knowledge and capacity pillar, the majority aim to increase research and development (40 percent of measures), followed by awareness raising and education (27 percent) and human resource training for climate action (20 percent).

Among adaptation measures along the institutions and governance pillar, the majority aim to enhance policy mainstreaming and coherence (41 percent of measures), followed by DRR/M (25 percent), and transparency and accountability, and institutional capacity building for climate action (17 percent each).

ANNEX 2. OVERVIEW OF THE MAIN CLIMATE CHANGE LAWS AND POLICIES IN THE ECA REGION

ARMENIA	• Law on Atmospheric Air Pollution (1994) • Perspective Development Strategic Programme for 2014–2025 (2014) • Strategy for Sustainable Rural and Agricultural Development for the period 2010–2020 (2010) • Sustainable Development Programme (2008) • National Programme for Energy Saving and Renewable Energy (2007) • National Forest Programme (2005) • Strategy for Development of the Energy Sector within the Context of Economic Development of Armenia (2005)
AZERBAIJAN	• State Programme for the Socioeconomic Development of the Regions of Azerbaijan for the period 2014–2018 (2014) • National Forest Program (2013) • Azerbaijan 2020 (2012) • State Program on Poverty Reduction and Sustainable Development in the Republic of Azerbaijan for 2008–2015 (2008) • National Program on Environmentally Sustainable Socio-economic Development for 2003–2010 (2003)
GEORGIA	• Climate Change National Adaptation Plan for Georgia's Agricultural Sector (2017) • Rural Development Strategy 2017–2020 (2016) • Strategy for Agricultural Development in Georgia 2015–2020 (2015) • Climate Change Strategy (2014)
KAZAKHSTAN	• Law on the Transition to Green Economy (2016) • Law on Energy Saving (2011) • Law about Support of Use of Renewable Sources of Energy No. 165-4 (2009) • Ecological Code of the Republic of Kazakhstan, No. 212 of 2007 and Amendment to said legislation on 3 December 2011 (2007) • Law on Power Industry, No. 588-II (2004) • Concept of Transition of the Republic of Kazakhstan to Sustainable Development for the period 2007–2024, Presidential Decree No. 216 of 2006 (2006) • Government Decree No. 857 on Wind Energy Development (2003) • National Allocation Plan for GHG Allowances for 2013, 2014–2015, 2016–2020
KYRGYZSTAN	• Law No. 137 on the Energy Efficiency of Buildings (2011) • Law No. 283 on Renewable Sources of Energy (2008) • Law No. 71/2007 about state regulation and policy in the field of Emission and Absorption of Greenhouse Gases (2007) • Law No. 88 on Energy Saving (1998) • Climate Change Adaptation Programme and Action Plan for 2015–2017 for the Forest and Biodiversity Sector (2015) • Priorities for Adaptation to Climate Change in the Kyrgyz Republic till 2017 (updated to 2020) (2015) • National Sustainable Development Strategy for the Kyrgyz Republic (2013) • Programme of the Agriculture and Water Resources Adaptation to Climate Change for 2016–2020
TAJIKISTAN	• Law No. 587 on Promoting the Use of Renewable Energy (Renewable Energy Law) (2010) • Law No. 29 on Energy Saving (2002) • Law No. 228 on Protection of the Atmospheric Air (Law on Air Protection) (1996) • Government Order No. 73 on the Long-term Programme for Building Hydropower Plants for 2009–2020 (2009) • Governmental Order No. 189 on the Committee on Environmental Protection (2008) • Governmental Order No. 41 on the Complex Programme for the Widespread Use of Renewable Energy Sources (2007) • National Action Plan for Climate Change Mitigation (2003/Mitigation and Adaptation Framework)
TURKMENISTAN	• National Strategy on Climate Change (2012/Mitigation and Adaptation Framework)

UZBEKISTAN	• Law on the Rational Use of Energy; and Parliamentary Decree regarding the procedure of enforcing the Law on the Rational Use of Energy (1997) • Decree No. DP-2343 on the Program of Measures to Reduce Energy Consumption, Implement Energy-Saving Technologies in the fields of Economy and Social Sphere for 2015–2019 (2015) • Decree No. UP-4512 about Measures for Further Development of Alternative Energy Sources (2013) • Resolution of the Cabinet of Ministers No. 142 Action Plan of the Republic of Uzbekistan for Environmental Protection for 2013–2017 (2013) • Resolution of the Cabinet of Ministers No. 245 validating the Regulation on Use of Electric and Thermal Energy (2009) • Resolution of the Cabinet of Ministers No. 183 validating the Regulation on the State Hydrometeorological Service and Cabinet Decision No. 606 (2004)
BELARUS	• Act No. 204 on Renewable Energy Sources (2010) • Act No. 426-N on the Use of Nuclear Power (2008) • Act No. 190-Z of 1998 on Energy Savings (1998) • National Programme on Climate Change Mitigation Measures for 2013–2020 (Resolution of the Council of Ministers of the Republic of Belarus No. 510) (2013/Mitigation Framework) • Decree No. 625 on Some GHG Emission Reduction Issues (2010) • State Building Sector Development Concept for 2011–2020 (Resolution of the Council of Ministers of the Republic of Belarus No. 1589) (2010) • Strategy of Technological Development of Belarus up to 2015 (Resolution of the Council of Ministers of the Republic of Belarus No. 1420) (2010) • Tax relief for renewable energy investors (Decree No. 10 of 6 August 2009 on Additional Conditions for Investment Activities as amended; Tax Code of Belarus of 29 December 2009, No. 71-W) (2009) • Concept of Energy Security of the Republic of Belarus (Decree of the President of the Republic of Belarus No. 433) (2007) • Directive No. 3 on the Economy and Savings as the Main Factors of the Economic Security of the State (2007) • Regulation of the National Greenhouse Gas Inventory System (Resolution of the Council of Ministers of the Republic of Belarus No. 585) (2006) • State Commission for Climate Change Problems (Resolution of the Council of Ministers of the Republic of Belarus No. 1145) (2006)
REPUBLIC OF MOLDOVA	• Strategy on Biological Diversity of Republic of Moldova for 2015–2020 (2015) • National Strategy on Agriculture and Rural Development for the period 2014–2020 (2014) • National Program for Energy Efficiency 2011–2020 (2011) • Strategy for Sustainable Development of Forestry Sector (Parliament Resolution No. 350-XV of 12.07.2001) (2001)
RUSSIAN FEDERATION	• Energy Efficiency legislation (Federal Law 261-F3 on Saving Energy and Increasing Energy Efficiency Increase and amending certain Legislative Acts of the Russian Federation) (2009) • State Program on Energy Efficiency and Energy Development (approved by Government Decree No. 321) (2014) • Decree No. 449 on the Mechanism for the Promotion of Renewable Energy on the Wholesale Electricity and Market (2013) • Greenhouse Gas Emission Reduction (Presidential Decree No. 752) (2013) • Climate Doctrine of the Russian Federation (2009/Mitigation Framework) • Energy Strategy to 2030 (2009) • Legislation on the Limitations of Associated Gas Flaring (2009) • Government Decree No. 844 on the Measures of Implementing Article 6 of the Kyoto Protocol to the United Nations Framework Convention on Climate Change (2009) • Rules of Using Thermal Performance of Buildings (2003) • Programme for Energy Efficient Economy (2001)
UKRAINE	• Law on Energy Efficiency Fund (No. 5598) (2017) • Law 1391-VI on Promotion of Biological Fuels Production and Use (2009) • Law 2509-IV on Combined Heat and Power (cogeneration) and Waste Energy Potential, amended by Law 2592-VI, Code 2755-VI, Law 2856-VI, and Law 3610-VI of 7 July 2011 (2005) • Law 555-IV on Alternative Energy Sources, amended by Law 601-VI (2003) • Law 1391-XIV on Alternative Fuels, last amended by Law 4970-VI (2000) • Law 575/97-BP on Electricity, amended by Law 601-VI and Law 5485-VI on Green Tariff (Feed-in Tariff) (1997) • Law 74/94-VR on Energy Saving, amended by Law 783-XIV and Law 2509-IV (1994) • Energy Strategy to 2030, approved by Decree No. 1071-p and to 2035 approved by Decree No. 605-p (2013) • National Action Plan on Implementation of the Kyoto Protocol, adopted through Resolution 346-p of the Cabinet of Ministers (2005/Mitigation Framework)

ALBANIA	• Law 7/2017 promoting the Use of Energy from Renewable Resources (2017) • Law 138/2013 on Renewable Sources of Energy (2013) • National Strategy of Energy (2003)
BOSNIA AND HERZEGOVINA	• Law on Energy Efficiency (2017) • Climate Change Adaptation and Low-Emission Development Strategy for Bosnia and Herzegovina (2014)
MONTENEGRO	• National Strategy with Action Plan for Transposition, Implementation and Enforcement of the EU acquis on Environment and Climate Change 2016–2020 (2016) • National Strategy in the field of Climate Change by 2030 (2015/Mitigation and Adaptation Framework) • National Forestry Policy (2008) • National Strategy for Sustainable Development to 2030 (2007)
SERBIA	• Law on Energy (2014) • Law on Efficient Use of Energy (2013) • National Renewable Energy Action Plan (2013) • Forest Law (2010) • National Sustainable Development Strategy of the Republic of Serbia and its Action Plan for 2009–2017 (2008)
THE FORMER YUGOSLAV REPUBLIC OF MACEDONIA	• Energy Law (compliant with the EU Third Energy Package) (2018) • Law on Ambient Air Quality (2004) • Action Plan on Renewable Energy Sources (2015) • Energy Efficiency Action Plan (2014) • Energy Strategy (2010) • Law on Environment (2005)
TURKEY	• Electricity Market Law (No. 6446) introducing tax deductions for renewables (2013) • Act No. 5627 on Energy Efficiency (2007) • Act No. 5686 on Geothermal Resources and Mineral Waters (2007) • Act No. 5346 on Utilization of Renewable Energy Sources for the Purposes of Generating Electrical Energy (Renewable Energy Law) (2005) • Act No. 5403 on Soil Conservation and Land Use (2005) • National Energy Efficiency Action Plan 2017–2023 (High Planning Council Decision No. 2017/22) (2018) • National Renewable Energy Action Plan (2014) • Energy Efficiency Strategy Paper 2012–2023 (2012) • Climate Change Action Plan 2011–2023 (2011/Mitigation and Adaptation Framework) • Decree Laws 644 and 648 on the Organisation and Duties of the Ministry of Environment and Urban Planning (2011) • Turkey's National Climate Change Adaptation Strategy and Action Plan (2011/Adaptation Framework) • Climate Change Strategy 2010–2020 (2010) • Strategy for Combating Agricultural Drought and Action Plan 2008–2012 (2008)

ANNEX 3. DATA-RELATED ISSUES FOR AFOLU SECTORS IN THE ECA REGION

COUNTRY	UNCERTAINTY ESTIMATION	ISSUES RELATED TO DATA COLLECTION AND USE	RECOMMENDATIONS FOR FUTURE IMPROVEMENTS
ARMENIA	Different uncertainty estimations per key sources – without forestry data, 2010: CO2 generic uncertainty of 3.6%; CH4 generic uncertainty of 24.4%; N2O generic uncertainty of 21.9% and HFC generic uncertainty of 6.6%; Data collection difficulties for forestry enhanced uncertainties, which doubled the CO2 genetic uncertainty to 7.8%.	Lack of data on emissions, removals and storage in AFOLU, which leads to inaccuracies and uncertainty in GHG emissions.	Implement targeted studies, including field studies, so that the findings can be used to establish procedures and guidelines for regular monitoring and inventory of organic carbon deposits in soil; Develop national factors for carbon emissions, removals and sinks in the AFOLU sector; Establish economic mechanisms, via training and awareness raising, to stimulate implementation of soil monitoring (especially for organic carbon content in soil) by land users.
AZERBAIJAN	n.a.	Uncertainties in forestry data due to the absence of an inventory of forests with the last inventory undertaken in 1988.	Establish a forestry inventory.
GEORGIA	Overall uncertainty in the range of 9.12% and trend uncertainty of 17.27%: CH4 and N2O plus fugitive emissions from coal, oil, gas production and indirect emissions from agriculture soils have highest uncertainty rate from biomass combustion, whereas fugitive emissions from gas transportation and distribution, CH4 from enteric fermentation and indirect emissions from soils result in highest contribution to total uncertainty.	The LULUCF sector had a net sink of GHG during 1992–2013, except 2004, due to the cropland category. This was the result of changes in the land cadastre data in 2004 as the boundaries of perennial orchards were indicated and the areas covered with these perennial crops were almost halved (BUR1 report).	Ensure accuracy and consistency in the cropland category with regard to recording of perennial crops.
KAZAKHSTAN	n.a.	n.a.	n.a.
KYRGYZSTAN	Uncertainty in sinks is estimated at 10%, as figures are based on the first national forestry inventory conducted in 2008–2010, but according to expert assessment of uncertainty the total estimates of sinks is 37.4% and overall rating of uncertainty of emissions from sinks from soils estimated at 35.5%.	Data on humus content for time series given not by a single value, but by an interval; High variations in observations of the soil humus content; Lack of inventory of manure storage systems; Lack of records on manure management; No studies on a definition of national emissions factors.	Improve accuracy and quality of data with regard to soil humus content; Establish inventory of manure storage systems and collect data on manure management, in addition to improving cooperation between different sectors and statistical agencies and relevant organizations; Undertake additional studies with regard to, for example, national emissions factors.

TAJIKISTAN	Overall inventory uncertainty is estimated at the medium level (10–50%), although per sector this uncertainty differs and for agriculture and LULUCF it considered a high level of uncertainty (> 50%).	Lack of statistical data and existing information gaps (not specified with regard to AFOLU sectors); Lack of clarity in allocation of data to different sectors (not specified with regard to AFOLU sectors).	Establish a national inventory of GHG emissions to be updated on a regular/ annual basis; Develop and adopt robust approaches with regard to, for example, collection of statistical data, reporting, optimization of data sources and flows, allocation of responsibilities for preparation of GHG inventory and undertaking of regular biannual reporting.
TURKMENISTAN	Uncertainty (by Tier 1) accounted for the trend of common national emissions equal to 30.2% of total estimated emissions.	Lack of the national inventory system; Lack of national emissions factors and activity data (e.g. underestimation of livestock on private farms).	Enhance the system of assessment of GHG emissions and sinks, i.e. establish the national inventory system (NIS); Expand the scope of scientific research regarding climate change, i.e. identify national GHG emission factors from various sources.
UZBEKISTAN	Uncertainty of emissions by level and trend (under Tier 1 approach) was approx. 8.4%, with emissions uncertainty in the agricultural sector by level at 65.7% and by trend at 79.1%.	Use of default emission factors and uncertainties of activity data resulted in high uncertainty levels for the agricultural sector.	Develop and use national emission factors in all key categories in order to reduce level of cadastre uncertainty; Apply advanced methodologies, software and other tools of IPCC; Build up the capacity of experts by enhancing their participation in training courses, international workshops and studies on other countries' experiences.
BELARUS	n.a.	n.a.	n.a.
REPUBLIC OF MOLDOVA	Overall inventory uncertainty is estimated for the period 1990–2015 (using Tier 1 approach) at approx. 8.45 % by level and around 2.37% uncertainty by trend.	Poor quality of activity data; Use of emission factors by default or limited understanding of how emissions are generated.	Collect additional and more detailed activity data; Enhance accuracy of emission factors through further research, for example, enhancing accuracy of indirect N2O emissions from agricultural soils.
RUSSIAN FEDERATION	n.a.	n.a.	n.a.
UKRAINE	n.a.	Insufficient level of data only from State Statistics Committee; Quality assurance and control system of inventory.	Include data from Ministry of Agriculture and Food as well as other sources of information (scientific publications, book etc.); Improve emission estimation methods (e.g. from Tier 1 to Tier 2): Consider additional categories of emissions.

ALBANIA	Overall inventory uncertainty estimation is 9.925%; main contributor to this uncertainty is CO2 emissions from fuelwood consumption in the residential and service sectors.	Lack of accurate data with regard to forest stocks (increase, decrease of area and volume etc.) is one of the main problems for LULUCF emissions estimation due to the absence of a cadastre for the entire country (waters, pasture, abandoned land, agriculture, bare lands, forests, resident areas, roads) documenting relevant land-use changes; A biomass survey was conducted to reduce the uncertainties with regard to fuelwood consumption.	Monitor the effectiveness of afforestation/reforestation programmes as there are currently no accurate data on the status of these programmes; Monitor the effectiveness of silvicultural interventions as there are currently no accurate data on the change of biomass in the areas as a result of silvicultural interventions; Set up training programmes for forestry staff to monitor burned areas as currently cadastres do not include qualitative and quantitative data of forest burned areas; Plant fast-growing species to reduce adverse impact of floods and soil degradation due to the increasing demand for firewood as a result of the high price of electricity; Conduct a public awareness-raising campaign to enhance energy efficiency from firewood due to lack of knowledge and required equipment (e.g. efficient stoves, appropriate places for firewood storage); Elaborate a survey with regard to enteric fermentation and manure management in collaboration with INSTAT.
BOSNIA AND HERZEGOVINA	Total estimated uncertainty in calculation of CO2 emissions for 2002–2013 period ranges from 7% to 13%.	Statistical data not harmonized with methodology of inventory compilation with regard to data availability and inadequate data format for all sectors, including agriculture as data on fertilizer consumption were almost totally lacking.	Enhance data availability on mineral fertilizers' consumption; Establish forestry inventory.
MONTENEGRO	Total inventory uncertainty of GHG emissions (Tier 1 approach) for 2011 is 8%, while uncertainty for 1990–2011 period is estimated at 4%. Differences per sector and per GHG emissions (e.g. combined measurement uncertainty of CH4 emissions from manure management and enteric fermentation is 58.3%).	Data on wood felling was also used to estimate sinks; In 2012, MONSTAT drafted a new methodology and new forms for collection and statistical processing of data, and these changes impact time series, therefore recalculations will be undertaken based on the 2010 agricultural census data.	Revise the data on activities (not specified for AFOLU sector); Calculate national emission coefficients, where possible (not specified for AFOLU sector).
SERBIA	Overall emission inventory uncertainty (Tier 1 approach) is 60.4%, while the trends uncertainty is 11.1%, including uncertainty of 85.2% for forest land.	Overall lack of data for 2014 and incomplete data collection system, as a result of the severe floods in 2014.	Strengthen the capacity of Serbia's Environmental Protection Agency and related institutions with regard to collection of activity data, which will enhance data quality and reduce uncertainties.

THE FORMER YUGOSLAV REPUBLIC OF MACEDONIA	Uncertainty only reported for the industrial processes CO2 emission estimates, ranging between 9.7% and 16.1% between 2003 and 2009, as a result of lack of data.	Use of default emissions factors with regard to LULUCF; Unavailability of accurate activity data related to LULUCF; Default values obtained on animal weight, emission and conversion factors in calculation of CH4 from enteric fermentation and both CH4 and N2O emissions from manure management; Data gap in the country's goat and buffalo populations; Poultry not divided into subcategories as broilers, ducks, chicks and hens or turkeys, which lead to difficulties in determining the CH4 factor (kg CH4/head/year) as well as excretion rate for manure management; with the same categorization required for cattle, swine, sheep and goats; Certain other livestock were not included in previous inventories (e.g. rabbits were registered in 2007 agricultural census, but not included in statistical yearbooks in 2003–2009 period, and mules and assess were not included as their numbers are quite low); Manure management system for poultry not adequately defined, which led to inaccurate estimations of emissions.	Enhance accuracy of activity data related to LULUCF; Fill the data gap in the country's goat and buffalo populations; Ensure that poultry is divided into subcategories and also apply same categorization methodology for cattle, swine, sheep and goats; Include all types of livestock in inventory and ensure inclusion and consistency across years; Define manure management system for poultry.
TURKEY	Uncertainty of the 1990–2013 inventory (using approach 1) calculated at 10.6%, including LULUCF. Most important sources for uncertainty include 6.7% CH4 emissions emitted during coal mining and 5.2% N2O emissions emitted by agricultural oils.	n.a.	n.a.

Source: Caucasus – third national communication of Armenia, Azerbaijan and Georgia and first biennial update report of Georgia; Central Asia – third national communication of all countries and third to sixth national communications of Kazakhstan; CIS – fourth national communication of Republic of Moldova and sixth national communication of Belarus, the Russian Federation and Ukraine; Southeastern Europe – third national communication of Albania, Bosnia and Herzegovina and The former Yugoslav Republic of Macedonia; second national communication of Montenegro and Serbia).

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