



# Implementation of the Paris Agreement by Countries of Caucasus and Central Asia: Gap Assessment



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## **Implementation of the Paris Agreement by Countries of Caucasus and Central Asia: Gap Assessment (Part 1 – English version)**

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## **Introduction**

Global Water Partnership is responding to the climate change challenge through the Global Water, Climate and Development Programme (WACDEP). WACDEP contributes to improved resilience to climate change, through enhanced technical and institutional capacity and predictable financing and investments in water security and climate change adaptation. WACDEP aims to integrate water security and climate resilience in development planning and decision-making processes, build climate resilience and support countries to adapt to a new climate regime through increased investments in water security. The WACDEP targets over 60 countries in Africa, Asia, Europe, Latin America, and the Caribbean, and it has aligned with the objectives of the National Adaptation Plan process, the Paris Agreement and the Sustainable Development Goals.

As part of WACDEP, GWP is stepping up efforts to support GWP regions in Asia to develop a sustainable Pan Asia consolidated WACDEP programme. GWP Asia regions include four RWPs; GWP South Asia, GWP Southeast Asia, GWP Central Asia and Caucasus (CACENA) and GWP China.

The objectives of the WACDEP in Asia are to support countries in Asia on the implementation of global and regional commitments under and the Paris Climate Agreement and the Sustainable Development Goals (SDGs). More specifically the programme will support countries on the implementation water and adaptation related priorities under the National Adaptation Plans (NAPs), and the Nationally Determined Contributions (NDCs), mainly through support to access funds from the Green Climate Fund (GCF). Support to the SDGs focus on the implementation of SDG 6 and other water-related SDGs.

The purpose of this report is to provide a gap assessment in the countries of Caucasus and Central Asia with the final aim to support GWP CACENA in the development of a WACDEP strategic planning document for the CACENA region.

The findings of this document intended to inform the water related society by identifying gaps that could potentially be addressing through future activities of key stakeholders over the CACENA region.

## **Overview of WACDEP in CACENA**

Project WACDEP CACENA in 2013-2016 has aimed at urgent and complex issue of climate change adaptation. Not so much have been done over the years, because climate change is too great and multi-faceted problem. However, the first and very important step was made: all CACENA countries were exposed to climate change issues; they conducted search for possible ways to adapt to its adverse effects on the pilot level; and positive results of IWRM have been distributed, as one of the possible instruments for adaptation to climate change in key sectors of each state. All that have be done in each country is a great contribution and very useful work and information.

The four-years project experience has shown that some countries targeted their efforts on irrigated agriculture (Azerbaijan, Tajikistan, Turkmenistan, Kazakhstan, Kyrgyzstan and Uzbekistan), some – on emergencies (Georgia), and others on the conservation of resources and the environment (Armenia, Mongolia). Every

region having its own specific problems related to climate change, and depending on their geographical location and historical climatic conditions focused their efforts on the issues that they considered most important at present and that are specific and pronounced in their countries. However, the worldwide experience shows that the expected climatic changes somehow lead all countries to common problems. Currently, some countries feel the negative climate impact in some areas, while other countries - in others. Nevertheless, in the end, the development and deepening of the climate change processes can lead to increased negative aspects of this phenomenon that is discreet at present. So the problems that currently are not felt in one country but occurred in another country, can in a short time relate to both.

Climate change around the CACENA region is evident, and in spite of the different opinions of scientists on its change and future impact, all clearly have come to the conclusion that now is the time to take all possible adaptation measures. However, the negative impacts of climate change do not occur only as extreme weather events and the elements. The negative impacts of climate change have been manifested in the barely visible phenomena in various spheres of human activity, and are more defined by experts in those sectors or perceived by those who face them directly.

In this regard, the work carried out within GWP CACENA is a good foundation; and its experience clearly demonstrates that climate change adaptation needs to be addressed on the basis of already existing problems in the areas where the negative impacts are the most. It is important at this stage to organize a dialogue with all stakeholders to exchange views and results and to try to summarize the accumulated by GWP knowledge and information, approaches and methods of climate change adaptation. It is important to implement those activities, so that we can make the right decisions for both different climatic zones and for different changes in climatic conditions in the various water-related areas. It is also necessary to attract the attention and interest of those who are in any way associated with any solution to these problems or are under the direct influence of the negative climate change impacts.

### **The geographical coverage of this assessment**

GWP Central Asia and Caucasus (CACENA) comprise nine countries of the region: Armenia, Azerbaijan, Georgia, Mongolia, Kazakhstan, Kyrgyz Republic, Tajikistan, Turkmenistan, and Uzbekistan. The region geographically should be subdivided into two sub-regions: The Southern Caucasus (three countries – Azerbaijan, Armenia and Georgia), and Central Asia (five countries – Kazakhstan, Kyrgyz Republic, Tajikistan, Turkmenistan and Uzbekistan) and in 2014 Mongolia joined regional network as a neighbor of Central Asia.

There is a big differentiation in renewable water resources availability among the countries within each sub-region. The region of CACENA, is very specific within the GWP family, as well as one leg of RWP is standing in the Europe and another in the hearth of Asia.

There could be observed the full range of water related issues, which are obvious in many places over the globe, but in CACENA they are the most sharp in the

agenda for solutions. For example, climate change processes are going two times faster rather than average over the globe, we faced with widely famous Aral Sea disaster, transboundary cooperation addressing water issues is the most complicated, and water use efficiency in irrigated agriculture (which uses about 85% of total water) is the lowest in the world practice, etc. The biggest part of the territory is located in the arid and semi-arid climate, and irrigated agriculture accounts for about 85-90 % of total water use.



The most common challenging issues for the Caucasian sub-region are the low access to proper drinking water supply and sanitation (as well as for Mongolia), water ecosystems degradation, floods and, in some zones - water scarcity.

For Central Asia they are increasing water deficit and water ecosystems degradation, water-food-energy-ecosystems nexus.

Transboundary water issues are common for all CACENA countries.

The principal efforts undertaken by national water authorities mostly addressing to implementation of the integrated water resources management (IWRM) principles towards Strategic Development Goals achievement in all nine countries. These include public participation in decision-making, promoting political will to cooperation among sectors and countries, initiating dialogues among all stakeholders and support to practical actions at local levels. The nexus tool is the key in those efforts.

**Table 1. Key Characteristics of the CACENA Countries**

Country	Territory, Km <sup>2</sup>	Population (2016)	GDP, Million USD 2015	Renewable Water Resources, km <sup>3</sup> per year
Armenia	29800	3031500	10561	6,500
Azerbaijan	86600	9933200	53047	8,710
Georgia	69700	3929800	13965	53,600
Kazakhstan	2717300	17984700	184361	64,800
Kyrgyz Republic	198500	6068000	6572	47,400
Mongolia	1564116	3026000	11758	34,600
Tajikistan	143100	8726300	7853	60,583
Turkmenistan	488100	5462300	37334	1,549
Uzbekistan	447400	31807000	66733	11,593

Source: CAWATER-info.net (web-portal of the ICWC)

Environmental conditions in CACENA region are rather specific but as long as climate change impacts are concerned, they are not. Inter-governmental Panel on Climate Change (IPCC) in its 5<sup>th</sup> report mentioned that for the whole globe there is convincing evidence of the following effects of climate change: sea level rise, melting glaciers, warm oceans, increased frequency and amplitude of extreme weather events - droughts / floods. Regarding impacts and adaptation in Asia, IPCC<sup>1</sup> clustered the main climate change risks and adaptation prospects as following:

Key Risk	Adaptation issues & prospects
Increased riverine, coastal, and urban flooding leading to widespread damage to infrastructure, livelihoods, and settlements in Asia (medium confidence)	Exposure reduction via structural and non-structural measures, effective land-use planning, and selective relocation Reduction in the vulnerability of lifeline infrastructure and services (e.g., water, energy, waste management, food, biomass, mobility, local ecosystems, telecommunications) Construction of monitoring and early warning systems; Measures to identify exposed areas, assist vulnerable areas and households, and diversify livelihoods Economic diversification
Increased risk of heat-related mortality (high confidence)	Heat health warning systems Urban planning to reduce heat islands; Improvement of the built environment;

<sup>1</sup> IPCC, 2014: Summary for Policymakers. In: Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Edenhofer, O., R. Pichs-Madruga, Y. Sokona, E. Farahani, S. Kadner, K. Seyboth, A. Adler, I. Baum, S. Brunner, P. Eickemeier, B. Kriemann, J. Savolainen, S. Schlömer, C. von Stechow, T. Zwickel and J.C. Minx (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

Key Risk	Adaptation issues & prospects
	Development of sustainable cities New work practices to avoid heat stress among outdoor workers
Increased risk of drought-related water and food shortage causing malnutrition (high confidence)	Disaster preparedness including early-warning systems and local coping strategies Adaptive/integrated water resources management Water infrastructure and reservoir development Diversification of water sources including water re-use More efficient use of water (e.g., improved agricultural practices, irrigation management, and resilient agriculture)

After three years of WACDEP implementation, GWP CACENA organized, a gap assessment to synthesize the results of that has done in the CACENA region, and to answer the following questions:

1. *Are there gaps between what is being implemented and what is set out in the NDCs and NAPs?*
2. *Are there gaps between what is set out in the NDCs and the NAPs and what is needed to enhance water security and climate resilient development? Are these gaps addressing elsewhere?*
3. *Are there gaps between what is set out in the NDCs and NAPs and the enabling activities related to capacity, knowledge, governance and financing needed in order to achieve them?*
4. *Are there gaps between the experiences of accessibility, relevance and amount of climate financing that is available compared to what is needed?*

## WHAT IS THE PARIS AGREEMENT?

Below there are some citations from Paris Agreement with the definition of key words:

**Paris Agreement** ... aims to strengthen the global response to the threat of climate change, ...by:

- (a) Holding the increase in the global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C...
- (b) Increasing the ability to adapt to the adverse impacts of climate change and foster climate resilience and low greenhouse gas emissions development,...
- (c) Making finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development.

The Paris Agreement entered into force on 4 November 2016, thirty days after the date on which at least 55. The list below contains the latest information concerning dates of signature and receipt of instruments of ratification from CACENA countries by the Secretary-General of the United Nations, as Depositary of the Paris Agreement.

Participant	Signature	Ratification Acceptance (A) Approval (AA)	Entry into Force
<b>ARMENIA</b>	20 Sep 2016	23 Mar 2017	22 Apr 2017
<b>AZERBAIJAN</b>	22 Apr 2016	9 Jan 2017	8 Feb 2017
<b>GEORGIA</b>	22 Apr 2016	8 May 2017 (AA)	7 Jun 2017
<b>KAZAKHASTAN</b>	2 Aug 2016	6 Dec 2016	5 Jan 2017
<b>KYRGYZSTAN</b>	21 Sep 2016		
<b>MONGOLIA</b>	22 Apr 2016	21 Sep 2016	4 Nov 2016
<b>TAJIKISTAN</b>	22 Apr 2016	22 Mar 2017	21 Apr 2017
<b>TURKMENISTAN</b>	23 Sep 2016	20 Oct 2016	19 Nov 2016
<b>UZBEKISTAN</b>	19 Apr 2017		

A mechanism to contribute to the **mitigation** of greenhouse gas emissions and support sustainable development... on a voluntary basis... shall ... aim:

- (a) To promote the mitigation of greenhouse gas emissions while fostering sustainable development
- (b) To incentivize and facilitate participation in the mitigation of greenhouse gas emissions by public and private entities authorized by a Party
- (c) To contribute to the reduction of emission levels in the host Party, which will benefit from mitigation activities resulting in emission reductions that can also be used by another Party to fulfil its nationally determined contribution
- (d) To deliver an overall mitigation in global emissions.

Parties ...establish the global goal on **adaptation** of enhancing adaptive capacity, strengthening resilience and reducing vulnerability to climate change...

Each Party shall engage in adaptation planning processes to formulate and implement national adaptation plans;

The assessment of climate change impacts and vulnerability, with a view to formulating nationally determined prioritized actions, taking into account vulnerable people, places and ecosystems;



Building the resilience of socioeconomic and ecological systems, including through economic diversification and sustainable management of natural resources.

Parties recognize the importance of averting, minimizing and addressing **loss and damage** associated with the adverse effects of climate change, including extreme weather events and slow onset events, and the role of sustainable development in reducing the risk of loss and damage.

Parties should enhance understanding, action and support, including:

- (a) Early warning systems;
- (b) Emergency preparedness;
- (c) Slow onset events;
- (d) Events that may involve irreversible and permanent loss and damage;
- (e) Comprehensive risk assessment and management;
- (f) Risk insurance facilities, climate risk pooling and other insurance solutions;
- (g) Non-economic losses; and
- (h) Resilience of communities, livelihoods and ecosystems.

### **Nationally Determined Contributions (NDCs)**

As nationally determined contributions (NDCs) to the global response to climate change, all Parties are to undertake and communicate ambitious efforts ... with the view to achieving the purpose of this Agreement.

The efforts of all Parties will represent a progression over time, while recognizing the need to support developing country Parties for the effective implementation of this Agreement. Each Party shall prepare, communicate and maintain successive nationally determined contributions that it intends to achieve. Parties shall pursue domestic mitigation measures, with the aim of achieving the objectives of such contributions.

Table below reflects the information about submission of the nationally determined contributions by the CACENA countries:

<b>Country</b>	<b>Date of NDC Submission</b>
Armenia	2015-09-29 11:47:37
Azerbaijan	2015-09-29 17:17:43
Georgia	2015-09-25 15:37:33
Kazakhstan	2015-09-28 17:06:06
Kyrgyzstan	2015-09-29 14:19:12
Mongolia	2015-09-24 12:06:59
Tajikistan	2015-09-30 15:24:02
Turkmenistan	2015-09-30 11:54:20
Uzbekistan	2017-04-19 15:44:32

## **National Adaptation Plans (NAPs)**

The national adaptation plan (NAP) enables Parties to formulate and implement NAPs as a means of identifying medium- and long-term adaptation needs, and developing and implementing strategies and programmes to address those needs.

It is a continuous, progressive and iterative process, which follows a country-driven, gender-sensitive, participatory and fully transparent approach.

NAP Guidelines could be found at:

[https://unfccc.int/files/adaptation/cancun\\_adaptation\\_framework/application/pdf/naptchguidelines\\_eng\\_high\\_res.pdf](https://unfccc.int/files/adaptation/cancun_adaptation_framework/application/pdf/naptchguidelines_eng_high_res.pdf)

## **Climate financing**

Green Climate Fund is a unique global initiative to respond to climate change by investing into low-emission and climate-resilient development. GCF was established by 194 governments to limit or reduce greenhouse gas emissions in developing countries (~40%), to help adapt vulnerable societies to the unavoidable impacts of climate change (~30%) plus cross-cutting projects benefitting both mitigation and adaptation (~30%).

GCF does not implement projects directly itself, but through partnerships with Accredited Entities - Direct Access Entities and International Access Entities. Direct Access Entities are sub-national, national or regional organizations that need to be nominated by developing country National Designated Authorities (NDAs) or focal points. Organizations nominated to become Direct Access Entities may be eligible to receive GCF readiness support.

GCF Guide - <http://www.greenclimate.fund/gcf101/funding-projects/project-funding>  
The Pilot Program for Climate Resilience, an initiative under the Climate Investment Funds, aims at mainstreaming climate resilience into core development planning for transformation at scale. The first round targeted 28 countries with a funding range per country of USD 30–110 million.

Some important lessons have been learned<sup>2</sup> from the first round of the program's implementation, including the following: institutional coordination at the highest level is the key for successful implementation; adaptation requires going beyond current variability to address slow onset and longer-term climate trends, adaptation also requires moving beyond 'low regrets', win-win and incremental measures.

User-oriented customized climate services are necessary for adaptation and can be developed by harnessing universal data, hydrometeorological data and technological innovations.

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<sup>2</sup> Based on the presentation made by the World Bank at the technical expert meeting on 24 May 2016. Available at <[http://unfccc.int/files/focus/adaptation/technical\\_expert\\_meeting/application/pdf/20160524\\_kanta\\_kumari.pdf](http://unfccc.int/files/focus/adaptation/technical_expert_meeting/application/pdf/20160524_kanta_kumari.pdf)>.

## National Designated Authorities and Focal Points in CACENA countries:

Country	Focal point	Designated Authority	Communication details
<b>ARMENIA</b>	Asya Muradyan	Ministry of Nature Protection, Environmental Protection Policy Department	interdpt@yahoo.com
<b>AZERBAIJAN</b>	Jeyhun Hasanov	Division of Cadaster of Greenhouse Gases, Climate Change and Ozone Centre, National Hydrometeorological Department, Ministry of Ecology and Natural Resources	jeyhun360@gmail.com
<b>GEORGIA</b>	Ramaz Chitanava	Department of Hydrometeorology National Environmental Agency Ministry of Environmental Protection of Georgia	chitanavaramaz@gmail.com
<b>KAZAKHASTAN</b>	Olzhas Agabekov	Ministry of Energy	o.agabekov@energo.gov.kz
<b>KYRGYZSTAN</b>	Sabir Atadjanov	State Agency on Environment and Forestry	min-eco@elcat.kg
<b>MONGOLIA</b>	Zamba Batjargal	Ministry of Environment and Green Development	z_batjargal@yahoo.com
<b>TAJIKISTAN</b>	Ilhomjon Rajabov	Head of Climate Change & Ozone Layer Centre, State Organization for Hydrometeorology, Committee for Environmental Protection	ilhomrajabov@mail.ru
<b>TURKMENISTAN</b>	Gurbangeldi Allaberdiyev	Ministry of Nature Protection	gallaberdiyev@yandex.ru
<b>UZBEKISTAN</b>	Bakhriddin Nishonov	Centre of Hydrometeorological Service at Ministry of Emergency Situations of Uzbekistan (Uzhydromet)	uzhymet@meteo.uz

**OUTCOMES OF GAP ASSESSMENT BY COUNTRIES**  
**(seven of nine in CACENA)**

## REPUBLIC OF ARMENIA

The territory of the Republic of Armenia is 29.743 sq.km, geographically it is located in the Armenian highlands (the name Armenishe Hochlandes is given by German Abick in 1843) in the northeastern part and covers 8% of these highlands. The Armenian highlands are higher than their surrounding Asia Minor and Iranian plateaus by 600 to 800 meters and, are a "Mountain Island" in comparison with them. This was noticed in 19<sup>th</sup> century [Edward Zyus] and it was named like that (Berginzel) because of its geological and geographical features. From the climatic characteristics viewpoint, the fact of being set so much higher above the sea level than the surrounding geographical areas is a very important one as it means 5 to 7 °C difference in air temperature and results in huge climatic differences and altering characteristics. Therefore, it can be called an "ecosystem island" with its very own specifics and consequences as per vulnerability and adaptation to unfolding climate change.

76,5% of the territory of the Republic of Armenia is situated in the altitude of 1000-2500m. Almost 72% of the lands are agricultural lands, 12% - forest lands and only 10.4% are covered by forests. The lands of SPAN in 2014 exceeded 10% (including the surface of the Lake Sevan). The territory's biodiversity is rich with more than 100 species per 1sq.km.

Armenia's rivers are the streams of the South Caucasian major rivers Araks and Kura. The total length of these is around 25 thou. km. In addition to the tributary Araks river, the longest rivers are Vorotan (179km), Debed (178km) and Hrazdan (146km). The rivers are characterized by uneven flow distribution and heterogeneity. The only large lake is Sevan lake, one of the largest alpine lakes in the world. As of 2013, the lake's altitude is 1900m above the sea level, its surface totals to 1257 km<sup>2</sup>, its water volume amounts to 33.4 km<sup>3</sup>.

Note worthily, it's a relict lake, so the problems of its preservation and restoration are of specific importance. In the territory of the Republic of Armenia, there are almost 100 small lakes.



### Population

Armenia's permanent population by the end of 2016 was 2.99 million people. The average population density is 101,0 people/sq.km.

### Climate conditions

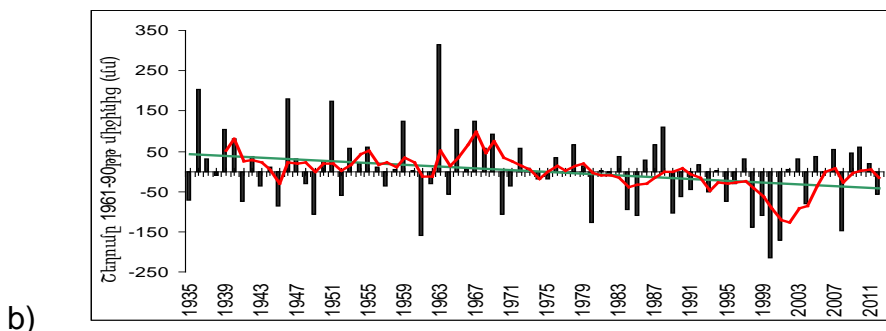
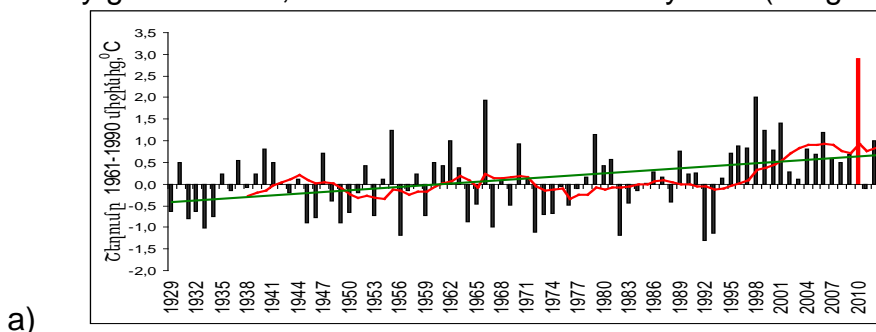
The climatic differences are significant due to the country's geographical position. Almost all types of climate exist in the country, from dry sub-tropical to alpine cold. The average annual air temperature is 5,5<sup>0</sup>C. The highest viewed average annual temperature is 12-14<sup>0</sup>C. The whole territory is characterized by temperate climate, average summer temperature is 16,7<sup>0</sup>C, however, in Ararat valley it fluctuates about 24 to 26<sup>0</sup>C. The registered maximal temperature is 43<sup>0</sup>C.

Winters are cold. January is the coldest month of the winter, average temperature is -6,7<sup>0</sup>C. The absolute minimal temperature was -42<sup>0</sup>C. In the northeastern and southeastern regions of the Republic the winter is temperate.

The average annual rainfall is 592mm. The most arid regions are Ararat valley and Meghri region with observed annual precipitation of 200-250mm. The maximal precipitation observed in alpine regions, about 1000mm. In summer, average rainfall does not exceed 32-36mm in Ararat valley, therefore, it is described as arid or semiarid. In some regions, especially in Ararat valley, mountain-valley winds are common. In summer, their speed reaches 20m/s or more.

### Climate Change in the Republic of Armenia

According to the Third National Communication In 2012, the average for all the territory grew 1.02<sup>0</sup>C, and the rainfall declined by 10% (image 1).



**The average air temperature (a) and deviations from the average annual precipitation (b), averaged over 1935-1990.**

### *Vulnerability and Adaptation*

The most important matter in the issue of the climate change in Armenia is the adaptation to the foreseen inevitable changes. This is due to the fact that Armenia is a mountainous country with dry subtropical climate. In such countries, the climate system is formed in vertical zonation and even minor climate changes are interfere considerably with the flora and fauna, forcing the species to change habitats; sometimes, being unable to retreat, they extinct.

In mountainous countries, water ecosystems undergo significant changes due to changes in river flow regimes and water quality. Water quantity, quality and flow regime changes have inevitable consequences also for irrigated agriculture, municipal water use, infrastructure (including inducing landslides) and on the hydroenergy making it vulnerable to the climate change impacts.

### **Nationally Determined Contribution**

The Decree №49 of the Armenian Government on “Adoption of the list of the measures to fulfill the country’s respective responsibilities under the RA environmental conventions” as for December 8, 2016 envisages to amend the **“Intended Nationally Determined Contributions” (INDC) document and submit to Armenian Government as Nationally Determined Contributions, NDC.**

The position of the Republic of Armenia is summarized in “Intended Nationally Determined Contributions”( INDC) document and does not contradict to Paris Agreement provisions. **Meanwhile, there is a need for some amendments:**

- Input also the date 2025 in Paris Agreement provisions implementation progress report dates for 2020 and 2030. Submit greenhouse gas emissions limitation milestone indicators for 2020-2025 until 2018.
- In case of greenhouse gas emissions limitation general indicators, not only consider the indicator for not exceeding the “2 degrees”, but also add the requirement for **“longing to 1.5 degrees”**.
- Add a new “Loss and Damages” section in NDC.

The implementation deadlines for the mentioned measures depend on the outcomes of the actions under the Convention and Paris Agreement and the global tendency of atmosphere heating. The “Intergovernmental Portal on Climate Change” group of experts envisages to develop and publish (in mid 2018) a special report, in order provide clarifications for the later. The report will act as a basis to make amendments in the dimensions of greenhouse gas emissions.

Considering the second two-year progress report developed by Armenia, there is a possibility that NDC will include more certain quantity indicators on greenhouse gas paths till 2030. The NDC of Armenia will be developed and submitted in 2018. It is recommended to somehow clarify the Adaptation Component in NDC, considering the progress of NAP program. NDC envisages certain amendmens in Technological Mechanism Component, as the “Climate Technologies Center and Network” has already agreed to implement the support program for ArmCTCN establishment (the implementing organization- UNIDO Representation in Armenia).

## **National Adaptation Plan**

As it has been noted in Paris Agreement Article № 7, every country is eligible to develop a National Adaptation Plan (NAP). Although there is no similar document in Armenia yet, relevant steps have been taken towards that. The Armenian Government Decree №49 on “Adoption of the list of the measures to fulfill the country’s respective responsibilities under the Armenian environmental conventions” as for December 8, 2016 , envisages the activity of “ development of the National Adaptation Programme - NAP for climate change ecosystem approach concept and adaptation and submission to Armenian Government for adoption in 2018 ”. The Armenian Ministry of Nature Protection is assigned as an implementation authority.

For this Armenian Ministry of Health, with the support of UN Development Programme in Armenia, has developed a “National Adaptation Plan (NAP) to enhance midterm and long term adaptation planning” project proposal to be submitted to Green Climate Fund.

The goal of the project is to support Armenia in development of the national climate change adaptation national program. The major disciplines are the capacity building and long-term sustainability. The goal of the project is to eliminate the existing obstacles and enhance the investment of the priorities in the climate change adaptation six key sectors under INDC.

In line with the NAP process, the systematic bases for specific actions towards midterm and long term risks, climate change adaptation priorities and the climate adaptation and sustainable growth in key sectors.

Meanwhile, NAP procedure will enhance the adaptation of the sustainable development goals (SDG) 6 in the context of climate change. The proposal was developed by the initial involvement and discussion with stakeholders. As the result, the initial list of measures towards adaptation was introduced. The project outcomes are as follows:

The liability frameworks of the state institutions and coordination mechanisms are envisaged to be developed, as well as the gaps will be detected and eliminated. A midterm and long term integrated and routine assessment will be conducted for climate change vulnerability.

Climate change further scenarios (e.g. water ecosystems and water resources vulnerability, as well as social and economic development scenarios assessment, climate change actions integration, NAP development and distribution among beneficiaries) will be developed for NAP.

NAP will engage the National Strategy for Adaptation, which will have a regional partnership component, as well as provisions for compliance to other multilateral agreements (on nature protection) coordination and synergy.

NAP will also engage Accountability, Monitoring and Review sections for the adaptation progress, as well as a mechanism for NAP efficiency and gaps evaluation.



The climate change adaptation financing strategy will be the key component of NAP.

NAP will serve also as a means for public and private investments involvement and a source of information about national and international financial mechanisms. It will be a platform for innovative and environment friendly technology investment, mobilization of financial sources and development of cooperative relations to donors.

### Headline messages from the gap assessment in the Republic of Armenia

<b>Gaps and Barriers</b>	<b>Recommendations</b>
<b>Implementation, Water security and climate resilient development</b>	
There is a stereotype amongst the decision-makers, the public, and the business community that environmental, including water-saving activity is contrary to economic activity and, in many cases, to the social development goals.	To overcome the stereotype, it is necessary “though not enough) to carry out awareness raising and training. This should be accompanied with visible demonstration projects, especially in the field of water use.
Awareness raising on the positive prospects of regional cooperation among the civil environment is implemented in an uncoordinated and not purposeful manner. In practice, the population is not informed about the benefits and observes only conflicts of interest in the field of water use.	Organize regional and international workshops for experience and knowledge exchange. Prepare and disseminate educational and awareness-raising video clips and explanatory films on the benefits of cooperation with ecosystem approach. Implement community-based, local inter-community and transboundary inter-community demonstration pilot projects.
There is not a specialized hydro-meteorological research institution in Armenia where it would be possible to consistently deal with the vulnerability analysis based on the country's needs. There is not also an educational institution for preparation of professionals specialized in the disciplines related to the climate change.	Strengthen the Hydro-Meteorological Service, increase its status. Establish an “Academic Network for Climate Problems” within the framework of the National Climate Technology Center and Network (ArmCTCN). Involve higher and secondary vocational education institutions therein, as well as relevant research organizations.
There are almost no international and regional co-ordinated studies for the use of common scenarios for reducing the uncertainties related to the climate change forecasting and initiating effective transboundary cooperation with the ecosystem approach.	Organize continuous regional studies on climate change for compilation and consistent improvement of common regional scenarios.
The ideology of green economy (axiomatic and standards) was forgotten in the activities for achieving sustainable development goals. Therefore, there is a danger of failure of the ideology.	Establish an environmental ecosystem monitoring system for the application of the Ecosystem Approach Toolkit, with the purpose of introducing Green Economy aimed at the implementation of sustainable development goals. Introduce a hydro morphological, hydro biological,

	physicochemical and other complex monitoring and assessment system for water ecosystems.
The population is not aware of the possibilities of climate change in the field of economic and social development, and therefore there is skepticism about the phenomenon of climate change and the urgent need of adaptation to it.	Carry out a planned campaign among the population of rural and urban communities, for implementation of projects aimed at economic and social development and, at the same time, at adapting to climate change.
Despite the large amount of work in the field of regional water use studies, agreed coordination has not been successful because of the resource approach.	Carry out national and regional campaign to introduce transboundary ecosystem approach to water use. This will allow to mitigate the positions of the parties in the fair distribution of water resources through an innovative approach.
<b>Enabling activities</b>	
Public administration is mainly based on state control and monitoring. The absence of incentive mechanisms hampers the introduction of the best available technologies, including in the field of water use.	It is necessary to gradually apply incentive methods. The Government should establish an incentive investment environment, particularly in the field of technology transfer, development and investment, support introducing in communities the innovative financial mechanism set out in INDC, introduce e-governance.
The Republic of Armenia Water Code and the legal acts developed on its basis do not include provisions on water ecosystems and ecosystem approach in water resource management.	Establish and introduce a water use ecosystem approach in the country with the relevant legal act.
For implementation of the measures and projects envisaged under the INDC, it is necessary to make some legislative amendments in line with the requirements and provisions of the new Constitution of the Republic of Armenia.	There is a need for amendments to the Civil Code. Fix the relations arising from the civil innovative right in the relevant legal acts.
The ongoing process of consolidation of communities has not been analyzed in the context of environmental impacts. Among others, uncertainties have arisen in the fair distribution and management of water resources. An uncertainty has been arisen also related to giving direct and delegated authorities to the local self-governing bodies (LSGs), in disposition and management of community property.	It is necessary to make the consequences of the consolidation of communities a subject of broad and profound studies and discussions and address the emerging problems. Give preference to the establishment of civil foundations in villages (settlements) that have lost their community status. If necessary, make a legislative adjustment for solving emerging problems.
The Paris Agreement on the Framework Convention on Climate Change, the Armenia's INDC (NDC) within the framework of its commitments, the future NAP require close inter-agency co-	Strengthen the activities of the Inter-Agency Coordinating Council on Implementation of Requirements and Provisions of the "Un Framework Convention on Climate Change"

operation and inter-sectoral coordination of processes, which is almost absent today. Participation of non-state actors (business community, communities, settlements, scientific-educational institutions and NGOs) is not coordinated.	established by the RA Prime Minister and the Inter-Agency working group under the Council. Establish a Forum for participation of non-state actors representing civil society, liaise with such a Forum established within the framework of the FCCC and the Paris Agreement.
<b>Climate financing</b>	
The innovative nature of the "Climate Civil Revolving Investment Funds" is not known among the population, and there are no final examples of its establishment.	Carry out a broad awareness campaign among the civil population for the establishment of Climate Civil Revolving Investment Funds, especially in the villages, accompanied by demonstration investment projects.
Implementation of the financial mechanism of INDC approved by the Government of Armenia was postponed to 2018-2022. In case of waiting passively, it may be postponed even more.	Accelerate formation of the first, domestic component of the financial mechanism envisaged under the INDC in Armenia. Cooperate with the main financial funds of the FCCC and Paris Agreement (GEF, GCF, AF) through accredited international organizations to promote the domestic component of Armenia's financial mechanism, set out in INDC.
Focusing on INDC's financial mechanism is not enough to implement adaptive projects. There is also lack of technological mechanism envisaged within INDC and other supporting tools.	Integrate technology (ArmCTCN) and financial mechanisms provided by INDC in Armenia, Transparency and Capacity building tools.

### **Recommendations for applying the conclusions**

Usually when talking about the protection of drinking water, access to it, development of a strategy and implementation of measures to conserve and protect it from pollution, water is considered purely as a resource, i.e. an item of practical use. The same refers to health (hygiene) and fishery factors of water. In other words - a purely utilitarian approach which firmly took root not only in public opinion, but even among those who sincerely consider themselves environmentalists.

With this approach no sustainable and long-term agreement can be achieved in principle between the competing parties –water users. Whereby the legislation does not promote ranging of water use among customers. It's an open secret that this leads to interstate, inter- and even intra-communal conflicts.

The ecosystem approach, if applied to it informally, requires concerted transboundary actions at the basin level: It is well known that in the resource approach, for example, interstate relations on the sharing of water resources are accompanied by certain conflicts related to differences in interests: With the ecosystem approach, interests in to a certain extent "smooth out", because the parties are equally interested in maintaining the integrity of the ecosystem both

"downstream" and "upstream". And this, obviously, will contribute to deepening and strengthening cooperation and solidarity:

Some timid attempts of reassessment of the resource approach and consideration of water as an ecosystem environment are being observed lately. In our approach we adhere to this understanding of the problem. This approach clearly corresponds to Green Economy principles with its axiomatics, according to which the protection of ecosystem including water should be an indisputable keynote and all social and ecological activities should proceed or rely on it.

Armenia, by its INDC, has adopted an ecosystem approach to climate change adaptation, such as water ecosystems and water resources vulnerability and adaptation (V&A), including transboundary cooperation.

Only the ecosystem approach which is mutually beneficial for all could be a clue to committed cooperation which is a necessary precondition and instrument for the protection of the aquatic environment and equal access to its resources. However, this approach cannot come to life without active participation of the interested civil society which should operate with the appropriate impact levers (mechanisms) which in fact it does not possess.

Some effective impact levers in the legal form are required, for example in the form of inalienable civil personalized ownership of resources.

Taking into account the above-mentioned interpretation and the need to overcome the major gaps and obstacles, it is proposed to implement a three-year pilot demonstration project on **"Organization of Water Use Aimed at Climate Change Adaptation through Ecosystem approach"**.

It is proposed to implement the project covering three types of areas:

- (a) Within the administrative area of one community in the Republic of Armenia, where there is a surface watercourse;
- (b) Within the administrative area of several communities in one catchment basin in the Republic of Armenia, where there is a common surface watercourse;
- (c) Within the boundaries of agreed water and near-water ecosystems that include common transboundary watercourses of common catchment basins in the territories of Armenia and neighboring states (Georgia, Azerbaijan, Turkey).

All three subprojects are to be composed of two consecutive components.

*The first one, with one year duration:* Activities: awareness raising, training, formation of local initiating groups for projects implementation, identification and assessment of needs, specification of institutional and organizational issues, establishment of a financial mechanism, preparation and agreement of investment project for the project idea and implementation, implementation of pre-design ecosystem monitoring (for all 4 seasons).

*The second one, with duration of two years:* Implementation of the investment project, continuation of awareness raising and training, involvement of other

stakeholders for demonstrating the progress, expansion of the project's involvement. Implementation of current and final ecosystem monitoring, organization and implementation of monitoring and evaluation activities of the project, assessment of the effectiveness of the financial mechanism and preparation of the project continuation plan.

As a pilot-demonstration area, the following is recommended:

*For the first sub-project*, a community area in the Azat River catchment basin, near to which the "Khosrov Forest" Reserve is located (the Azat River is practically not explored).

*For the second sub-project*, the areas of the communities covering the Vorotan River catchment basin entirely. The selection of the area is conditioned by the great influence on the river and its tributaries (water intake for large and small hydropower plants, irrigation and household needs, etc.).

*For the third project*, the area of water and near-water ecosystems covering the Debed-Khrami-Kur and Aghstev-Aghstafa-Kur River basin communities. A large number of studies of this watercourse have been carried out, including hydrological studies. There was also a very limited and episodal, including aquatic biological study, but not a complete study (ecosystem). It makes sense to focus on the regional cooperation with the organizational and ecosystem approach. At the same time, a continuous ecosystem monitoring and assessment (including vulnerability) is to be organized and prepare a concept paper and program of adaptation to climate change with ecosystem approach.

During the sub-project implementation, a comparative analysis of the NDCs and financial and technological mechanisms used by countries within their framework, as well as experience and knowledge exchange will be carried out.

The innovative idea and process of the project will be widely covered among the civilian communities of participating countries and in the countries participating in WACDEP.

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## AZERBAIJAN

The territory of the Azerbaijan Republic covers the area of 400 km from north to the south, while the said length is 500 km from the east to the west, it is situated in the width of northern latitude of 38°25' - 41°55', and eastern longitudes of 44°50' - 50°51'.

The Azerbaijan Republic is situated on the Eastern part of the Southern Caucasus and the western coast of the Caspian Sea. It covers the area of 400 km from North to the South, 500 km from the East to the West, it is situated in the width of northern latitude of 38°25' - 41°55', and eastern longitudes of 44°50' - 50°51'.

Azerbaijan borders Russia in the North (391km), Georgia in the North West (471 km), Armenia in the West (1007 km), Iran in the South (765 km), Turkey in the South West (13 km) and the Caspian Sea (825 km) in the East . The total length of its borders is 3472 km. The territory of the Azerbaijan Republic is 86,6 thousand km<sup>2</sup>s. Its capital city of Baku is situated on the Absheron peninsula, on the Caspian coast. While being a gulf city of an international importance, Baku has well-developed large industrial areas.



The relief of Azerbaijan's territory is very diverse and complicated. The average altitude is 384 m. The height of the land level changes in between the numbers of -27 m's on the Caspian shore to 4466 m's on the Greater Caucasus mountain chain's Bazarduzu peak. The territories under the ocean level compose 18% of the whole territory of the republic, while the number for the areas with height in between 0 – 200 m is 24%, 200 – 500 m 15.5%, 500 – 1000 m 15.5%, 1000 – 2000 m 19.5%, 2000 – 3000 m 6.5%, whereas one can also see the 1% of the country's territory with the height of more then 3000 m. 11% of the whole territory is composed of mountains.

The Azerbaijan Republic has regained its independence on the 18<sup>th</sup> of October, 1990 first established on the date of May 28, 1918. The state of Azerbaijan is a democratic, secular, unitary republic. The state structure in the Azerbaijan Republic is the presidential administration. Azerbaijan is a member of the UN & OSCE since the year of 1992, while it has also entered the European Union in 2001.

Azerbaijan has one Autonomous Republic (The Nakhchivan Autonomous Republic), 66 rayons, 78 cities, 14 city rayons, 257 settlements, 1719 rural lands and 4260 villages. More than 25 years 20% of the republic has been under the Armenian occupation.

Azerbaijan is rich with natural resources, especially oil and gas deposits. Azerbaijan surrounded by Europe from the West, Asia from the East, Russia in the North and Iran and Middle East in the South plays the role of a natural transportation corridor in between East and West, as well as North and South.

According to the information officially given by the Azerbaijan Republic State Statistics Committee, the country has 9.8 million citizens (acc. 01.01.2017), with its 53.1 % currently residing in the city. The yearly increase of the population is 1,3%. The 49% of the population is composed of male citizens, while 51% corresponds to the female part of the population.

17% of the population of Azerbaijan is composed of 80 different nationalities, including Russians, Armenians, Lezgi, Jewish, Avars, Tatars, Tats, Talysh and other nations.

Azerbaijan is a dynamically developing agrarian-industrial country. The basis of its state economy is the oil and gas sector. In 2012, 43.4 million tons of oil and 26.8 bln.m<sup>3</sup> gas has been produced in Azerbaijan. Currently the Azerbaijani oil is exported into 22 different countries. The role of electro energetics is huge in the Azerbaijan Republic's economic development. The electricity within the Republic is generated via thermal power and hydropower plants. In 2012, the electricity supply has reached the indicator of 18.7 bln. kWt/hour .

The Agriculture is the third for the income provision within the country, while being the main part for the job provision. Because of the reasons of water scarcity, land erosion, salinization, swamping and chemical contamination, only 22.9% of the Azerbaijani territory is used for planting. Livestock, poultry, forestry and fishing farms are the most developed industries.

In 2016, \$ 35287 mln. gross domestic product (GDP) has been produced in the country. Gross domestic product (GDP) 65,7 % of the GDP was for the non oil sectors of the economy, while 34,3 % has been the indicator for the oil-gas sector. The GDP per capita has been calculated as 3661,1 USD.

### **The Paris Agreement**

As a developing country, the Republic of Azerbaijan recognizes that climate change is a potential threat to all human beings and adopts the new Global Climate Change Framework Agreement, which will be applied to all Parties at the 21st Conference of the United Nations Framework Convention on Climate Change, which will be held in Paris in the late 2015.

The Republic of Azerbaijan considers global climate change as one of the most challenging environmental problems facing humanity and supports joint cooperation and co-operation of all countries in the world to prevent it. In this regard, the Republic of Azerbaijan, by presenting its contribution to the national level, once again affirms a new climate agreement based on multilateral regulations on climate change, as well as on solidarity with climate change sensitive countries.

Azerbaijan signed the Paris Convention on Climate Change Framework Convention signed at the 21st Conference of the Parties on 12 December 2015 in Paris, signed on April 22, 2016 in New York and ratified by the Milli Majlis (the parliament of Azerbaijan) on October 28, 2016.

### **Intended Nationally Determined Contributions (INDCs) and Nationally Determined Contributions (NDCs)**

Azerbaijan submitted its INDC to the Convention Secretariat and undertook a commitment to reduce heat wastes by 35% compared to the 1990 base year. At the same time, the importance of climate change adaptation in our country is reflected in the INDC. Total emissions reduction for 2030 compared to the base year: 25.666 Gg CO<sub>2</sub> equivalent (excluding LULUCF) and 24.374 Gg CO<sub>2</sub> equivalent (including LULUCF).

Azerbaijan considers that the DNC's exchange of information between the Parties will facilitate the joint efforts to prevent the global temperature rise above 2 ° C, as noted in the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC). Taking into consideration the potential and national circumstances of the Parties and their capabilities, it further improves the principles of justice.

In 2010, net emissions declined from the 69.6 Qq of CO<sub>2</sub> emissions down to 46.4 Qt to CO<sub>2</sub> equivalent. The rapid decline of EHEC emissions in the 1990-2000 period was 35.9 Qt CO<sub>2</sub> em. was observed. This decline in ICE emissions is the weakening of industry's development and the implementation of mitigation measures since 2000. Economic growth rate and population growth lead to an increase in CO<sub>2</sub> emissions, as evidenced by inventory results.

When Azerbaijan was a part of the former Soviet Union, environmental problems have been left out of focus for the development of the industry. As a developing country, Azerbaijan is sensitive to the impact of the climate change. The Heat Effect creating gas on the national level constitutes only 0.1 % of the total global emissions, while the per capita gas emissions for the year of 2010 equal 5.4 tonns of CO<sub>2</sub> equivalent.

Despite the fact that Azerbaijan is a developing country, as well as 20% of its territory being under the occupation of Armenia along with one million refugees, it has already contributed to the global efforts against the climate change and chosen the way of development requiring more financing with less emissions.

Official national statistics on the projected population of approximately 1.1% or 100 thousand increase in the population will increase the demand for energy and other natural resources. This is one of the major problems for the reduction of heat-generating gas emissions



As an independent state, the Republic of Azerbaijan has already identified its national development priorities and strategies and considers environmental protection as one of the top priority issues. Thus, a part of the "Azerbaijan 2020: vision for the future vision", which defines the country's development priorities for 2020, is also dedicated to environmental issues. The Concept Paper states: "In the period covered by the concept, the average amount of energy used for the production of single GDP in Azerbaijan and the amount of emissions of carbon dioxide are to be approximated to the relevant indicators of the Organization for Economic Cooperation and Development, which is important for achieving the Millennium Development Goals "

Despite Azerbaijan's oil and gas exporting country, it is also deemed necessary to set up and expand the process of renewable energy. In addition to creating additional financial resources for this country, it is based on the fact that these new technologies will contribute to the establishment of renewable technologies, "green energy" and the solution of ecological problems in the world. The use of alternative energy sources in Azerbaijan is a priority for the country as their use of organic fuels reduction of consumption and mitigation of EIA emissions into the atmosphere. An organizational structure was created for the development of this sector, domestic and foreign sources were funded to promote alternative energy sources: reaching this goal in 2010 by million manat, 14.4 million manat in 2011, 28 million manat in 2012 and 2013 20 million manat was allocated from the state budget for the first nine months of the year and 15 million euros - by the European Commission.

It is forecasted that by 2020, the renewable energy sources will be increased by 40%, solar energy - by 28%, wind power - 8%, solar panels - 14%, household and biomass energy - by 8% (Source: Alternative and Renewable Energy Sources Agency of Breeders)

In addition, the development of alternative energy in Azerbaijan, as well as the development of low-carbon events in the commercial and residential sectors, has been prioritized and reduces CO<sub>2</sub> emissions by 2030 to 41.7 million tonnes in 2007, compared to 32.7 million tonnes in 1990.

After ratifying the UN Framework Convention on Climate Change and the Kyoto Protocol, which has been added to the Convention, the Republic of Azerbaijan has not taken any quantitative commitments to reduce the WFP. Nevertheless, the reduction of greenhouse gas emissions was one of the key environmental priorities. A number of institutional measures have been implemented to coordinate and carry out more consistent work in this direction. Thus, in accordance with the Decree of the President of the Republic of Azerbaijan of April 30, 1997, the State Commission for Climate Change and the State Committee for Ecological and Natural Resources in order to coordinate the implementation of the obligations under the UN Framework Convention on Climate Change Climate Change and the Ozone Center have been set up at the National Hydrometeorology Department of the Ministry.

The chairman of the ICRC coordinates all activities on climate change in Azerbaijan by the Deputy Prime Minister of the Republic of Azerbaijan.

In order to strengthen Azerbaijan's participation in the Kyoto Protocol Clean Development Mechanism, the Ministry of Ecology and Natural Resources has been appointed National Authorized Body (MSO) by the Order of the President of the Republic of Azerbaijan dated 01 April 2005.

Employee of the Ministry of Ecology and Natural Resources of the Republic of Azerbaijan, National Coordinator of the United Nations Framework Convention on Climate Change, Isa Aliyev, has been identified.

### **National Adaptation Plan (NAP) of Azerbaijan**

The physical and geographical features of the territory of Azerbaijan make it a highly vulnerable country to the negative effects of climate change. Located at the northern end of the subtropical zone at the western shore of the Caspian Sea, 27 m below the ocean level, more than 40% of its territory is mountainous, and more than 60% are located in arid and semi-arid zones. increases the sensitivity. Negative effects of climate change on the country - floods, floods, droughts, heat stress, sharp increase in early summer temperatures, and so on. due to increased force and repetition frequency, are increasingly exposed to extreme meteorological events. For example, the damage caused by the floods in Kur and Araz rivers in 2010 was more than \$ 400 million.

Therefore, Azerbaijan has adopted the adaptation of climate change as a key priority in reducing impacts associated with climate change and ensuring sustainable development of the country.

Azerbaijan has perceived the implementation of adaptive measures as a strategic target to reduce the potential impacts on water resources in the near and distant future, in order to ensure the security of the sectors that are closer to climate change, including water security. Azerbaijan pays special attention to socio-economic development of the regions. For this purpose, since 2004, State programs on socio-economic development of regions of the Republic of Azerbaijan for 2004-2008, 2009-2013 and 2014-2018 have been adopted. These programs envisage a broad range of measures to address climate change in all sectors of the economy, including water shortages, as well as reduce environmental tensions caused by pollution of transboundary water resources, provide population with drinking water and canals, and fight flood and flood impact.

The ecological tension in the international river basin, both due to the lack of water and pollution of transboundary rivers, is based on the broadening of cooperation between the basin states and the effective use and protection of water from the rivers in order to prevent these problems from getting more serious. However, since it is in a state of war with Armenia that it is not possible to carry out any kind of cooperation with it, under the auspices of international organizations, it attaches importance to the preparation and implementation of adaptive measures to address these problems.

The Government of Azerbaijan is working on reconstruction and construction of drinking water supply and sewerage networks in more than 30 regional centers due to foreign loans and state budget resources to ensure the country's population with ecologically pure drinking water and sewerage system.

National Adaptation Plan has not been developed in Azerbaijan. Preparation of the National Adaptation Strategy and National Action Plans in the country and integrating into the relevant national sectors is currently underway, with the funding of the Green Economy Fund being

prepared to prepare this Plan. However, as Azerbaijan's oil and gas producing country, it further advances the development of less carbon-fired production. For the development of low carbon emissions, Azerbaijan has drafted a number of laws, state programs and regulatory acts on the Convention, and has adopted international documents that support climate mitigation.

It should be noted that at present, the draft "State Strategy for the Use of Alternative and Renewable Energy Sources in the Republic of Azerbaijan" has been developed and the strategy is under approval.

In addition, it is currently planned to discuss the "State Program for the 2015-2020 Action Plan for the Improvement of the Environmental Situation and Efficient Use of Natural Resources in the Republic of Azerbaijan" and the "Energy Efficiency and Energy Efficiency Development Program (2015-2020)" domestic procedures are underway.

"Improvement of the Environment in the Republic of Azerbaijan and Action Plan for the Efficient Use of Natural Resources for 2015-2020" contains a special chapter on air quality and climate change, in which the National Action Plans (NAMA in English) and the National Adaptation Plan (MAP).

Based on the "Azerbaijan 2020: Looking to the Future" Development Concept, which identifies priorities for Azerbaijan as a whole, 2020 will be to improve environmental protection, minimize environmental pollution and ensure efficient use of natural resources to meet the needs of present and future generations, sources of energy efficiency and achievement of energy efficiency, determination of global environmental problems at the national level, expansion of relations with international organizations have been taken as the main directions of the state's environmental policy.

Water resources, agriculture, coastal areas, health and climate change, as the most vulnerable sectors that will be exposed to climate change impacts, will be more exposed to impacts of climate change impacts on Climate Change sensitivity assessment and adaptation country development priorities in the Republic of Azerbaijan natural disasters (floods, floods, droughts, heat stresses, diseases, forest fires, etc.), forest, mountain, alpine meadows, wetlands and other ecosystems have been identified.

In accordance with the requirements of the Convention, the first phase of the first national data on Climate Change project was completed in 1998-99, and in the second phase in 2000. Within the framework of the first phase of the project, the trend of modern climate change has been identified in the country, scenarios of expected climate change (scenario 5), national adaptation plan to minimize losses from climate change, national cadastre of greenhouse gases causing global warming, national action plan to reduce In the second phase of the project, national needs for greenhouse gas emissions were identified in the Republic of Azerbaijan, and the current state and potential of systematic observations on climate were assessed.

At the national level for climate change, the following strategic objectives are essential:

- Establishment of analytical information systems on statistical reporting, estimation, sources and collectors of emission wastes generating thermal effects
- Establishment of the state information system for collecting, analyzing and summarizing information on the adverse impacts of climate on the economy and natural ecosystems to ensure sustainable socio-economic development
- Assessment of impacts of climate change on population health and development of appropriate adaptation measures
- Stimulation of bringing of ecologically clean technologies into Azerbaijan, providing possibility of heat and electricity from sun, wind and biogas
- Gradual elimination of ozone-depleting substances.

The main directions of the strategic roadmap for national economy and key sectors of the economy have been approved by international experts in order to identify the country's perspective development goals and directions and to ensure their implementation. Strategic road maps include the economic development strategy and action plan for 2016-2020, a long-term vision for the period up to 2025 and a targeted view of the post-2025 period. The Strategic Roadmap covers 12 key sectors of the economy. The strategic roadmap designs and implements adaptive measures to mitigate climate change impacts on various sectors of the economy.

In the strategic roadmap, adaptation measures have been taken more widely in the agricultural sector and water use that is more sensitive to climate change. "Strategic Roadmap for the Production and Processing of Agricultural Products in the Republic of Azerbaijan" was adopted as a strategic target "Environmental protection, sustainable use of natural resources and management of natural factors on agriculture." This strategic goal identified priorities and their implementation and measures are being taken.

### ***1. Development of negative impacts of climate change and other natural factors on agriculture***

- Evaluating the impacts of climate change on agriculture and preparing adequate adaptation plans
- Agrometeorological database improvement
- Considering opportunities for intervention in the weather and creation of a full-fledged defense system for farming purposes
- Improving the legislative framework and strengthening coordination among relevant agencies

### ***2. Improvement of environmental protection mechanisms in the agrarian sector***

- Preparation and assessment of indicators meeting the modern requirements for agricultural production compliance with environmental norms
- Reduction of carbon dioxide emissions in the agricultural sector

- Construction of forestry lanes
- Application of economic approach to environmental protection
- Arrobiomorphism protection
- Evaluating the transition potential of the "green economy" in the agrarian sector and the use of alternative energy sources in the heat supply of greenhouses

### ***3. Improve the mechanisms of sustainable use of agricultural land and water resources***

- Establishing a mechanism for evaluating environmental impacts of land acquisition changes
- Implementation of measures to ensure efficient land use and land recultivation
- Improvement of pasture management
- Reduction of losses when consuming water for consumers
- Improvement of reclamation status of irrigated soils and prevention of recurrence
- Assessment of water resources and information supply.
- Improved water use in dry regions
- The management of mountain rivers related to climate change

### ***4. Development of ecologically pure agricultural production***

#### **Water reserves:**

- Complete assessment of the underground and surface water resources of the Republic of Azerbaijan, Climate change, including factors affecting the stability of water balance, in particular regional problems of the use and protection of transboundary water resources, international standards, complex analysis of natural and anthropogenic factors and planning of risk reduction measures ;
- Construction of water reservoirs for collecting and utilizing rain and snow from land plots, small water basins and micro-drainages;
- Reducing water losses in all water systems (drinking, irrigation and technical) and enhancing water recyclable capacity by increasing the capacity of thirst technologies and recycling-period water systems;
- Expansion of use of non-conventional waters (wastewater, marine, collector-drainage, etc.);
- Use of running water, including underground waters;
- Construction of Small Water Power Plants in irrigation canals;
- Preparation and implementation of integrated water management plans;
- Building of water protective forests along water reservoirs and trunk irrigation channels to increase carbon monoxide concentration and coastal protection;
- Improvement and expansion of the country's hydrological and hydro-chemical monitoring network;
- Application of water-saving irrigation techniques and technologies.

#### **The natural cataclisms related to the climate changes (floods, overflows, droughts, heat stresses, diseases, forest fires, etc.) :**

- Openness and awareness of climate change in all groups of the population;

- Prepare an initial risk management system for hazardous hydrometric conditions;
- Creation of an early warning system on national and local levels of floods and floods, especially for climate change natural disasters;
- Climate change-related disaster risk reduction and disaster preparedness measures;
- Implementation of engineering-protective measures in the rivers and rivers' floodplains and rivers;
- Development of regional cooperation in the field of prevention and elimination of emergency situations, drawing up of regional risk maps and installation of transboundary monitoring networks.
- Involvement of civil society, scientific community, women and local communities into the prevention and control of climate change prevention.

### **The adaptation of the ecosystems**

- To prepare and implement a forestry plan, using drought-resistant native and other types of trees;
- Carrying out forest and forestation activities in Arid areas;
- Carrying out forest deforestation in flood and flood-affected regions;
- Taking precautionary measures to prevent forest fires;
- Prevention of pests and diseases;
- Study of modern state of forests, inventory, preparation of new forestry projects;
- Identification of recreation areas of significant importance, determining the amount of pressure available to them, and the establishment and use of tourism-oriented recreational potential;
- Designing and building economically important forested areas that meet the needs of the new farming system;
- timely implementation of appropriate measures to identify the phytosanitary condition of forests, protection from various diseases and pests;
- Establishment of forest protection zones in those areas for protection of the country's agricultural lands from wind and water erosion, planting and drought and dry land.
- Expansion of cooperation with the Caspian littoral states for the improvement of the ecological status of the Caspian Sea and the protection of biodiversity.

The UNDP supports UNDP and other initiatives to fulfill Azerbaijan's commitment to the United Nations Framework Convention on Climate Change and is expected to provide further support.

### **Headline messages from the gap assessment**

Azerbaijan is among the countries most vulnerable to climate change. Average annual increase of air temperature in Azerbaijan occurs against the background of high natural variability, which causes significant inter-annual fluctuations. The rate of warming exceeds in two times the average rates observed in the global scale.

Azerbaijan signed the UN FCCC in 1995, in July 2000 ratified the Kyoto Protocol.

The GEF/UNDP project During the years of 1998-2000 the «The First National Information of the Azerbaijan Republic» project has been prepared for the UN Framework Convention;

In 2000, the project of «The measures of empowering the potential of the high priority areas of the Azerbaijani Economy» within the Phase 2 of the First National Information has been implemented;

Second National Information was prepared with the help of QEF in 2006-2009 and the report has been submitted in June 2011;

Since 2012, the creation of the Third National Information had been started. The report has been made ready in 2015.

Azerbaijan signed the Paris Agreement last among the CACENA countries - the only on 28 October 2016.

Azerbaijan submitted the INDC on 29 september 2015. This document presented the strengthening measures and actions aimed at climate change mitigation.

The National Adaptation plan (NAP) still not prepared by Azerbaijan. The only NDC presented the certain Adaptation Measures in Azerbaijan for period up to 2030.

Much attention is paid in Azerbaijan to the mobilization and effective use of investment resources and resources of technical assistance from foundations, donors, development partners to address priorities, including for programs and projects aimed at reducing/preventing GHG's emissions and adapting to negative consequences of climate change.

The key of the WACDEP in 2013-2015 were demonstration activities in Kura-Araks Valley. CWP-Azerbaijan accumulated knowledge on innovative and state of the art technologies and methods for irrigation water use to improve land and water productivity at the farm level, capacity building, training and extension materials. Using that basis, the following measures were implemented by CWP-Azerbaijan to demonstrate how to obtain a good profit at farm level in spite of climate negative impacts.

There are certain gaps between what is being implemented by CWP-Azerbaijan in the past WACDEP and what is set out in the INDC. It was focusing the only to the irrigation/agriculture sector. Thus, in future CWP-Azerbaijan should concentrate more wide attention to other sectors (industries, domestic, ecosystems, etc.). Also, priority should be addressed to fundraising for climate issues.

### ***Recommended way forward***

As mentioned in the Third National Communication which was published in 2016 - priority directions to implement measures to mitigate and adapt to climate change are as following:

Further stabilization of greenhouse gas concentrations in the atmosphere at a level that does not allow for dangerous anthropogenic impact on the climate system and within a time frame sufficient for natural adaptation of ecosystems to

climate change that will not jeopardize food production and ensure further economic development on a sustainable basis.

Activation of innovative sources of financing for projects aimed at reducing greenhouse gas emissions, including through the Clean Development Mechanism (CDM). In the medium term priority sectors for the implementation of CDM projects will be: (i) traditional and renewable energy; (ii) oil and gas industry; (iii) the chemical industry; (iv) urban utilities; (v) agriculture.

Improvement of the investment mechanisms for the implementation of modernization programs, technical and technological re-equipment of the economy, aimed at increasing the share of own financial resources for the implementation of energy efficient facilities that ensure achievement of energy efficiency targets as an important factor in reducing greenhouse gas emissions. State support for the wide involvement of small business and private entrepreneurship into processes of waste recycling and processing using conversion technologies.

It is required to develop and implement the long-term national adaptation and low-carbon development plans (NAP) and / or integration of measures and actions to combat climate change within the strategies and sectoral development plans, as well as significant technical and financial assistance attraction from international funds and donors.

For the preparation and implementation of effective, targeted and source-financed projects, a significant increase in the capacity of experts is required to prepare projects and expand international cooperation with financial institutions of the UNFCCC. There is a clear need to continue and develop research on vulnerability assessment and the possibility of adaptation of ecosystems and sectors of the economy to climate change, which will require the collection and analysis of a large amount of information and, accordingly, the improvement of the system of state statistics, as well as enhanced cooperation and interaction with relevant ministries and departments.

The needs for capacity development in the area of adaptation also include: improved hydrometeorological monitoring and the expansion of the network of snow surveys in the zone of formation of the flow of transboundary rivers; Improvement of early warning systems for droughts for individual basins; The development of plans aimed at training the population and governing bodies for action in the face of dangerous hydrometeorological phenomena.

Climate change affects to all segments of the population. In this regard, the task remains to regularly educate and widely publicize the causes and consequences of climate change, measures and activities to prevent its negative consequences, inform about energy-saving technologies, policies and measures that reduce GHG emissions and hazardous hydrometeorological phenomena. There is a need to integrate climate change issues, along with environmental knowledge, into educational programs and development plans for various sectors of the economy.

It is clear that for the moment Azerbaijan's sectoral authorities have a lack of understanding about the procedures and communication channels to be used to



access the GCF and other principal donors for climate. It is crucial, as well as the certain donor agencies and the GCF have rather rigid rules in this regard.

The momentum of the Paris Agreement and the need for additional investment to implement NDC and NAP provide an opportunity to position Azerbaijan's NAMA more prominently on national strategic agenda.

Based on the above presented observations, CWP-Azerbaijan sees its role as GWP knowledge provider through the Pan Asia WACDEP with certain focus to the UNFCCC National Focal Point is Ministry of Ecology and Natural Resources and other involved actors. The water related issues should be the main targeted address under CWP-Azerbaijan contribution to the sectoral activities mentioned in the Azerbaijan INDC .

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## GEORGIA

Georgia is located in the mountainous south Caucasus region, south-east part of Europe. It borders Russia in the north, Azerbaijan in the east, Armenia and Turkey in the south and the Black Sea in the west. Its total area is 69.7 thousand km<sup>2</sup>, of which 40% is covered by forests. Nearly 2.6 million hectares is agricultural land, including 468 thousand hectares of arable land. The length of coastal zone is 310 km and the land border covers 1,838 km. Capital of Georgia is Tbilisi (east part of the country).

Despite its small area, Georgia has a very diverse topography; A mountainous landscape determines the variety of Georgia's physical geography: there are mountains, valleys, plains, lowlands, glaciers, wetlands, arid lands, lakes, rivers and even 18 geysers. Mountains cover a significant part of the territory: 54% of it is located at an altitude of 1,000 m above sea level. In addition to the Great Caucasus range, there are several other mountain ranges in Georgia. The most important is the Likhi Range, running from the North to the South and dividing the country into its Eastern and Western parts.



**Climate** Almost every climatic zone is represented in Georgia except for savannas and tropical forests. To the North, the range of the Great Caucasus protects the country from the direct penetration of cold air. The circulation of these air masses has mainly determined the precipitation regime all over the territory of Georgia. The climatic picture totally differs in both parts of Georgia as divided by the Likhi Range.

The climate in Western Georgia is highly diverse, altering in certain areas very sharply from humid subtropical to permafrost. The climate is determined by the Black Sea coast to the West, and by the amphitheatre of three big mountain ranges, in addition to the surrounding Kolkheti lowland (wetland) in the very centre.

The Black Sea coastal zone has a humid subtropical climate. The average annual temperature there is 14-15<sup>0</sup>C, with extremes ranging from +45<sup>0</sup>C to -15<sup>0</sup>C, and annual amounts of precipitation vary between 1,500mm and 2,500mm. The Black Sea influences the climate of West Georgia, resulting in mild winters, hot summers and abundant precipitation. Here in the mountainous and high mountainous areas, the annual air temperature ranges from 6-10<sup>0</sup>C to 2- 4<sup>0</sup>C with an absolute minimum between -30<sup>0</sup>C and -35<sup>0</sup>C, and annual amounts of precipitation range between 1,200-1,600mm and 2,000mm.

In East Georgia, the climate is also complex: the basin of the River Mtkvari (Kura) crosses the central plain. The climate in the plains of East Georgia is dry: in the

lowlands, it is a dry subtropical climate, and in mountainous areas it is alpine. The average annual temperature is 11-13<sup>0</sup>C in the plains, and 2-7<sup>0</sup>C in the mountains. The absolute minima are -25<sup>0</sup>C and -36<sup>0</sup>C respectively. The absolute maximum reaches +42<sup>0</sup>C, and the absolute minimum falls to -42<sup>0</sup>C in the high mountains. The annual amounts of precipitation vary in the range of 400-600mm in the plains, and 800-1,200mm in the mountains.

### **Georgian INDC**

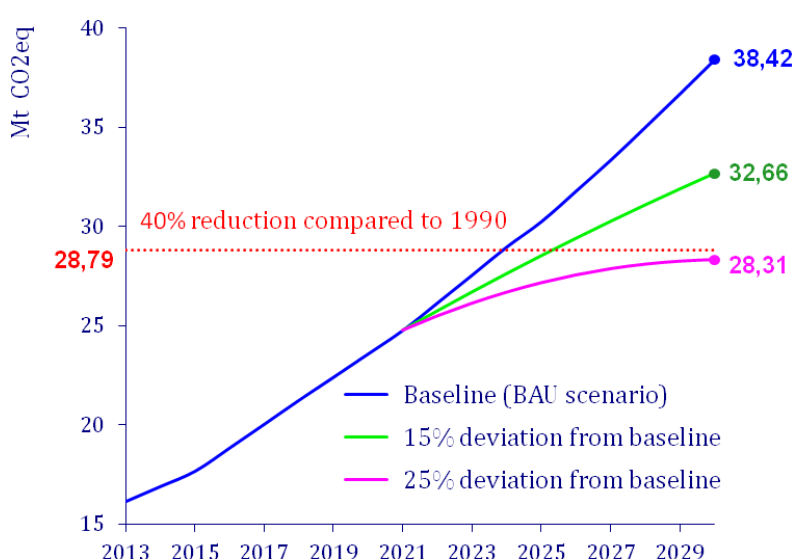
Georgia has submitted INDC at 2015-09-25. Georgia is fully committed to the UNFCCC negotiation process with a view to adopting a global legally binding agreement at the Paris Conference in December 2015 applicable to all Parties in line with the below 2<sup>o</sup>C objective.

The dissolution of Soviet Union and the collapse of centrally planned economy in early 90s caused significant reduction in national greenhouse gases (GHG) emissions (lowest value 8,799 KtCO<sub>2</sub>eq in 1995). According to the Third National Communication of Georgia to the UNFCCC, GHG emissions from Georgia in 2011 constituted 16,036 KtCO<sub>2</sub>eq which is 34% of 1990 emissions level (47,975 KtCO<sub>2</sub>eq).

Economic growth will be accompanied by increase in GHG emissions (if no efforts are made to reduce GHG emissions associated). Therefore, it is important to undertake efforts to substantially limit this increase by boosting investments in low carbon technologies throughout the country.

In 2010 Georgia acceded to the Copenhagen Accord and declared that “Georgia will take steps to achieve a measurable, reportable and verifiable deviation from the baseline scenario (below “business as usual” levels) supported and enabled by finance, technology and capacity building”.

The Government of Georgia acknowledges and appreciates the role of international support in Georgia’s efforts to mitigate climate change, namely the support of the US Government in the development of a Low Emission Development Strategy (LEDS) and the support of the European Union and the Government of Germany in preparation of the INDC. The preparation of LEDS was launched in 2013 and is expected to be finalized in 2016. Georgia’s INDC is largely based on currently available results achieved during the LEDS preparation process. The final LEDS and the mitigation actions specified therein will become key instrument in achieving Georgia’s GHG emission reduction target.



Georgia plans to unconditionally reduce its GHG emissions by 15% below the Business as usual scenario (BAU) for the year 2030. This is equal to reduction in emission intensity per unit of GDP by approximately 34% from 2013 to 2030. The 15% reduction target will be

increased up to 25% in a conditional manner, subject to a global agreement addressing the importance of technical cooperation, access to low-cost financial resources and technology transfer. This is equal to reduction of emission intensity per unit of GDP by approximately 43% from 2013 to 2030. The 25% reduction below BAU scenario would also ensure that Georgian GHG emissions by 2030 will stay by 40% below the 1990 levels.

A decision on whether to include land use, land-use change and forestry (LULUCF) will be made at a later stage. Information on GHG emissions reduction targets for the forestry sector of Georgia, given in Annex 1 to the INDC, states that the commitment in LULUCF sector comprises:

Unconditionally:

- Increase of carbon stock in about 80,000 ha by strengthening law enforcement and introducing SFM practices. It is estimated that this measure will lead to an overall carbon sequestration of about 3 million tons of CO<sub>2</sub> over a period 2020-2030;
- Afforestation of 1,500 ha of degraded non-treed land by 2030;
- Assistance to natural regeneration of forests through fencing of 7,500 ha by 2030 in order to restore natural forest cover.

Conditionally (in case of financial and technical support):

- Afforestation/reforestation of up to 35,000 hectares until 2030;
- Expansion of protected area cover from 0.52 million ha to 1.3 million, comprising at least 1 million ha of forests.

While the INDC does not include information on specific actions to be taken to achieve the goals, it refers to other official policy documents on climate mitigation actions, namely the Low Emission Development Strategy (LEDS) and the National Energy Efficiency Action Plan (NEEAP). Georgia has also been developing multiple nationally appropriate mitigation actions (NAMAs) for: energy efficient refurbishment in the public building sector; efficient use of biomass for equitable, climate proof and sustainable rural development; and urban mobility (Mdivani, 2016). These NAMAs are also planned to be linked with the NEEAP (ibid.).

Georgia plans to finalise LEDS in 2017 with the support of the United States Agency for International Development (USAID). The LEDS aims to detail the pre-2020 mitigation actions. Further, the government finalised the NEEAP by the end 2017.

The adaptation section of the INDC mentions agriculture, disaster risk management and coastal protection against the sea level rise of the Black Sea. The INDC also outlines types of technologies for which international support is needed, such as technologies for: the protection of coastal infrastructure; sustainable water management; sustainable agriculture; and sustainable forest management. The implementation of adaptation actions will be further elaborated in the country's national adaptation plan (NAP) that is currently being developed. In addition, the country's latest National Communication to the UNFCCC also identifies agriculture, healthcare and tourism as important sectors to be evaluated for their vulnerability to climate change.

## **Table 0- Summary of Georgian INDC**

Scope of Action		Targets	Priority sectors for mitigation actions
Mitigation		[Unconditional] To reduce GHG emissions by 15% below the BAU by 2030	Energy efficiency and renewable energy on both the supply and demand sides
		[Conditional on international support] To reduce GHG emissions by 25% by 2030	
Adaptation		The main objective is to improve the country's preparedness and adaptive capacity by developing climate resilient practices that reduce vulnerability of highly exposed communities.	Agriculture Disaster risk management Coastal zone protection
Means of implementation		Quantified needs if any	Description
Finance		(The INDC mentions that the more ambitious target is subject to "technical cooperation, access to low-cost financial resources and technology transfer".)	The INDC does not indicate specific figures of need to be supported by international sources, but indicates that the total adaptation costs would be USD 1.5-2 bln in the period 2021-2030
Capacity Development			N/A
Technology Transfer			Priorities in the needs for international support for technologies transfer are: the protection of coastal infrastructure; technologies for sustainable water management; sustainable agricultural technologies; and technologies for sustainable forest management.

There are several barriers identified to developing low-carbon and climate-resilient transport systems. For instance, Georgia's transport sector often lacks: local governments' capacities; institutional exposure to the best international practices of sustainable transport systems; access to finance; and public awareness to support and increase demand for such transport systems".

LEDS and NEEAP are also highlighted in the INDC as means to identifying Georgia's pre-2020 actions. Moreover, the country also plans to develop "Climate

2021-2030” by 2018, which will define the legal instruments, activities, methods and other relevant issues, and with the aim of co-ordinating climate related multi-sectoral activities in the country and provide pathway for reaching the country’s climate targets.

On 8 May 2017, Georgia has approved the Paris Agreement (UNFCCC 2017a) with the same legal effects as ratification. Therefore, it can be expected that Georgia will transmit NDC as part of the Paris Agreement soon. Nationally Determined Contribution (NDC) preparation process started in 2017 and should be finalised by end of 2019.

## Conclusions of Gap Assessment

Bellow in the table are given main gaps and barriers identified in the report and appropriate recommendations.

	<b>Gaps and Barriers</b>	<b>Recommendations</b>
Implementation	<ul style="list-style-type: none"> <li>• Gap between what was planned and what was achieved in terms of relevant policies and action plans. Main reason - insufficient funding sources, limited institutional capacities and human resources;</li> <li>• Absence of specific climate related legislation and strategic framework which will regulated climate change related activities (including mitigation and adaptation). Country at this moment has no flagship legal acts on climate change. Climate change mitigation and adaptation is dealt though different sectoral laws and policy documents;</li> <li>• The lack of well-defined sectoral strategies and policies, coupled with a weak integration and coordination among different government agencies at inter-ministerial and inter-institutional levels;</li> <li>• Lack of capacity to implement policies and plans at all level.</li> <li>• Lack of coordination and exchange of information between different state and nonstate institutions.</li> <li>• Lack of climate related awareness among decision-makers, especially at a local level.</li> </ul>	<ul style="list-style-type: none"> <li>• The mechanisms that facilitate a single approach to climate change issue, shall be introduced in the country.</li> <li>• Improvement of coordination between key players (State, Academic, Public and Privat Sectors) at all level (National, local).</li> <li>• Existence of specific, climate change related governmental program, which will adopted by high level governmental body, political status of which is higher than status of Ministry of Environment (Parliament, Prime Minister office, Climate Change governmental commission, Sustainable Development governmental commission etc).</li> <li>• Raising awareness/knowledge of the stakeholders about climate change process.</li> </ul>
Water security and climate resilient development	<ul style="list-style-type: none"> <li>• The water sector is poorly represented in INDC submitted Georgia. In fact, the country is considering the impact of climate change on water resources only in terms of agriculture and natural disasters.</li> <li>• According INDC country is seeking</li> </ul>	<ul style="list-style-type: none"> <li>• Water sector should be strengthened in NAP and new NDC as well as in other policy documents;</li> <li>• Increase the awareness of key stakeholders on Climate change and water sector.</li> </ul>

	<ul style="list-style-type: none"> <li>international support for the technologies for the protection of coastal infrastructure and sustainable water management;</li> <li>The country's latest National Communication to the UNFCCC doesn't identifies water sector as an important sector to be evaluated for its vulnerability to climate change</li> <li>In INDC technologies and sustainable management of water resources are recognized as a priority.</li> <li>New water legislation is under development with compliance of EU Water Framework Directive.</li> </ul>	<ul style="list-style-type: none"> <li>Increase the level of knowledge and skills/abilities of the water sector actors (state, non-state, expert society) to improve the quality of the planned activities. The process of training and education should be continued.</li> </ul>
Enabling activities	<ul style="list-style-type: none"> <li>Lack of national capacity to develop adaptation strategies;</li> <li>The lack of capacity in policy making. Unclear distinction between causes of environmental deterioration, processes accentuating this deterioration, and impacts resulting from the deterioration. This often leads to partial, symptomatic, and short-termed solutions instead of measures comprehensively tackling the original problem;</li> <li>The lack of expertise, monitoring plans and appropriate equipment</li> <li>Lack of policy makers capacity for climate change adaptation planning;</li> <li>The long time frames and uncertainty associated with the effects of climate change, resulting in a low level of priority being accorded to the issue;</li> <li>Lack of capacity of communities to reduce their vulnerability to adverse impacts of future climate hazards;</li> <li>The lack of public awareness and acceptability, coupled with an underestimation of socio-economic gains that can be derived from implementation of the UNFCCC;</li> <li>Lack of knowledge and capacity among decision-makers and employees of governmental agencies at all level makes significant barriers for climate related activities enforcement.</li> <li>The lack of national experts having complex vision of environmental, social and economic development issues.</li> <li>The absence of relevant scientific assessments and research.</li> </ul>	<ul style="list-style-type: none"> <li>Increase the level of knowledge and skills/abilities of the state actors to improve the quality of the planned activities. The process of training and education of appropriate specialists should be continued.</li> <li>Setting up sustainable MRV systems and building the staff capacity required for national communication and BUR reporting;</li> <li>Enhancing involvement of civil society in decision making and policy development process at all level.</li> </ul>

	<ul style="list-style-type: none"> <li>• Absence of sustainable MRV systems.</li> <li>• lack of knowledge and information on climate change in the education system of the country (schools, colleges, universities),</li> <li>• lack of incentives mechanism as a tool for accelerating of the transfer of modern technologies.</li> </ul>	
Climate financing	<ul style="list-style-type: none"> <li>• Georgia is seeking to prioritize adaptation measures and is identifying associated financial needs (domestic and external)</li> <li>• Within the country, the Ministry of Environment and Natural Resource Protection is the national focal point, or designated authority, to the UNFCCC, the Green Climate Fund and the Global Environment Facility, and is involved in a range of climate-related projects that are supported by international sources.</li> <li>• None of the national structures (governmental or non-governmental) are currently accredited in Georgia, therefore the country is entirely dependent on decision of international institutions;</li> <li>• County faces difficulties with mobilizing, accessing and delivering financial resources and technical constraints on how to collect, collate and store data on climate change finance</li> <li>• Until now most of the climate related projects were conducted through international finance support.</li> <li>• During the period 2013-14, approximately USD 239 million per year of climate-related development finance was committed to support mitigation and adaptation actions in Georgia;</li> <li>• The largest amount of climate-related development finance in 2013 and 2014 was committed to the energy sector (i.e. 67.8% of total).</li> <li>• Key donor organizations are: Global Environment Fund (GEF), European Union (EU), USAID, GIZ, also the governments of Austria, the Netherlands, Norway, Sweden, Switzerland and Czech Republic. UNIDO, FAO and Green Climate Fund (GCF).</li> </ul>	<ul style="list-style-type: none"> <li>• National accredited bodies in financial institutions should be assigned (Climate Green Fund, Global Environmental Fund, Clean Development Mechanism Adoption Fund, and all others that assist the accreditation of national structures).</li> <li>• financial mechanism that facilitates the implementation of the Convention should be establish. This will accumulate finances in the country through the climate change line and will issue grants and preferential loans.</li> <li>• Newest, highly effective technologies, should be used in climate change mitigation projects. For this instrument, proposed by the international climate change process should be used.</li> <li>• At the local level, it is necessary to take measures for protection of domestic market from inefficient technologies, by introduction of relevant standards for technologies, with compliance of international best practices.</li> </ul>



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## MONGOLIA

**Country and Population:** Mongolia is a landlocked country in North East Asia located between China and Russia (Figure 1). The total land area of Mongolia is 1,564,116 km<sup>2</sup> and it is the 18<sup>th</sup> largest and the most sparsely populated country in the world, with a population of around 3 million people (population density of 1.9 people per km<sup>2</sup> in 2015). It is also the world's 2<sup>nd</sup> largest landlocked country



behind Kazakhstan that does not border a closed sea. The country contains very little arable land, and its territory is covered by grassy steppe, with mountains to the north and west and the Gobi desert to the south. Ulaanbaatar, the capital and largest city, is home to about 45% of the country's population. Approximately 30% of the population is nomadic or semi-nomadic.

**Economic growth:** The country began simultaneous economic and political transformations in 1990 after the collapse of the Soviet Union. The rapid liberalization and privatization of the economy resulted in serious social differentiation and impoverishment. The global economic crisis of 2008 struck the Mongolian economy, seriously affecting key mineral exports as well as the agriculture and livestock sectors. However, Mongolia has witnessed significant economic progress in recent years and has recovered quickly from the global financial crisis in 2008-09; the economy recorded double-digit growth in recent years. In coming years, the economy of Mongolia is expected to grow extensively due to large-scale mining and quarrying projects. Still the economy has a narrow base. Mineral commodities account for about 80% of the country's exports and mining provides around 40% of total government revenues, though the sector employs only 3% of the total workforce. The agricultural sector, which accounted for 15% of GDP in 2010 and provided a livelihood for about 40% of its population, experienced double-digit contraction in 2010 due to high livestock mortality caused by zud [11].

**Social development indicators:** The human development index<sup>3</sup> (HDI) of Mongolia is 0.675 and the average human development index of countries in the Asia and Pacific Region is 0.683. The HDI of Mongolia is greater than the average level of human development index of countries that have a middle-level of human development. Compared to other developing countries, the literacy rate and level of education are relatively high in Mongolia. The literacy rate is 98.5% and the average years of schooling are 8.3 years. This is higher than the world average (7.5 years), and close to that of developed countries. The life expectancy of a

<sup>3</sup> The human development index is a composite statistic of life expectancy, education, and per capita income indicators, which are used to rank countries for human development.

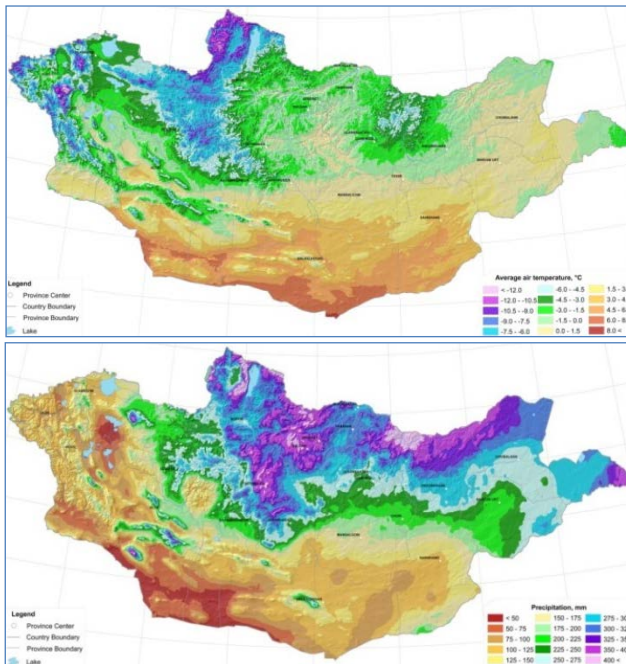
Mongolian person is the same as the world average (69.3 years). Although Mongolia has experienced a relatively high level of economic growth in the last several years, the poverty level has not declined significantly. In 1995, the poverty level based on the national poverty line was 36.3%, and in 2012 it has declined slightly to 27.4%. Unemployment in Mongolia has not declined either, according to population censuses and large-scale surveys [13]. Inequality, poverty and food insecurity are present in the country, especially in rural areas where there are large numbers of herders and households that exist around the poverty level.

**Water resources:** The total surface water resource of Mongolia is estimated at 608.3 km<sup>3</sup>/year [14] and is composed mainly of water stored in lakes (500 km<sup>3</sup>/year) and glaciers (62.9 km<sup>3</sup>/year). The long-term average annual renewable water resources include 32.7 km<sup>3</sup> of surface water and 6.1 km<sup>3</sup> of groundwater. The agricultural sector is the largest water user in Mongolia; irrigation accounts for 30% and livestock for 23.5% of the total water demand. Mining accounts for 12.7% of the water demand, but is likely to become the major water user in the future. Water consumption is highest in the Tuul and Orkhon water basins, accounting for 27.6% and 13.5% of total water use in Mongolia, respectively [15]. Groundwater is available all year round from shallow and sometimes deep wells; however the quality of groundwater varies depending on the location of the source. In more than 100 of 326 soums (smallest administrative unit), groundwater does not meet drinking water quality standards and requires treatment. The quality of natural groundwater in the Southern Gobi and Eastern steppe regions is found to be of lesser quality than in the other regions [15]. Salinization is another major problem in arid and semi-arid regions and it is caused by a combination of poor drainage and high evaporation rates that concentrate salts in the surface layers of soil, lakes and groundwater aquifers. Natural water quality problems related to saline waters, seasonal freezing and droughts limit the use of water resources in Mongolia.

**Climate:** The climate of Mongolia is harsh continental and has a distinct four seasons, a wide range of temperature fluctuations and variations, and low precipitation. The annual mean temperature ranges between -8<sup>0</sup>C and +8<sup>0</sup>C, the summer average is between +10<sup>0</sup>C and +26<sup>0</sup>C and the winter average is between -15<sup>0</sup>C and -30<sup>0</sup>C.

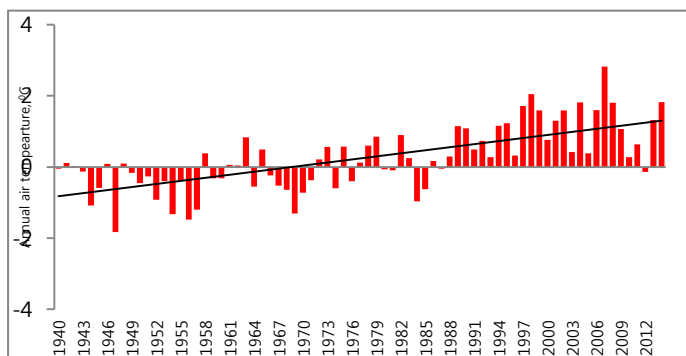
The annual mean air temperature is about -4<sup>0</sup>C in the Altai, Khangai, Khentei and Khuvsgol mountains ranges, -6 ... -8<sup>0</sup>C in the depressions between mountains ranges, also along the valley of big rivers, 2<sup>0</sup>C in the steppe-desert region and 6<sup>0</sup> C in the southern part even exceeds. Warmest point is Ekhiingol where annual mean air temperature is 8.5<sup>0</sup>C.

The annual precipitation is about 50-400 mm and 85% of it falls in the warm season when intense rainfalls occur from the convection process. Spatial distribution of precipitation in Mongolia is very specific due to vast area, land composition, roughness and geographical peculiarity. Typically, precipitation decreases from north to south and from east to west, however, surface roughness has much impact on spatial distribution of precipitation. About 85% of total precipitation falls from April to September and among them 50-60% falls only within July and August. Winter precipitation, snow amount is very low.



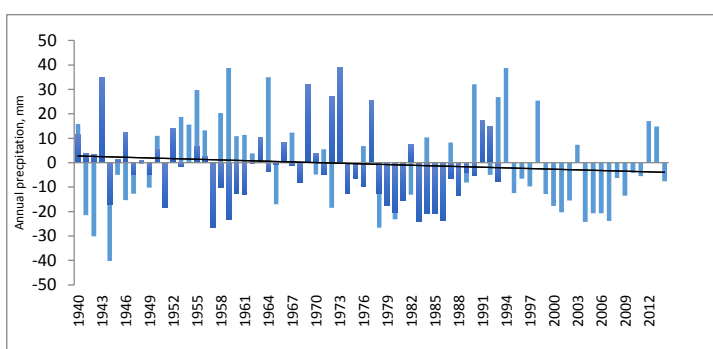
Spatial distribution of annual mean precipitation, temperature, 1961-1990 (Munkhbat, 2014)

**Climate change and its future projection:** Mongolia is very sensitive to global climate change due to its geographic location, fragile environment, extreme weather conditions, and socio-economic issues. Mongolian ecosystems have been noticeably altered by increased variability in global climatic conditions. The analysis of meteorological observation data shows Mongolia's annual mean temperature has risen by 2.24°C between 1940 and 2015. The warming trend is indicated in all ecological zones of the country. One obvious change of the air temperature change is the sudden rise in number of extreme hot days and decline of extreme cold days.



Deviation from the multi-year average (1961-1990) of annual mean temperature average of the entire territory of Mongolia for the period 1940-2014

The annual precipitation trend is determined by the precipitation in the warm seasons, especially by summer precipitation trends, which constitute 70% of the annual total precipitation. The largest precipitation decrease occurred in the central regions of Mongolia. In areas where precipitation is increasing, there is 95% significance only by Altai Gobi region. Another change of precipitation that is occurring during the growing season is the increase in heavy rains.



Deviation from the multi-year average (1961-1990) of annual

total precipitation of the entire territory of Mongolia for the period 1940-2014

The climate change projection for Mongolia indicates that the temperature will continuously increase in the future. Precipitation will increase by a much higher percentage in winter, and there will be almost no change in the summer months. The high intensity of the above-mentioned temperature change is projected in the western and eastern parts of the country in winter and the western part in the summer season.

Generally, temperature change directly depends on intensity of GHG emission. However, winter temperature change slightly low and interannual variability is higher than compare to summer temperature change. Intensity of temperature changes are similar for all RCPs scenarios until first half of this Century and then its gives different results, while increasing year to year. In near future 2016-2035, seasonal temperature change will range only 2.0-2.3°C, but it will be expected as 2.4-6.3°C depending on each RCP scenarios in far future 2081-2100.

For precipitation change, winter snow is expecting to increase and summer rainfall has not significant change, there is only slight increasing less than 10% for all scenarios. Winter snow will be increased by 10.1-14.0% depending on each scenarios in near future and by 15.5-50.2% in far future as respectively.

***Climate Change Impact:*** The impact of climate change includes land degradation and desertification, more frequent and intensive natural disasters such as wind-, dust-, and snowstorms, thunderstorms, heavy rains and snows, hot and cold waves, flash and rain floods, droughts and zuds (harsh winters), increased scarcity of water resources and greater biodiversity loss. Therefore, it is a priority for the country to develop sustainable medium- and long-term solutions to adapt to a changing climate.

In the country, climate-induced disasters occur 51 times per year on average. However, magnitude and frequency of natural disasters is increasing significantly as a consequence of climate change. Excluding drought and zud, 15 types of atmospheric disasters were registered in Mongolia. The annual average occurrences of the most frequent extreme phenomena are strong winds and storms, thunderstorms, lightning, squalls, hails, heavy rains, heavy snows, frost surface, wet snow and other minor extreme events. Also, it should be noted that due to high temperatures and low rainfalls, the occurrence of large forest fires has increased, averaging 160 per year.

Increased intensity and frequency of natural disasters induced by climate change has not only impacted the livelihood of rural populations but also poses a greater threat to the society and economy of the country. A consequence of drought and zud, is people's exposure to a risk of malnutrition. Natural disasters and zuds affect daily life, in particular for the most vulnerable. Although poverty alone does not necessarily make people vulnerable to weather events and climate, at the individual or rural level, it deepens the dependency on natural resources and increases the risk of migration to cities due to the loss of permanent income sources such as livestock and rural jobs. Furthermore, the negative effects of climate change will increase frequencies of diseases, including cardiovascular and respiratory diseases such as asthma. Also, climate change can increase vector-

borne diseases and other infections, especially infections among young children. Increased prevalence of emerging and re-emerging diseases is expected as well. Increases in the frequency of natural disasters can cause death, distress, and homelessness and disrupt the supply of essential medical and health services.

### **Headline messages from the gap assessment**

1. In the report, gaps and barriers between adaptation goals and targets per sectors, in particular water resources, identified in INDC and NAPCC of Mongolia, current status and required financial, capacity and technical supports are analysed and assessed.
2. Mongolia, as a Party to the UNFCCC, has developed its INDC, which reflects Mongolia's endeavours towards the reduction of emissions and establishment of climate-resilient society. The INDC of Mongolia was officially submitted to UNFCCC Secretariat on 24th of September, 2015. The INDC respectfully addressed both mitigation and adaptation challenges.
3. Mongolia's INDC has its conceptual roots in the Green Development Policy of Mongolia, approved by the Parliament in 2014, to which key sectoral action plans at the national level, including energy sector, are being adjusted. The National Action Programme on Climate Change (NAPCC) approved by the Parliament in 2000 and revised in 2011 includes concrete measures in response to climate change covering all principal sectors of the economy. These and other relevant national level policy documents served as a basis for the development of Mongolia's INDC, which was shaped and finalized through comprehensive consultation exercises with a broad range of stakeholders.
4. Mongolia ratified the Paris Agreement on 21 September 2015. The successful implementation of Paris Agreement and national climate change response actions and measures identified in NAPCC and INDC will depend directly on availability of funding resources. Therefore, support of international climate financing mechanism, especially GCF and other funding sources will play crucial role to achieve the goals of INDC, NAPCC and other policy and planning documents.
5. According to a UNFCCC progress tracker for overall work programme implementation, only Mongolia of the East Asian countries provided a preliminary indication and rough estimation on financing needs for the mitigation and adaptation measures outlined in the INDC. Mongolia has indicated intention to seek international funding, as well as capacity building and technology support, to complement its domestic resource allocations and efforts. Mongolia is interested in opportunities to access international climate funds, namely the GCF and participation in crediting mechanisms to implement the measures. Rough estimations of adaptation measures for vulnerable sectors identified in INDC show that in the near future Mongolia will need around 3.4 billion USD for funding in technology and capacity building. Up to 80% of total need expected to be financed from international sources and donor institutions. As estimated, approximately 2,460.00 Million USDs will be needed for water sector actions.
6. Mongolian plateau is a hot spot place of intensive climate warming and Mongolia is one of the most vulnerable countries to adverse impacts of climate change due to its geographical location, harsh continental climate and socio-economic features.

7. According to Mongolia's Second Assessment Report on Climate Change 2014 (MARCC 2014), the impacts and consequences of climate change are eventually visible in Mongolia through environmental degradation with *the change in water resources and regimes, shrinking lakes, ponds and springs in non-permafrost areas, depletion of groundwater tables*, pasture and soil degradation due to aridity and extreme hot weather in the summer, a loss of biodiversity, intensified desertification, the changes of wildlife habitat, and the increasing frequency of forest and steppe fires.
8. Water sector of Mongolia is very sensitive and vulnerable to any changes in temperature and precipitation regimes. On a national scale, Mongolia does have sufficient water by volume and quality to support its population and its economic development. On a local scale, however, serious water challenges, which can threaten the country's economic and social development, can be found in the urban and economic hub of Ulaanbaatar city and in the mining hub of the Southern Gobi region. Alarmingly, modelling Ulaanbaatar's future water demand shows that in all scenarios, the water demand will exceed the current water supply capacity before the year 2021. In the high water demand scenario, Ulaanbaatar's demand will even exceed the maximum available resources within seven years.
9. Within the INDC, Mongolia will aim to invest on integrated water resources management, creation of water reservoirs and multipurpose systems of water use, and solutions for sustainable water supply. In order to maintain availability of water resources through protection of run-off formation zones and their native ecosystems in river basins, INDC of Mongolia includes measures to increase state protected areas up to 25-30% of the total territory including upstream area of rivers in order to maintain natural ecosystems and water resources and ensure sustainable financial mechanism.
10. Mongolia takes various efforts to address challenges and risks associated with climate change and to achieve the strategic goals to establish climate resilient and low carbon society in the country. However, actual financial and technical supports from international organizations and partner countries under the UNFCCC and Paris Agreement is not sufficient and not adequate. Currently, there are very few initiatives, mainly readiness and preparatory small projects, supported by international financing mechanism in Mongolia. There are still not any full size GCF supported project and programme in Mongolia.
11. Generally, the current status of implementation of INDC goals, especially external financial support for enabling activities and adaptation measures to achieve water security and climate resilient development in the country can be rated as "*inadequate*".
12. Considering the fact that climate change is causing serious problems and challenges related to water scarcity, long-lasting dry spells and droughts in the country; there are big gaps and barriers in implementation of INDC and NAPCC; and external support in implementation of Paris Agreement is inadequate, Mongolia would be interested to participate in the Pan Asia Water, Climate and Development Programme (WACDEP) through enhanced technical and institutional capacity building activities, predictable financing and investments in water security, better drought/flood management and climate change adaptation.

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Assessing The Intended Nationally Determined Contributions of ADB Developing Members.

Janet Arlene Amponin and James Warren Evans, ADB Sustainable Development Working Paper Series

NO.44 August 2016



## KYRGYZ REPUBLIC

According to the Constitution, the Kyrgyz Republic is a sovereign, democratic, legal, secular, and social state. Exercise of state power in the Kyrgyz Republic is based on the principle of separation into legislative, executive and judicial branches. The first constitution was adopted at the twelfth session of the Supreme Council of the Kyrgyz Republic on May 5, 1993. Following the referendum on June 27, 2010, the current version of the Constitution was approved.

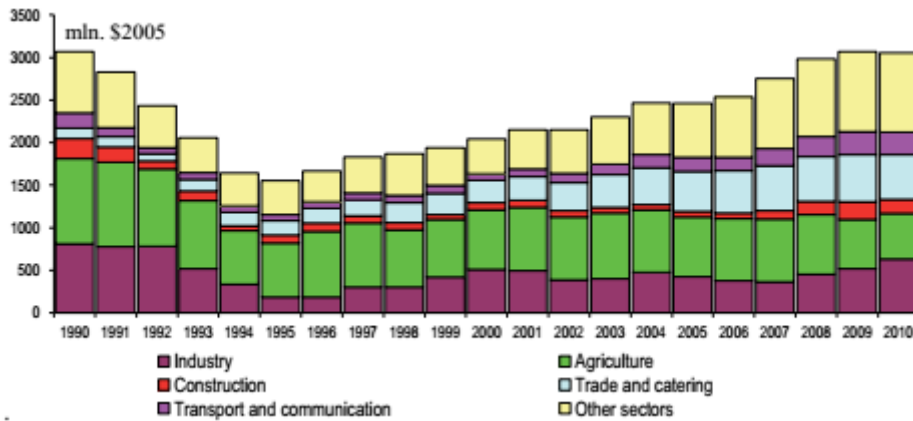
Territorial structure of the Kyrgyz Republic is based on principles of unity and integrity of its national territory, on balance of social and economic development of the regions of the Kyrgyz Republic. The administrative subdivision of the Kyrgyz Republic takes into account historic, economic and environmental features of its regions. Public administration has three levels of administrative division. As of January 1, 2017, the system of administrative and territorial structure includes 7 regions (oblast), Bishkek and Osh cities with a status of national subordination, and 40 districts (rayon), 31 cities, 9 urban settlements, 3 settlements of regional subordination, 453 rural districts (ayil aimak).

The population of the Kyrgyz Republic, as of 1 January, 2017, is 6,140.2 thousand people. Regarding the country's mountainous terrain, the population distribution within the country is extremely irregular. The population mainly resides and carries out most of its economic activities on the low-hill terrain, in the intermountain basins and mountain valleys. The highest population activity is concentrated within settlements, as well as in a relatively small buffer zone of 5 km around settlements. The urban population share is 33.8%, of which 66.2% are of working-age (men: between the ages of 16-62, and women: between 16-57). The rural population share is 66.2%, of which 59.2% are of working-age.

Over 2005-2014, the annual growth rate of the country's resident population increased from 1.0 % to 2.1 %, and averaged 1.4 % over the ten years.

The population of Kyrgyzstan is gradually approaching the threshold of old age: At the beginning of the 2017. 65 years and older were 275.2 thousand or 4.5 %, which is significantly lower than other countries (e.g. Kazakhstan 7%, Moldova 11%, Russia 14%, Ukraine 16% at the beginning of 2016). In the case of Kyrgyzstan, the United Nations predicts that this trend will be 2030, when the number of older persons is almost doubled.

The socio-economic development during 1990-2010 can be divided into several stages. The first stage (1991-1995) saw a significant recession in the economic activity, particularly in industry. There was a sharp, almost two fold, decline in GDP up to 50.7% compared to 1990. In particular, industry fell to 33%; agriculture to 61.3%; construction to 45%; transport to 88.6%, and services 61.7%. The second phase (1996-2010) is characterized by the GDP growth in real terms. Together, the significant changes in the economic activity structure took place.



**Change in real GDP from 1990 to 2010 in constant \$2005. Sources: NSC, World Bank.**

Kyrgyzstan, officially the Kyrgyz Republic, is situated in the center of the Eurasian continent, in the North-Eastern part of the Central Asian region (see map below) . It covers an area of 199.95 thousand square kilometers<sup>4</sup>. It stretches 900 km from east to west, and 450 km from north to south. Kyrgyzstan has borders with four countries: the Republic of Kazakhstan, the People’s Republic of China, the Republic of Tajikistan and the Republic of Uzbekistan.

The assessment of vulnerability main sectors (“Water resources”, “Population Health”, “Agriculture” and “Emergency Climate Situations”) regarding expected climate changes have been performed, and adaptation measures suggested. The most detailed study was devoted to expected state of water resources of the Republic (glaciers, surface water-flow and lakes), because they represent the principle life supporting sectors in the Kyrgyz Republic and other countries of Central Asia regions.



The Kyrgyz Republic is located within the Tien Shan and Pamir-Alai mountain ranges. A border pass with the Republic of Uzbekistan across the Naryn River is the lowest altitude (488 m)<sup>5</sup>, and Pobeda Peak is the highest altitude (7,439 m). The average altitude above sea level is 2,630 m. All the landscape varieties and natural climatic conditions are grouped into four climatic zones: Plain and Submontane Belt (valleys and foothills) – up to 1,200 m;

<sup>4</sup> Based on the land resources records by the SRS, as of January 1, 2012.

<sup>5</sup> Data of the Shuttle radar topographic survey (SRTM) made in February 2000 by radar sensors SIR-C and X-SAR. Data Accuracy: latitude and longitude resolution - 90 m (3 arc seconds); height resolution - 1 m. (<http://srtm.csi.cgiar.org/>)

Medium-Altitude Belt – 1,200 to 2,200 m; High-Mountain Belt (Alpine)– 2,200 to 3,500 m; and Nival Belt (permanent snow) – above 3,500 m.

The Kyrgyz Republic has an extreme continental climate, mostly arid, which is somewhat mitigated by increased cloudiness and precipitation due to the alpine relief.

The natural climatic characteristics are determined by the country's location in the Northern Hemisphere, in the center of the Eurasian continent, remoteness from major water bodies, and the close proximity of deserts. The temperature trends rise on land and in the Northern hemisphere are slightly higher than those on the water surface and in the Southern hemisphere. This predetermines a somewhat higher temperature growth rate in the Kyrgyz Republic as compared to the global growth rates. Therefore, the impact of climate change on the Kyrgyz Republic is considerably higher than that for coastal countries and/or countries located in the Southern hemisphere.

The first meteorological station in Kyrgyzstan was opened in 1856 (the Issyk-Kul Lake shores). Systematic instrumental climate observations have been carried out since 1883 (Karakol weather station). The diagram in the box shows changes in the number of meteorological stations throughout the observation period. A sharp decrease in the number of weather stations in the late 90's of the past century was due to decreased public funding for the maintenance of the observation network.

Under the Third National Communication preparation, the data on climate change observed was processed under an approach that allows to get an estimation of average annual temperature trends for 1885-2010 (whereas the longest series of observations are less than 100 years), as well as increasing significantly the length of the trend estimates for separate isolated areas. This approach helps eliminate constraints normally faced due to an inadequate number of observations, a small number of weather stations with long-term records, and on top of that, the gaps in observations.

The analysis proved a significance of the climate change already observed in the country. Thus, the average annual temperature over 1885-2010 has increased significantly. It should be noted that the rate of temperature change is not linear and has increased significantly in the recent decades. Although the average annual temperature growth rate over the entire period of observations was  $0.0104^{\circ}\text{C}/\text{year}$  across the country, it more than doubled during 1960-2010 reaching  $0.0248^{\circ}\text{C}/\text{year}$ , and reached  $0.0701^{\circ}\text{C}/\text{year}$  in 1990-2010.

Increase in the average annual temperature is observed in all climatic zones and regions across the country. Almost the similar increase in the average annual temperature is also observed at all altitudes.

In general, precipitation changed insignificantly, but in recent years there have been rather drastic changes in certain regions, both upward and downward. Also, the overall trend is downward in recent years. Thus, annual precipitation in the country has slightly increased over the total period of observations ( $0.847\text{ mm}/\text{year}$ ), but the growth rate has decreased significantly in the last 50 years ( $0.363\text{ mm}/\text{year}$ ), and there has been even a slight downward trend in the last 20 years ( $-1.868\text{ mm}/\text{year}$ ).

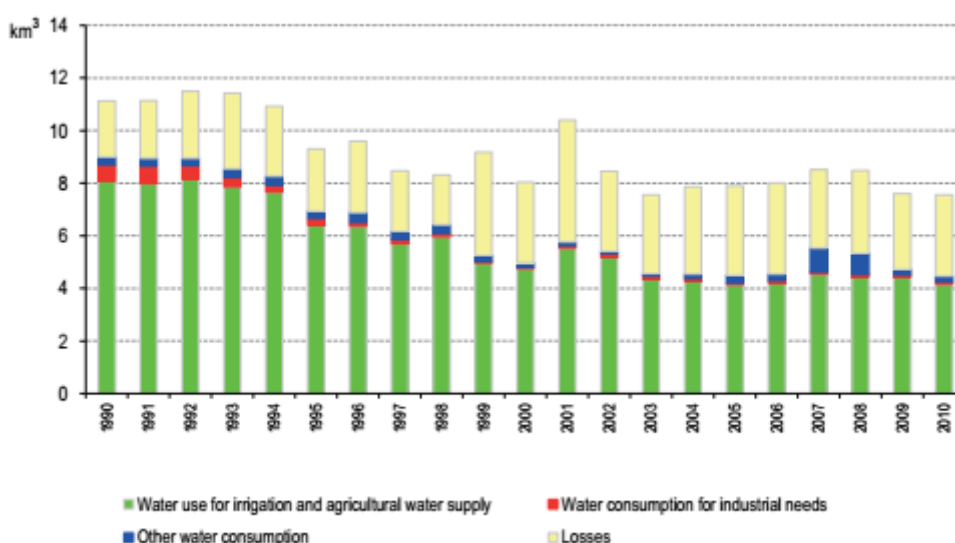
## **Water Resources**

Water resources are used for irrigation, industrial and domestic water supply, as well as energy generation. The country's water resources are concentrated in glaciers, lakes, rivers and groundwater. In 2010, the total estimated glacial volume was 390 km<sup>3</sup>. According to the mathematical and cartographic model, the glacial volume has decreased by approximately 15% from the mid-70s of the last century to 2000.

There are 1,923 lakes in the Kyrgyz Republic. The Issyk-Kul, Son-Kul and Chatyr-Kul are the largest lakes. Water reserves in the lakes are estimated at 1,745 km<sup>3</sup>. Of these 1,731 km<sup>3</sup> (or 99.2% of the total volume of all lakes) are concentrated in the Issyk-Kul Lake, the water of which is salty and unfit for water supply. The mountainous terrain of the Kyrgyz Republic resulted in the formation of an extensive river network.

There are around 5 thousand rivers and 2 closed lakes (Issyk-Kul and Chatyr-Kul). These lakes are the inland basins: their river runoff is approximately 3.5% of the total runoff. In 2010, the cumulative long-term annual average river runoff is estimated at 47.8 km<sup>3</sup>.

Potential fresh groundwater reserves are estimated at 13 km<sup>3</sup>. They are mainly concentrated in the intermountain basins, the most reclaimed economically. The proven useful groundwater reserves by industrial category exceed 16 million m<sup>3</sup> per day (over 5 km<sup>3</sup> per year).



**Figure: Water resources use over the period of 1990-2010. Source: NSC**

Water resources in the basins of Naryn, Karadarya, Chu, Talas, Sary-Dzhaz rivers, as well as the rivers in the slopes of the Ferghana Valley and Karkyra river are used by neighbouring countries.

**Hydropower Resources** based on the linear account of 268 rivers, 97 largest canals and 19 reservoirs, the total hydropower potential in 2010 (for a year of average water content) was estimated at 28.83 million KW of power and 245.52

billion KWh of gross electric power output, including a power generating capacity of 60 billion kWh.

In Kyrgyzstan, there are 16 large and medium-sized hydropower plants with a total installed capacity of 2,949 MW and a cumulative annual output of 10.406 billion KWh. At present, 18% of the country's hydropower potential is already in use (19.5% for large hydropower plants and 4% for small HPPs). The country is constructing two HPPs in the Mid-Naryn chain of power plants: Kambarata-1 and Kambarata-2. Upon the operational commissioning of these two plants, the total generating capacity will increase by 2,260 MW (77% of the existing generating capacity), which will increase the annual power generation by 6.312 billion KWh (61% of the current power output). Since the 20th century, 39 large and medium-sized HPPs have been constructed with a total generating capacity of 7,155 MW and annual power output of up to 23,625 billion KWh. The construction of all planned HPPs will increase the capacity up to 46% (up to 48.8% for large HPPs, and up to 21.3% for small HPPs).

The potential energy resources of alternative and renewable energy sources, actually accessible at the current technology development level, are presented by solar, wind and geothermal energy and biomass. Non-traditional and renewable energy sources also include the hydropower resources of the small streams. Unfortunately, the renewable energy resources are scarcely used in the country.

The other climate change related activities and national communications process identified a number of constraints and gaps, which weaken the efficiency of the results.

Bellow in the table is given main gaps and barriers identified in the report and appropriate recommendations.

<b>№№</b>	<b>Constraints and gaps</b>	<b>Comment</b>	<b>Measures</b>
<b>1</b>	<b><i>Vulnerability and adaptation</i></b>		
1.1.	Insufficient level of regional cooperation on adaptation to climate change	Many problems of vulnerability and adaptation of natural resources, such as water resources or biodiversity have a trans boundary character. Solution of such problems should also take into account the transboundary aspects	Regional cooperation should be strengthened.
	<b><i>Water resources</i></b>		
1.2.	Huge losses under a distribution and use of the water resources.	Tariff system does not ensure sufficiently the water resources saving.	Justified change of tariff system is needed.
1.3.	Lack of incentives for introducing water saving technologies.	Introduction of water saving technologies in many cases are not economically justified in the short-term perspective.	Further improvement of legal framework is needed.

<b>2.</b>	<b>Mitigation</b>		
2.1.	Insufficient capacity in emissions forecasting.	Long-term forecast, including macroeconomic, demographic and other projections, is required as a basic data, while in practice the government normally practices the short-term forecasts.	The capacity of the government bodies engaged in the long-term forecasting should be strengthened.
2.2.	Lack of a national strategy on GHG emissions reduction.	A lack of the strategy complicates monitoring of the emissions reduction process and reduces the opportunities to mobilize the external support for mitigation actions.	National strategy should be developed based on the nationally determined contributions of the Kyrgyz Republic.
2.3.	Insufficient legal framework for stimulating the clean technologies introduction.	Introduction of clean technologies in many cases is not cost effective in a short-term period. On the other hand, it is clear that activities on introduction should be preventive. The country has adopted a number of stimulating measures but they are not sufficient	Legal framework should be further improved.
2.4.	Insufficient capacity on using of forecasting models linking the emissions with baseline data (alike Marcal program) or on development of the national models.	Emissions forecasting for a long-term period requires utilization of models, correct and clear for users.	Training sessions for groups of specialists to support a regular forecasting process
<b>3.</b>	<b>GHG Inventory</b>		
3.1.	Lack of institutional mechanisms for the inventory execution on a regular basis.	Currently, GHG inventory is carried out only under the national communication processes. There is a need for a more regularity accounting the requirements for periodicity. Moreover, the climatic indicators should be included into various development programs and plans.	Preparation of the normative acts to the Law "On State Regulation and Policy on Greenhouse Gas Emission and Removal", defining its implementation mechanism. Calculation of GHG emissions by the basic approach with a support of statistical bodies and the results inclusion into the official statistical reporting.
3.2.	Inconsistency of official statistical records with the inventory requirements.	The inconsistency complicates the inventory process and introduces additional uncertainty in the outcomes.	Work on improving the Fuel and Energy Balance has already started but requires time for finalization.

3.3.	Part of the required data is not collected by statistical bodies and is solely owned by the organizations.	The inventory requires specific data.	Cooperation between the different sectors should be strengthened.
3.4.	Part of the data is missing or has a large uncertainty.	It refers, first of all, to a morphological composition of wastes, biomass growth rates, humus content in the soil.	Additional studies should be carried out, and in some cases at a regular basis.

In general, the main problems in all thematic areas are lack of the financial resources and availability and reliability of the information. The main reasons for the information lacking are the insufficient monitoring, incomplete conversion of the departmental archives to digital media and the limited access to information.

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## TAJIKISTAN

Tajikistan is located in the southern mountainous part of Central Asia between 36°40'N and 41°05'N (a latitude similar to Korea, Turkey, Greece and capital cities of Beijing and Washington) and 67°31'E and 75°14'E and stretches for 700 km from west to east and for 350 km from north to south. The area of the country is 142,600 sq. Km<sup>2</sup>, which is smaller than the other countries of Central Asia. Mountains occupy over 93% of country's territory and more than half of the country is more than 3,000metres above sea level. These areas are not suitable for agriculture due to extreme climatic and landscapes which consists predominantly of rocks, glaciers and highlands. Absolute altitudes vary from 300 m to 7,495 m. Tajikistan borders with Afghani- stan in the south (for more than 1000 km), Uzbekistan in the west and north (for about 900 km), Kyrgyzstan in the north (for 630 km), and China in the east (for about 400 km). A large part of the country is prone to high seismic risks. Mountain- ous districts as well as arid and semi-arid zones are especially vulnerable to dangerous hydro- meteorological events.



**Relief map of Tajikistan**

Altitude in metres	— — —	National border
3 000 m	— — — —	Provincial border
1 000 m	○	Khorog Provincial capital

Administratively, Tajikistan is divided into the following regions: Soughd oblast (north), Khatlon oblast (southwest), and also the Gorno-Badakhshan Autonomous oblast (GBAO) in the east. The GBAO occupies 45% of country's territory, but its population is only 250 thousand people (3% of total population). The Districts of Republican Subordination (DRS) are located in the centre and in the west of the country surrounding Dushanbe, the capital city. As

of 1<sup>st</sup> January 2017 Tajikistan had 17 towns, 62 districts, 57 settlements and 369 Jamoats.

### **Climate conditions and characteristics**

Tajikistan is located at the meeting point of powerful atmospheric circulation processes. One of them is the Siberian anti-cyclonic system that dominates the winter period. Cold air from the Arctic often reach the southwestern parts of Tajikistan and the mountains surrounding the country in the north and east create a favorable environment for retention of these cold air masses. As a rule, the inflow of warmer air in winter takes place as a result of the intrusion of tropical air masses. Thermal depressions are another important atmospheric process that dominates the summer period. The proximity of arid areas and high mountains, as well as clear, dry and hot weather contribute to their formation.

The annual mean temperature depends partly on altitude and varies between +17°C in hot southern districts to -6°C and lower in the Pamir highlands. The highest temperature is observed in July and the lowest in January. The Eastern Pamir is known for its extreme climate and here the lowest temperature reaches minus 63°C. In the south of the country, the maximum air temperature reaches +47°C. Thus, the difference between the highest and lowest air temperature in different parts of the country exceeds 100°C.

Approximately 75% of annual precipitation takes place during the colder times of the year. The majority of precipitation falls in mountain districts which are open to humid air masses from the west. High mountains create an effect of orographic opacity thus some districts 'fenced' or protected from humid air masses have less precipitation. These include the deep and closed valleys, mountains and highland plateau in the eastern part of the Pamir which has the least amount of precipitation (less than 100mm per year). The hot lowland deserts in the south of Tajikistan also have a low level of precipitation. The maximum level of precipitation is observed in the mountains of central Tajikistan which experiences 1,000-1,800 mm per year.

### ***National circumstances***

Public administration in Tajikistan originates from the Soviet era. However after two decades of independence the country has successfully created a national system of decision making which includes legislative and executive branches of power. The political system is distinct, with central- ized vertical power in which the President and the Government play the leading roles. Nonetheless, the level of public participation in the decision making process is steadily

increasing.

Presidential elections in November 2013 resulted in structural changes within the Government which have implications for climate change issues. For example, a Ministry of Energy and Water Resources was created, whilst the Ministries of Industry and New Technologies, Health and Social Protection, and Ministry of Education and Science were all re-organized.

Tajikistan is proud of having the lowest level of GHG emissions in the region, both in absolute and relative per capita terms. Hydropower is used to meet the main energy needs of the country. Due to geopolitical circumstances the supply of fossil fuels is limited, whilst a shortage of energy resources coupled with poverty prevents the development of industrial production, transport development and heat supply. Developing the huge hydropower potential is a priority for the country. The Ministry of Energy and Water Resources has the capacity to manage this process and reduce potential conflicts of interest in the water and energy sectors.

Due to population growth and increasing energy needs, the existing hydropower plants are not sufficient to meet annual and especially seasonal needs. To address the winter and autumn energy deficits, the use of power plants running on coal is envisaged. Having said that, further development of hydro-energy potential could serve as an alternative.

During the Soviet period, Tajikistan maintained political, economic, energy and transport relations with other Soviet republics. Despite their strategic importance, Afghanistan and China, remained outside the area of direct cooperation due to geopolitical circumstances, However Tajikistan is committed to developing regional partnerships in the field of the environment. The role of China as a strategic partner in economic development, and as a source of investments in technologies and improvement of the transport system is growing. Cross-border cooperation between Tajikistan and Afghanistan has resulted in the formulation of cooperation plans for environmental protection and hydrology, as well as the creation of new opportunities in the trade and transport sectors. Energy security and border issues are priority areas for both countries.

### **Climate change trends and scenarios**

Vertical zonation, geographical contrasts and forms of land surface favor to great diversity of the climatic conditions that can be observed in Tajikistan, which is

of big interest for local and regional climate change modeling.

Since comprehensive meteorological observations have started in Tajikistan from 1950s-1960s and remarkable changes in the climate system attributable to human activities have also occurred and further accelerated from this period (as noted by IPCC), national research considers in details the aspects of climate changes for the period 1961-1990 and throughout the period of instrumental observations in Tajikistan.

During 1961-1990, the increase of 0.7-1.2°C in the annual mean air temperature was observed in the wide valleys of Tajikistan. To a lesser degree, the growth of temperature had taken place in mountain areas by 0.1-0.7°C, and only in the mountains of Central Tajikistan, Rushan and lower reaches of Zeravshan river there was a small decline in temperature of 0.1-0.3°C. In large cities, the growth of near surface temperature was especially significant and reached 1.2-1.9°C that is obviously associated with urbanization (construction of roads, buildings, vehicles, industrial emissions, etc.).

The 1990s was the warmest decade during the period of instrumental observations in Tajikistan, and 1997 and 2001 the warmest years.

Models of future climate project that annual mean near surface temperature in Tajikistan will increase within the interval of 1.8-2.9°C. The projected rate of warming is much greater than the observed changes during the 20th century. It is likely that increase of temperature will be essential in the warm period of a year and in some regions will reach 4.9°C.

The tendencies in precipitation in Tajikistan are not uniform. In 1961-1990 in the mountains of Central Tajikistan, as well as in the valleys of Southwest and Northern Tajikistan, foothills of Turkestan range and mountain areas of Eastern Pamir, a reduction in the amount of annual precipitation of 1-20% is observed. In Karategin and Darvaz, from the altitude of 1,500 m and higher, the amount of precipitation has increased by 14-18%. In Western Pamir, the increase of precipitation is 12-17%. The greatest increase in precipitation (36%) is observed on Fedchenko glacier.

For the period of instrumental observations the most arid years in Tajikistan were 1944 and 2000, when a precipitation deficit of 30-70% was observed all over the territory of the country. The most humid year was 1969, when precipitation was as much as 1.5 times above the long-term average.

Due to complexity of mountain landscape, there is medium and low confidence in precipitation scenarios. According to some models (HadCM2 and others) the increase of annual precipitation to 3-26% is expected by the year 2050. Other models (CCCM and others) project the decrease of precipitation by 3-5% and more.

Changes in snow stock vary in different altitude zones. An increase of snow stock is observed in the most of the foothills and low mountains of the republic. On the contrary, the reduction of snow stock has been observed in many high altitude zones (exceptions are Fedchenko glacier and some other regions). Recent lack of snow stock in high altitude zones and high temperatures adversely affect stream flows in many rivers.

The increase of hot days, heavy rainfalls, floods and avalanches can be observed.

The dynamics of occurrence of other extreme weather events appear not to have changed.

### **Anthropogenic greenhouse gas emissions and scenarios**

Industrialization, urbanization, the increase of industrial and agricultural production, development of motor transport apart from social and economical benefits have resulted in the increase of greenhouse gas emissions and overall anthropogenic impact on the environment and climatic system.

According to expert assessments, contribution of Tajikistan to the global warming during 1970-2000 totalled 300 million tonnes of CO<sub>2</sub>, including emissions from fossil fuel combustion and cement production.

The results of GHG inventory show that most of emissions in Tajikistan were observed in 1991 and amounted to 31 million tonnes of CO<sub>2</sub> without consideration of their removal by natural sinks. The least emissions were observed in 1998 and amounted to 6.3 million tonnes.

The biggest reduction is observed in CO<sub>2</sub> emissions, and the small reduction in emissions of CH<sub>4</sub>, PFCs and N<sub>2</sub>O.

CO<sub>2</sub> emissions per capita in the period under review have reduced from 3.8 to 0.5 tonnes; they are the lowest in Central Asia. Tajikistan takes 100th place in the world on the volume of greenhouse gas emissions (CDIAC).

High capacity of hydropower engineering in many respects potentially makes low level of CO<sub>2</sub> emissions nowadays and in the outlook.

**CO<sub>2</sub> emissions.** In Tajikistan in the period of 1990-1998, the biggest CO<sub>2</sub> emissions were observed in 1991 (22.6 mln tonnes), mainly because of fossil fuels combustion.

Totally, the volume of carbon dioxide emissions in the period under review has decreased more than 10 times, mainly because of decline in energy-related activities.

Most of CO<sub>2</sub> emissions come from:

- Fossil fuel combustion in industry, transport and residential sector (82-92%);
- Production of cement, lime, aluminum, ferrous metals and ammonia (8-18%).

Because of illegal deforestation, the absorption of CO<sub>2</sub> by forests and other woody biomass has decreased by 35%. Given that in 1990 this indicator was 588 Gg, in 1994 it was only 447 Gg.

In the result of changes in land use and reclamation of new lands, absorption of CO<sub>2</sub> by soils increased from 932 Gg in 1990 to 1,436 Gg in 1998. Emission of CO<sub>2</sub> from intensively used soils increased from 19 Gg in 1992 to 84 Gg in 1998. However, there are significant uncertainties in the category "Land use

change and forestry" due to inaccuracy in activity and other factors.

**CH<sub>4</sub> emissions.** The biggest volume of CH<sub>4</sub> emissions in the period 1990-1998 in Tajikistan was indicated in 1991 (176 Gg) mainly because of intestinal fermentation, manure management and oil-gas systems. Totally, in the period under review, the volume of methane emissions has decreased more than 40% as a consequence of structural changes in the agricultural sector and decrease in production and consumption of fossil fuels.

Methane emissions from fossil fuel consumption occur in coal mining, oil and gas production and transportation. Contribution of these sources to the total CH<sub>4</sub> emissions in different years comprises 5-35%.

Rice cultivation, solid waste disposal sites and wastewater treatment processes are the sources of CH<sub>4</sub> emissions. The volume of methane emissions from these sources comprises 10%.

**N<sub>2</sub>O emissions.** The biggest volume of N<sub>2</sub>O emissions in the period 1990-1998 in Tajikistan was indicated in 1990 (about 4 Gg); the lowest emission was indicated during 1995-1998 (up to 2 Gg), mainly because of applying mineral fertilizers in agricultural soils. Nitrous oxide emissions in the category "Agriculture" make in different years 97% to 99% of all N<sub>2</sub>O emissions.

N<sub>2</sub>O emissions from other sources (manure management, burning of agricultural residues) are insignificant. Part of N<sub>2</sub>O emissions occurs due to fossil fuel combustion, mainly in transport sector.

**Perfluorocarbon emissions.** The only source of perfluorocarbon emissions in Tajikistan is the aluminum industry, which emits practically up to 100% of these gases. CF<sub>4</sub> comprises the biggest part of emissions (91%); the smallest part is C<sub>2</sub>F<sub>6</sub> (9%).

Since the production of primary aluminum has decreased from 450.3 thousand tonnes in 1990 to 195.6 thousand tonnes in 1998, perfluorocarbon emissions have proportionally decreased by 57%. The biggest volume of perfluorocarbon emissions was registered in 1990 - 0.69 Gg. The least PFC emissions indicated in 1997 - 0.29 Gg.

Aluminum production gives rise to the emissions of harmful substances, including nitrous oxides, carbon oxide, sulphur dioxide, fluorides and other pollutants that affect both environment and climate system.

Perfluorocarbons have a big potential of global warming. Small quantities of emissions of these gases (less 1 Gg) have significant contribution to the total GHG emissions and comprise up to 32% of total CO<sub>2</sub>-equivalent.

In the perspective, without taking response measures on reduction of greenhouse gas emissions, the annual volume of aggregate GHG emissions will increase together with economic growth (baseline scenario). Implementation of the measures indicated in National Action Plan has the potential to significantly reduce GHG emissions by 20-30% and more.

## **Climate change impacts on the environment, economy and public health**

Projected climate change in global and regional scales will have beneficial and adverse effects on both environmental and socio-economic systems, but the larger the changes and the rate of change in climate, the more the adverse effects predominate. In this regard, adaptation to climate change is of the highest importance.

In the mid-term, the increase of air temperature by 2-3°C will likely accelerate process of glacier retreat. It is very likely that thousands of small glaciers will disappear in Tajikistan. Countrywide, the ice cover will reduce by 20%; the ice volume will decrease by 25-30%. Initially, glacier melting will increase stream flow in some rivers and will partially compensate the decrease of stream flow in other rivers. In the mid- and long-term, a catastrophic reduction of water flow in many rivers is expected.

Water resources in the mid-term will increase in some regions (Western Pamir); in other regions they will deteriorate (Zeravshan, Kafirnigan) due to glacier retreat, change in precipitation pattern and an increase of evaporation. It is likely that scales and consequences of natural disasters will be more spread and destructive due to changes in the global and regional hydrological cycles.

Climate changes have the impacts on the quantity and quality of water resources. The character of river flow is constantly altering that negatively affects local ecology and vulnerable sectors of economy such as irrigation, water supply and hydropower engineering in Tajikistan and Central Asian region.

Changes in vertical zonation of flora and fauna may occur in mountain ecosystems with a rich biodiversity. Mountain pastures and alpine meadows will likely favor, others, such as winter pastures on the contrary will degrade in result of temperature rise and the lack of precipitation.

It is likely that tugai ecosystem (flood plain) will degrade because of shortage of water resources, increase of temperature, and fire risk. Frequent and long lasting droughts are expected to affect the condition of broad-leaf forests. Climate warming will shift phenological parameters of forest vegetation (earlier ripening, fading, blooming, etc.). Biological linkages within ecosystems are expected to alter. The area of deserts will probably expand.

Agriculture in Tajikistan is at particular risk of severe effects of climate change, where apart from other factors, land degradation and desertification are the typical natural processes.

The most damage to agriculture in Tajikistan is occurred in result of such hydro-meteorological phenomena as:

- High temperatures, hot winds and low temperatures;
- Heavy rainfalls;
- Floods and mudflows;
- Strong winds and sandstorms;
- Agricultural pests and diseases.

During 1991-2000, annual losses of agricultural gross product from extreme weather events totaled to 1/3 of overall agricultural loss.

Long dry periods together with high temperatures in spring and summer seasons lead to the intensification of desertification processes in Southern and Central Tajikistan. Uncontrolled deforestation conditioned by lack of energy resources lead to catastrophic scales of those processes.

In the outlook, water economy will need more water, especially for irrigation, in view of climate warming and increased evaporation. Water needs for irrigation of basic agricultural crops will rise by 20-30% compared to present climate conditions.

Hydropower engineering is relatively stable towards the hydrological cycle fluctuations, however long-term drought and increased suspended solids will negatively affect this economy.

Development of road transport is limited by unfavorable natural-climatic conditions. High temperatures in summer season in valleys and foothills cause infringement of fastness indicators and deformation of road surfaces. Flash floods in spring and mudflows, which spread over the big territories, wash out tens of kilometers of road ballast bed. More than 500 km of roads every year prone to unfavorable natural phenomena, among which climatic factors play essential role.

As a result of climate warming, vector-borne and other dangerous diseases, including malaria will spread significantly.

Alterations in the hydrological cycle will lead to water shortage and an increase of water temperature in the rivers. This fact will favor to the formation of potential choleric and malaria water reservoirs, especially in lower reaches of the rivers Vakhsh, Kafirnigan, Pyanj, and others.

It is very likely that the rise of extreme summer temperatures will lead to higher infant and adult mortality.

In the circumstances, when the climate is changing very rapidly, human adaptation mechanisms are overstrained, and cannot react appropriately, which increases human being's vulnerability. The climate change impact on public health and mortality remains poorly studied both in Tajikistan and in the world. There is a need in further detailed investigations.

Most vulnerable to the climate change is the population in poverty because of absence of necessary resources for coping adverse affects and adaptation.

It should be noted that V&A research has revealed uncertainties that refer to the lack of scientific knowledge and an inadequate system of observations over the climate change indicators and consequences, including ecosystems, public health, etc.

## **Tajikistan's commitments to the UNFCCC**



Considering the importance of the climate change problem and its adverse impact, Tajikistan continues to take part in the international efforts in solving this problem.

The Republic of Tajikistan joined the UN Framework Convention on Climate Change on January 7, 1998 and accepted its commitments, as the Party not included in Annex I of the Convention.

The Republic of Tajikistan is a developing country with fragile ecosystems, water resources and agriculture, which are vulnerable to climate change and various natural hazards. Sectors of national economy release greenhouse gas emissions thereby contributing to climate change.

The commitments of the Republic of Tajikistan concerning the UN Framework Convention on Climate Change include:

- Formulation and implementation of measures to mitigate climate change by addressing anthropogenic emissions by sources and removals by sinks of all greenhouse gases, and measures to facilitate adequate adaptation to climate change;
- Promotion and cooperation in the development, application and diffusion of technologies, practices and processes that control, reduce or prevent greenhouse gas emissions, and in the conservation and enhancement, as appropriate, of sinks and reservoirs of all greenhouse gases;
- Cooperation in preparing for adaptation to the impacts of climate change;
- Integration of the problem of climate change in social, economic and environmental policies and actions;
- Promotion to the international efforts on strengthening systematic observation, potential and opportunities in the field of scientific research related to the climate system;
- Promotion and cooperation in the field of information exchange, education, training and public awareness on climate change;
- Communication to the Conference of the Parties information related to implementation, in accordance with Article 12, including national inventories of anthropogenic emissions by sources and removals by sinks of all greenhouse gases.

### **The process of National Action Plan preparation**

In 1999, the Government created a working group with representatives from key ministries and institutions and designated National Focal Point to prepare a National Action Plan for climate change mitigation to fulfill national commitments on UNFCCC.

The document of the National Action Plan (NAP) has been prepared with support from the Global Environmental Facility and the Government of the Republic of Tajikistan. The process of NAP preparation lasted from 2001 to 2002 (tab. 1) and involved more than 100 qualified experts from roughly 30 ministries, institutions, academic and educational entities and public organizations.

### **The preparation stages of the National Action Plan for Climate Change Mitigation**

Date	Events
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<b>Date</b>	<b>Events</b>
<b>January 1998</b>	The Republic of Tajikistan joins the UN Framework Convention on climate change
<b>July 1999</b>	Establishment of the Governmental working group and the designation of a National Focal Point to develop National Action Plan on climate change
<b>December 1999</b>	Receive notification from UN FCCC Secretariat and GEF with the intention to support the preparation of the First National Communication on climate change and the National Action Plan
<b>May 2000</b>	Submission of project proposal on the preparation of the First National Communication of the Republic of Tajikistan for GEF approval
<b>August 2000</b>	Arrange initial national workshop on climate change with support from UNDP GEF
<b>October 2000</b>	Sign project document "Enabling the Republic of Tajikistan to Prepare its First National Communication on Climate Change "
<b>October 2000</b>	Conduct the first assessment of public awareness on climate change in the regions of the republic
<b>February 2001</b>	Start implementation of the project on preparation of First National Communication
<b>April 2001</b>	Arrange Project Initiation workshop on preparation of First National Communication
<b>July 2001</b>	Finalize report about climate change and scenarios in the Republic of Tajikistan
<b>August 2001</b>	Finalize report about national GHG inventory of the Republic of Tajikistan
<b>August 2001</b>	Arrange national workshop to discuss the results of climate change research and national GHG inventory
<b>November 2001</b>	Finalize report about assessment of vulnerability of natural resources, national economy and public health to climate change and adaptation measures
<b>December 2001</b>	Arrange National workshop to discuss the results of vulnerability assessment and strategy of adaptation to climate change
<b>January 2002</b>	Finalize report on GHG emissions scenarios and measures for GHG reduction
<b>February 2002</b>	Arrange national workshop to discuss measures on GHG reduction and likely structure of the NAP document
<b>May 2002</b>	Arrange national workshop to discuss the results of NAP preparation and to make decisions on the content of draft NAP document
<b>July 2002</b>	Arrange a meeting with the participation of leading authors to discuss final draft of the NAP document
<b>August 2002</b>	Submission of the document of National Action Plan for Climate Change Mitigation for consideration and approval by Tajik Government

Source : Tajik Meteo Service (2002)

Partnerships during NAP preparation and information exchange have been strengthened through a series of national workshops, expert meetings and companies on public awareness in the regions of the republic. Governmental institutions, public organizations, private sector, universities, scientific organizations and mass media have taken part in national workshops on the aspects of the climate change problem.

Adequate access to the resources of the Internet and distribution of climate change information in the national language were implemented. First National Communication along with the summary of results of thematic research has been published. For a better understanding of the climate change problem by the public a series of broadcasts on radio and TV, publications in newspapers, popular books, and brochures were organized.

The following working groups were established and performed designated tasks in the course of NAP preparation:

- I. Scientific basis of climate change and scenarios;
- II. National inventory of anthropogenic emissions by sources and removals by sinks of greenhouse gases and subgroup on verification;
- III. Greenhouse gas emissions scenarios and abatement measures;
- IV. Assessment of vulnerability of natural resources, national economy and public health to climate change;
- V. Adaptation to climate change, measures for optimization of systematic observations and raising public awareness.

The experts from UNFCCC Secretariat and UNDP-GEF together with national consultants have verified the results of research.

This National Action Plan document indicates the priorities and measures to be undertaken by the Republic of Tajikistan to address the problem of climate change, to develop a capacity for further research and analysis of the climate system, its variability and change, to strengthen the international cooperation and joined efforts to mitigate climate change. The measures indicated in the National Action Plan serve as a basis for planning and decision making at all state levels and in all relevant sectors.

### **List of publications, statistical data and archive sources for Tajikistan**

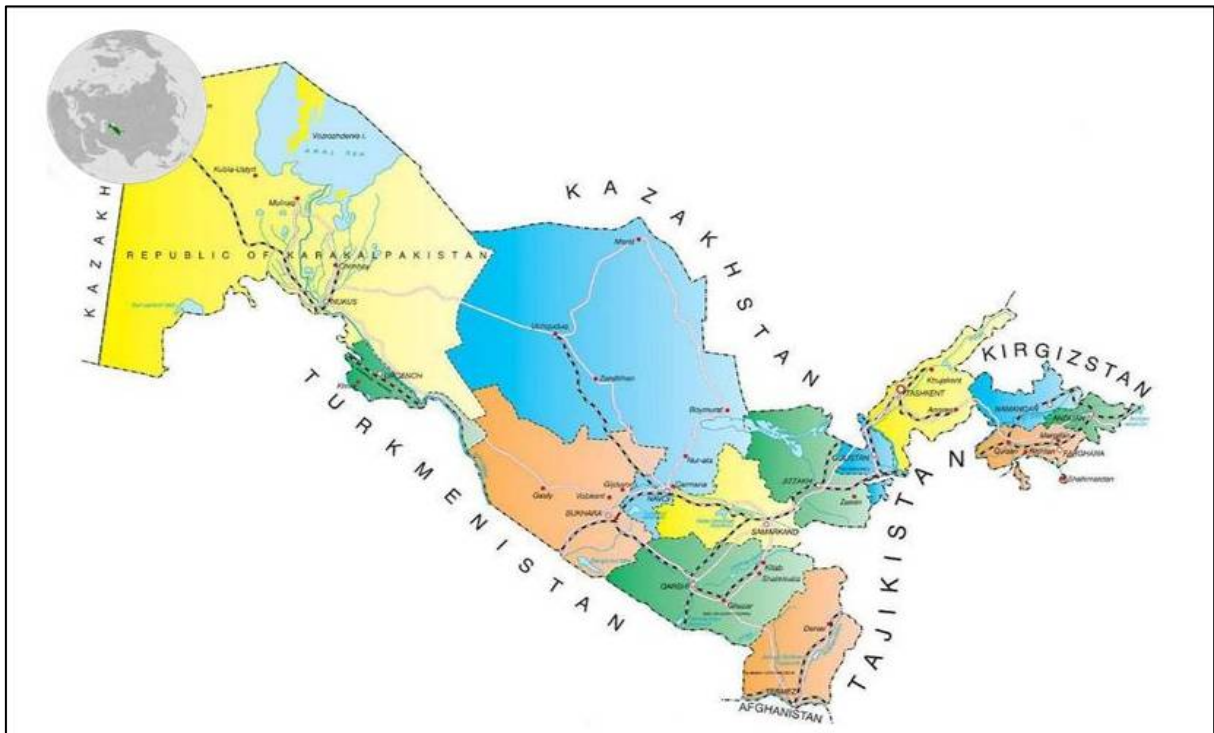
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16. Archive data of the State Design Institute on Land Use "Tojizaminsoz" for the period 1945-1998.
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20. Dushanbe.
21. National economy of the Tajik SSR. Statistical year-books for 1960-1990.
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23. Protection of the environment in the Republic Tajikistan. Statistical year-book.
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## UZBEKISTAN

Along with Liechtenstein, Uzbekistan is one of the only two doubly landlocked countries in the world. Uzbekistan has an area of 448,840 square kilometers. Uzbekistan lies between latitudes 37° and 46° N, and longitudes 56° and 74° E. It stretches 1,425 kilometers from west to east and 930 kilometers from north to south. Bordering Kazakhstan and the Aral Sea to the north and northwest, Turkmenistan to the southwest, Tajikistan to the southeast and Kyrgyzstan to the northeast, Uzbekistan is one of the largest Central Asian states and the only Central Asian state to border all the other four. Uzbekistan also shares a short border (less than 150 km) with Afghanistan to the south.



Uzbekistan is Central Asia's most populous country. It's about 32,121 million (January 2017) citizens comprise nearly half the Central Asian total population. During 2016 the total population was increased by 545,8 thousand, or 1,7%. Of total population 50,6% is urban and 49,4% rural. The population of Uzbekistan is very young: 34.1% of its people are younger than 14. According to official sources, Uzbeks comprise a majority (80%) of the total population. Other ethnic groups include Russians 5.5%, Tajiks 5.0%, Kazakhs 3%, Karakalpaks 2.5%, Tatars 1.5%, about 1% ethnical Koreans and about 1.5% other nationalities.

Republic of Uzbekistan administratively encompasses: The Republic of Karakalpakstan, 12 veloyats (provinces), 159 tumans (rural districts), 119 large and average cities, 114 urban-type settlements, and 1472 villages. Major cities include Andijan, Bukhara, Fergana, Namangan, Samarkand and the capital Tashkent.

Uzbekistan declared its independence from Soviet Union on August 31, 1991. In December 1991, an independence referendum was passed with 98.2 percent of the popular vote. The same month, a new Parliament was elected and Mr. Islam

Karimov was chosen the new nation's first President. The actual President is Mr. **Shavkat Mirziyoyev**, who was elected to this position on 4 December 2016.

The Republic of Uzbekistan is a presidential constitutional republic, whereby the President of Uzbekistan is both head of state and head of government. Executive power is exercised by the government. Legislative power is vested in the two chambers of the Supreme Assembly, the Senate and the Legislative Chamber (Parliament). The judicial branch (or judiciary), is composed of the Supreme Court, Constitutional Court, and Higher Economic Court that exercises judicial power.

The volume of gross domestic product (GDP) in 2016 amounted to \$ 72.43 billion USD. Over the past 10 years, GDP in Uzbekistan has almost doubled. Contribution of sectors to GDP: Industry – 24,75%, Services – 23,79%, Agriculture – 16,61%, Transport and Communications – 11,0%, Trade-offs – 8,65%, Net Taxes – 7,95%, Construction – 7,25%.

### **Water Management Infrastructure**

The total irrigated area of the republic of 4.3 million hectares of land. Of these, over an area of 2.2 million hectares, water is supplied by pumping stations. The scale of huge pumping systems can be seen from the following examples: Karshi cascade of pumping stations - total discharge of 210 m<sup>3</sup> / sec, has seven steps (lifting cascade) with total height of 132 m deliver water from Amudarya to the irrigation area of 350 thousand hectares. The pumping system along the Amu - Bukhara canal – with total discharge of 263 m<sup>3</sup> / sec, supplies the irrigation area of 285 thousand hectares, lifting height of 69 m. On the balance of Ministry of Agriculture there are 1588 pumping stations with 5003 pumping units. Their annual electricity consumption is above the 8.2 billion kW.

The total length of inter-farm irrigation network in the republic is more than 27.8 thousand km, and the on-farm network - 155 thousand km. Along the main and inter-farm canals there are more than 25,000 hydraulic structures, along the on-farm network - more than 44 thousand structures. In general, the main and inter-farm irrigation networks are equipped with hydraulic structures in sufficient quantity.

On the irrigated area over 2.5 million hectares there were installed about 103.3 thousand km of engineering drainage network, of which 32.1 thousand km – are main and inter-farm collectors, and about 107.7 thousand km – on-farm drainage networks (including 37.5 thousand km of subsurface drainage). On the balance of the Ministry of Agriculture and Water Resources there are 7808 tube wells, including 3659 vertical drainage wells, and 4149 wells for irrigation.

### **River Flow Regulation by Reservoirs**

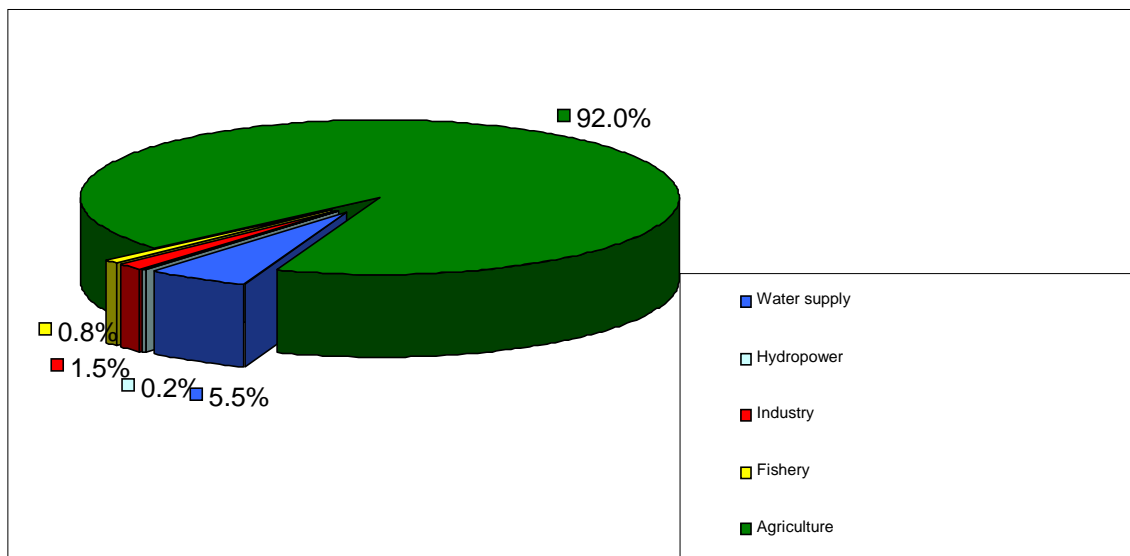
55 reservoirs including 31 off-channel reservoirs and 24 in-channel reservoirs have been built in Uzbekistan (among them 27 reservoirs with an initial active storage over 10 million m<sup>3</sup> of water). Reservoirs regulate the regime of natural river flow, making it favorable for economic use and promoting the increase of irrigated areas and their water availability. A total storage capacity of all reservoirs exceeds 20 km<sup>3</sup> including about 16 km<sup>3</sup> of an active storage of water. Most of reservoirs have been built more than 20 years ago. Over the period of their

operation all reservoirs were subjected to sedimentation that has led to loss of initial active storage.

### **Brief Chronology of Water Management**

Use of water resources in the territory of present Uzbekistan, mainly for drinking needs and irrigation, began more than 6000 years ago. Especially intensively water resources began to be used after 1960, that was caused by fast growth of the population, intensive development of an industry and, mainly, irrigation. As a whole irrigated agriculture consumes more than 90 % of total diversion.

Total withdrawal to the country in the 1980s was about 65 km<sup>3</sup> per year. After independence in Uzbekistan could be observed a tendency to reduce water consumption and water intake, particularly in the last five years, the total water intake was only 51 km<sup>3</sup> per year. It should be noted that the population of the republic has grown from 20.3 million in 1990 up to more than 31 million today.



### **Water resources use by economic sectors in Uzbekistan**

#### **Hydrological conditions of Uzbekistan**

In Uzbekistan, available water supply is formed by renewable surface and underground waters of natural origin, as well as by return water of anthropogenic origin. Water resources are mainly formed in the transboundary river basins.

A feature of the country is the division of its territory into three main zones of surface runoff: (a) the zone of flow formation (upper watersheds in the mountain areas), (b) the zone of flow transit and its dissipation, and (c) the delta zones. As a rule, there is not a significant level of anthropogenic changes in the zone of flow formation, but due to construction of big dams and water reservoirs on the border of this zone, the downstream run-off regime is changing significantly. Within the zone of flow transit and dissipation the run-off and the whole hydrological cycle are changing in consequence of interaction between rivers and territory. This interaction is characterizing by water withdrawal from river to the irrigated areas and the loading of return flow to the river with salt and agricultural chemicals.

The Amudarya is the biggest river in Central Asia. Its length from the headwaters of the Pyandzh to the Aral Sea is 2540 km, with a catchment area of 309000 km<sup>2</sup>. It is called the Amudarya from the point where the Pyandzh joins with the Vaksh. Three large right tributaries (Kafirnigan, Surhandarya and Sherabad) and one left (Kunduz) flow into the Amudarya river within the middle reach. Further downstream towards the Aral Sea it has no tributaries. It is fed largely by water from melted snow, thus maximum discharges are observed in summer and minimum ones in January-February. Such availability of the flow within a year is very favorable to the use of the river water for irrigation. While crossing the plain, from Kerky to Nukus, the Amudarya loses the majority of its flow through evaporation, infiltration and withdrawal for irrigation. In terms of sediment the Amudarya carries the highest load of all the rivers in Central Asia and one of the highest levels in the world. The main flow of the Amudarya river originates on the territory of Tajikistan. The river then flows along the border between Afghanistan and Uzbekistan, across Turkmenian territory and then again returns to Uzbekistan where it discharges into the Aral Sea.

In terms of water availability the Syrdarya is the second most important river in Central Asia but the largest in terms of length. From the Naryn headwaters its length is 3019 km, with a catchment area of 219000 km<sup>2</sup>. Its headwaters lie in the Central (Interior) Tien-Shan mountains. The river is known as the Syrdarya after the point where the Naryn joins with the Karadarya. The river has glacial and snow feeding, with a prevalence of the latter. The water regime is characterized by a spring-summer flood, which begins in April. The largest discharge is in June. The main part of the Syrdarya run-off originates in the Kyrgyz Republic. The Syrdarya then flows across Uzbekistan and Tajikistan and discharges into the Aral Sea in Kazakhstan.

Table. Total natural river flow by origin in the Aral Sea basin (multiyear flow, km<sup>3</sup>/year)

State	River basin		Aral Sea basin	
	Syrdarya	Amudarya	Km <sup>3</sup>	%
Kazakhstan	2.426	-	2.426	2.1
Kyrgyz Republic	27.605	1.604	29.209	25.1
Tajikistan	1.005	59.578	60.583	52.0
Turkmenistan	-	1.549	1.549	1.2
Uzbekistan	6.167	5.056	11.223	9.6
Afghanistan and Iran	-	11.593	11.593	10.0
<b>Total Aral sea basin</b>	<b>37.203</b>	<b>79.280</b>	<b>116.483</b>	<b>100</b>

Source: SIC ICWC, 2013

### Climate of Uzbekistan

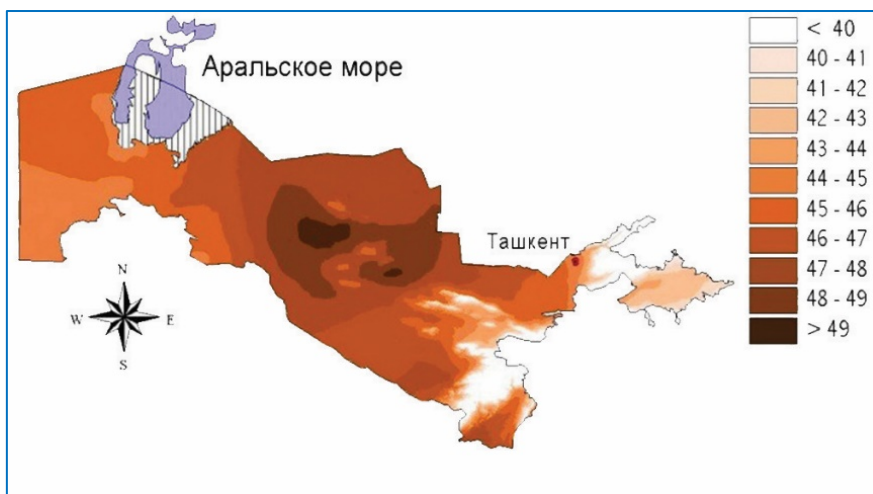
The most territory of Uzbekistan has a continental, dry (arid) climate, with little precipitation expected annually (100–200 millimeters). Cold air masses freely penetrate into the most southerly parts of the country, where the minimum temperatures in the winter can reach -25 ° C. In the northern part of Uzbekistan (Ustyurt plateau), the absolute minimum is -39.7 ° C (February, 1969).





**Figure: Temperature in Winter season**

In the warm period of the year, a high level of solar radiation creates conditions for the formation of vast hot spots, extreme air temperatures in summer in the central desert regions of Uzbekistan reach +45-49 ° C



**Figure: Temperature in Summer season**

Tendencies of climate changes in the territory of Uzbekistan:

- Increase in the duration of dry hot period.
- An increase in the number of days with heavy precipitation and high variability in precipitation.
- Reduction of snow stock in the mountains and degradation of glaciation.
- Increase in the frequency of extreme events.
- Increase of mudflow hazard.
- Increase of evaporation along flat and foothill territory.
- Increase in the frequency of droughts and extreme low water levels.

For assessment the vulnerability of natural resources and sectors of the economy of Uzbekistan, there were applied approaches, methods and UNFCCC tools, FAO

CropWat model, etc. Estimates were made by Uzbek Hydromet<sup>6</sup> with analysis of socio-economic and demographic indicators, information on the land use, and water management. In assessing the vulnerability of natural resources, various factors were compiled and formed into Complex indicator of vulnerability. According to the Complex indicator, a group of the most vulnerable to climate change within the country's territory includes: the Republic of Karakalpakstan, Khorezm and Syrdarya regions; a medium-vulnerable group - Navoi, Jizzakh, Bukhara, Surkhandarya, Namangan, Kashkadarya and Tashkent regions. The low-vulnerable group includes Andijan, Fergana and Samarkand regions.

Uzbekistan is among the countries most vulnerable to climate change. Average annual increase of air temperature in Uzbekistan occurs against the background of high natural variability, which causes significant inter-annual fluctuations. The rate of warming exceeds the average rates observed in the global scale. The most significant increases in mean annual air temperatures were recorded at Tashkent and Fergana (1.8 ° C and 1.6 ° C, respectively). On average, Uzbekistan has a warming rate of 0.27 ° C in 10 years.

Analysis of changes in annual precipitation amounts averaged over various regions of Uzbekistan during the period 1950-2016. It shows very weak tendencies to decrease. The most pronounced trends in decreasing precipitation marked on the southern plains of Uzbekistan (Bukhara and Kashkadarya regions).

Throughout the territory of Uzbekistan and in all seasons of the year there is an increase in the number of significant positive temperature anomalies. The highest rates of increase in the number of days with "heat waves" were recorded in the Aral Sea area and lower reaches of the Amudarya river.

### **The UN Framework Convention on Climate Change, Paris Agreement and Uzbekistan**

Uzbekistan signed the UN FCCC in 1993, in August 1999 ratified the Kyoto Protocol. Uzbekistan ranks first among the CIS and Eastern European countries in terms of the number of registered by the UN FCCC projects for the implementation of clean development mechanisms.

In accordance with the UN FCCC, the Parties to the Convention are obliged to periodically submit their National Communications with information on the process of implementing the Convention.

The first National Communication was carried out in 1999 under the GEF/UNDP project "Uzbekistan - Country Study on Climate Change" and presented at the 5th Conference of the Parties in Bonn. The first National Communication included greenhouse gas inventory data for the period 1990-1994, materials for calculating emission trends, assessing Uzbekistan's vulnerability to climate change, and a general description of mitigation and adaptation measures.

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<sup>6</sup> Third National Communication for the United Nations Framework Convention on Climate Change of Uzbekistan, 2016

The second National Communication was prepared in 2008 with the implementation of the GEF/UNEP project "Uzbekistan: Preparation of the Second National Communication on the UN FCCC". The following results were presented: the database on greenhouse gas emissions was improved and supplemented; reduced uncertainty in the inventory; assessments of the mitigation potential, vulnerability and adaptive capacity of various sectors of the economy; identified priority strategic directions and adaptation measures; potential risks and needs for the development of early warning systems for hazardous climate events were assessed; analysis of the compliance of systematic observations with the requirements of the Global Observing System for Climate and principles of climate monitoring.

The third National Communication was published in 2016 and preserved the continuity of the strategic and conceptual provisions reflected in the first two reports and summarizes the most up-to-date information on climate change issues and the UN FCCC process and includes: the results of the greenhouse gas inventory for period 1990 - 2012; observed changes in climatic characteristics; assessment of vulnerability to climate change; analysis of current policies and measures to reduce greenhouse gas emissions and adaptation to climate change.

Uzbekistan signed the Paris Agreement last among the CACENA countries - the only on 19 April 2017. The document was signed by Ambassador of Uzbekistan to the US Mr. Bakhtiyor Gulyamov. The signing ceremony, held in the UN headquarters, was also attended by Mr. Santiago Villalpando, chief of the Treaty Section in the UN Office of Legal Affairs.

### **Intended Nationally Determined Contributions (INDCs) by Uzbekistan**

Uzbekistan submitted the INDC on 19 April 2017. This document presented the **strengthening measures and actions aimed at climate change mitigation.**

Uzbekistan carries out the targeted policy for energy saving in the key economy sectors. *"Decreasing in GDP energy consumption by approximately 2 times as a result of broad introduction of the advanced energy saving technologies<sup>7</sup>* has been identified in Uzbekistan as the one of targeted tasks for period up to 2030.

Strengthening the institutional capacity and improving the legal framework are carried out in renewable energy sector and energy efficiency to achieve the long-term sustainable development goals. The draft Long-term Strategy for low carbon development is considered in the country. It identifies target indices to energy efficiency and the "Program of measures for transition to low carbon development" for the key sectors of economy (electric energy, thermal energy, housing and utilities sectors), which are the main contributors to GHGs emission in Uzbekistan.

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<sup>7</sup> Report of the President of Republic of Uzbekistan, Mr. Islam Karimov, at the extended session of the Cabinet of Ministers devoted to the results of the social and economic development of the country in 2015, and the most important priority directions of economic program for 2016 (16 January 2016).

The measures for energy saving will allow decreasing consumption of primary energy, mainly natural gas. Investments in energy efficiency and renewable energy sources are of high priority from both economic (decrease in costs for energy generation) and climate viewpoint (decrease in volumes of greenhouse gas emissions).

The republic successfully carries out measures for adaptation to and mitigation of climate change impacts, including implementation of Clean Development Mechanism (CDM) Projects within the framework of the Kyoto Protocol. Over the entire period of the CDM project activities in Uzbekistan, it has been put into circulation 15,229,536 tons of Certified Emission Reductions in CO<sub>2</sub>-equivalent (CERs), and attracted foreign private investments in amount of USD 24.4 million.

The gradual modernization of the industry and a number of other measures implemented during the period from 1990 to 2010 have led to decrease in energy consumption of GDP by almost 2.5 times. Specific emissions of CO<sub>2</sub> per unit of GDP have been decreased by almost 50%.

Measures and actions aimed at energy resources saving have allowed Uzbekistan to stabilize level of greenhouse gas emissions and decrease its contribution to the world-wide emissions. According to the GHG inventory data, increase in the GHG emissions during the period from 1990 to 2010 was around 10% only.

During the period from 2007 to 2012, in accordance with the Decree of the Cabinet of Ministers<sup>8</sup>, 188 thousand units of vehicles were changed over to run on gas fuel.

Great attention is paid in the country to the development of renewable energy sources, especially solar energy. The production and experimental use of solar water heaters for hot water supply to residential houses and social facilities are carried out for more than 10 years. A large-scale project for construction of a number of photovoltaic power plants of 100MW each has been commenced. It is planned to bring up the share of solar energy in the total energy balance of the country to 6% by 2030.

Uzbekistan shares opinion of the world community regarding necessity to apply efforts to control the global climate change in accordance with the capabilities and responsibility of each country on a reasonable and equitable basis.

### **National Adaptation Plan (NAP) of Uzbekistan**

Adaptation to climate change is the priority direction in Uzbekistan's activities aimed at decrease in vulnerability and ensuring the country's sustainability to climate change. Adaptation measures cover a wide scope of actions for protecting the communities from adverse impacts of climate

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<sup>8</sup> Decree of the Cabinet of Ministers No.30, dated 10 February 2007 "On Measures for Developing the Network of Automobile Gas Filling Compressor Stations and Gas Refilling Stations, and Gradual Change-over of Automobile Transport to Run on Liquefied and Compressed Natural Gas".

change such as extreme droughts and dangerous hydro- meteorological phenomena, associated with the global change in air temperature; increasing the sustainability of strategic infrastructure and ecosystems for conservation of agro- and biodiversity; diminishing harmful impact of the Aral Sea disaster on the environment and life of millions of people living in Priaralie, through, inter alia, implementation of well conceived targeted projects and programs supported by proper financing sources. This will require substantial assistance from the United Nations institutions, other international organizations and partner countries in development.

The National Adaptation plan (NAP) still not prepared. The only NDC presented the certain Adaptation Measures in Uzbekistan for period up to 2030. On the first turn it includes the **Adaptation of agriculture and water management sector**<sup>9</sup>:

- Improvement of the climate resilience of the agriculture through diversification of food crops production pattern; conservation of germplasm and indigenous plant species and agricultural crops resistant to droughts, pests and diseases; development of biotechnologies and breeding new crop varieties adopted to conditions of changing climate.
- Improvement of irrigated lands affected by desertification, soil degradation and drought, increase in soil fertility of irrigated and rainfed lands.
- Further improvement of water management practice in irrigated agriculture with wide use of integrated water resources management approaches and innovative technologies for water saving, including broad introduction of drip irrigation systems.
- Improvement of pasture productivity and fodder production in desert and piedmont areas.

#### **Adaptation of social sector to climate change**<sup>10</sup>:

- Raising of awareness and improvement of access to information about climate change for all groups of population;
- Development of early warning systems about dangerous hydro-meteorological phenomena and climate risk management;
- Prevention of diseases onset and aggravation caused by climate change;
- Widening the participation of the public, scientific institutions, women and local communities in planning and management, taking into account

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<sup>9</sup> Governmental Program for Further Improvement of Irrigated Lands and Rational Use of Water Resources for the Period 2013-2017; Decree of the President of the Republic of Uzbekistan No.PP-1958, dated 19 April 2013; “Uzbekistan Towards 2030: Transition to the Resource-efficient Growth Model”, UNDP/CER (Center for Economic Research) Project, 2015; Program of Measures for Reduction in Energy Consumption, Introduction of Energy Saving Technologies in Economy Sectors and Social Sphere for 2015-2019; Decree of the President of the Republic of Uzbekistan No.PP-2343, dated 05 May 2015; and others.

<sup>10</sup> Law of the Republic of Uzbekistan «On Sanitation-and-Epidemiological Safety of Population, No 451, dated 06 August 2015.

approaches and methods of gender equity.

### **Mitigation of the Aral Sea disaster impacts<sup>11</sup>:**

- Conservation of the current fragile ecological balance in Priaralie, combating desertification, improvement of management system, efficient and rational water resources use;
- Creation of conditions for reproduction and conservation of genofond and population health in Priaralie, development of the social infrastructure, extensive network of medical and educational organizations;
- Creation of essential social and economic mechanisms and incentives for improvement of quality and living standards for population, development of base infrastructure and communication system;
- Conservation and rehabilitation of flora and fauna biodiversity, including through creation of local water bodies in Priaralie;
- Expansion of foreign investment attraction for implementation of measures and actions for mitigation of the Aral Sea disaster impacts;
- Conservation and restoration of forest resources, including afforestation of the dried Aral Sea bottom.

### **Adaptation of ecosystems:**

- Restoration of forests in mountain and piedmont areas, conservation of indigenous plant species in semi-deserts and deserts;
- Conservation, restoration and maintenance of ecological balance in the protected nature territories;
- Improvement of sustainability in management of fragile desert ecosystems.

### **Adaptation of strategic infrastructure and production facilities:**

- Introduction of adaptation criteria into governmental investment projects for construction, modernization, O&M of infrastructure in various sectors of economy;
- Reconstruction and modernization of irrigation and drainage infrastructure in water management sector
- Expansion of sectoral programs for purification of municipal and industrial effluents, ensuring quality of water for drinking wate supply

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<sup>11</sup> Decree of the Cabinet of Ministers of the Republic of Uzbekistan No.255, dated 29 August 2015 “On Integrated Program of Measures for Mitigation of the Aral Sea Disaster Impacts, Rehabilitation and Socio-Economic Development of the Priaralie region for 2015-2018”. In February 2017 **the President of the Republic of Uzbekistan Shavkat Mirziyoyev** approved the *Action Strategy on Five Priority Areas for Development in the Republic of Uzbekistan for 2017-2021*. This document stresses the importance of adoption of systemic measures to mitigate the negative impact of global climate change and the drying up of the Aral Sea on agricultural development and people livelihoods. In this context, the President of Uzbekistan has approved **the State program for development of the Aral region for 2017 - 2021**.

- and sanitation;
- Modernization of gage stations on natural water courses, improvement of water resources monitoring and forecasting;
  - Improvement of the system for monitoring ameliorative conditions of irrigated lands and soil fertility;
  - Application of technologies for protection of littoral and river infrastructure, etc.

### **Headline messages from the gap assessment in Uzbekistan**

Uzbekistan is among the countries most vulnerable to climate change. Average annual increase of air temperature in Uzbekistan occurs against the background of high natural variability, which causes significant inter-annual fluctuations. The rate of warming exceeds in two times the average rates observed in the global scale.

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The National Adaptation plan (NAP) still not prepared by Uzbekistan. The only NDC presented the certain Adaptation Measures in Uzbekistan for period up to 2030.

Much attention is paid in Uzbekistan to the mobilization and effective use of investment resources and resources of technical assistance from foundations, donors, development partners to address priorities, including for programs and projects aimed at reducing/preventing GHG's emissions and adapting to negative consequences of climate change. According to the Ministry of Finance, in 2008-2013. Uzbekistan received in the form of grants and technical assistance 860.4

million US dollars, which is equivalent to 0.3% of GDP and 1.5% of the state budget for this period.

More than USD 1 billion per year of climate-related development finance was committed to mitigation and adaptation projects in Uzbekistan in the period 2013-14, which was the largest amount among the countries of Eastern Europe, the Caucasus and Central Asia (EECCA) (the average committed amount to the EECCA countries was USD 303 million per year per country).

Uzbekistan has mobilized a considerable amount of domestic finance for climate-related projects and for a wider set of development activities. The Fund for Reconstruction and Development was created in 2006. Since its creation, the Fund accumulated USD 15 billion in assets by 2014. Most of the assets were managed by the Central Bank of Uzbekistan.

The key of the WACDEP in 2013-2015 were demonstration activities in Fergana Valley. CWP-Uzbekistan accumulated knowledge on innovative and state of the art technologies and methods for irrigation water use to improve land and water productivity at the farm level, capacity building, training and extension materials. Using that basis the following measures were implemented by CWP-Uzbekistan to demonstrate how to obtain a good profit at farm level in spite of climate negative impacts. As a result of the advanced technologies applied by the project, the water supply to the farm demonstration plots were reduced by 30-40%, and farmer obtained the crops significantly higher than the average yield of neighboring farms.

There are certain gaps between what is being implemented by CWP-Uzbekistan in the past WACDEP and what is set out in the INDC. It was focusing the only to the irrigation/agriculture sector. Thus, in future CWP-Uzbekistan should concentrate more wide attention to other sectors (industries, domestic, ecosystems, etc.). Also, priority should be addressed to fundraising for climate issues.

### **Recommended way forward**

As mentioned in the Third National Communication which was published in 2016 - priority directions to implement measures to mitigate and adapt to climate change are as following:

- Further stabilization of greenhouse gas concentrations in the atmosphere at a level that does not allow for dangerous anthropogenic impact on the climate system and within a time frame sufficient for natural adaptation of ecosystems to climate change that will not jeopardize food production and ensure further economic development on a sustainable basis.
- Activation of innovative sources of financing for projects aimed at reducing greenhouse gas emissions, including through the Clean Development Mechanism (CDM). In the medium term priority sectors for the implementation of CDM projects will be: (i) traditional and renewable energy; (ii) oil and gas industry; (iii) the chemical industry; (iv) urban utilities; (v) agriculture.



- Improvement of the investment mechanisms for the implementation of modernization programs, technical and technological re-equipment of the economy, aimed at increasing the share of own financial resources for the implementation of energy efficient facilities that ensure achievement of energy efficiency targets as an important factor in reducing greenhouse gas emissions.
- State support for the wide involvement of small business and private entrepreneurship into processes of waste recycling and processing using conversion technologies.

It is required to develop and implement the long-term national adaptation and low-carbon development plans (NAP) and / or integration of measures and actions to combat climate change within the strategies and sectoral development plans, as well as significant technical and financial assistance attraction from international funds and donors.

For the preparation and implementation of effective, targeted and source-financed projects, a significant increase in the capacity of experts is required to prepare projects and expand international cooperation with financial institutions of the UNFCCC. There is a clear need to continue and develop research on vulnerability assessment and the possibility of adaptation of ecosystems and sectors of the economy to climate change, which will require the collection and analysis of a large amount of information and, accordingly, the improvement of the system of state statistics, as well as enhanced cooperation and interaction with relevant ministries and departments.

The needs for capacity development in the area of adaptation also include: improved hydrometeorological monitoring and the expansion of the network of snow surveys in the zone of formation of the flow of transboundary rivers; Improvement of early warning systems for droughts for individual basins; The development of plans aimed at training the population and governing bodies for action in the face of dangerous hydrometeorological phenomena.

Climate change affects to all segments of the population. In this regard, the task remains to regularly educate and widely publicize the causes and consequences of climate change, measures and activities to prevent its negative consequences, inform about energy-saving technologies, policies and measures that reduce GHG emissions and hazardous hydrometeorological phenomena. There is a need to integrate climate change issues, along with environmental knowledge, into educational programs and development plans for various sectors of the economy.

It is clear that for the moment Uzbekistan's sectoral authorities have a lack of understanding about the procedures and communication channels to be used to access the GCF and other principal donors for climate. It is crucial, as well as the certain donor agencies and the GCF have rather rigid rules in this regard.

The momentum of the Paris Agreement and the need for additional investment to implement NDC and NAP provide an opportunity to position Uzbekistan's NAMA more prominently on national strategic agenda.

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## CONCLUSION

The Paris Agreement calls for responses to the threat of climate change in two ways:

- a) by mitigating the effects, restraining the growth of the global average temperature, and
- b) by adaptation, increasing resilience and ability to adapt to adverse climate change.

GWP promotes the idea that water is the key to the ability to resist climate change. No matter how successful mitigation efforts might be, people will experience the impacts of climate change through water.

Despite that, not so many countries, which ratified the Paris Agreement included full scale adaptation measures either in their contribution to the Paris Agreement or in the commitment to the Global Sustainable Development Goal 13 to combat Climate Change and its impacts.

Gap analysis conducted by CACENA CWPs in order to assess what is set out in their NDCs and the NAPs and what is needed to enhance water security and climate resilient development in the region shows that the most significant and relevant issues for the countries of the region to date include the establishment of an efficient system of response and adaptation in water sector to the negative challenges related to changes in climatic conditions in Central Asia and the Caucasus. The most vulnerable for the regional countries are the rural population that suffers from floods, landslides and mudflows, and agricultural production that suffers from dry years and heavy rainfall and low temperatures.

Within the framework of these issues GWP CACENA, using its natural advantages of being recognized neutral platform for dissemination of knowledge, will:

- assist countries in the development of water adaption planning using risk-based approach proposed by IPCC in its 5th report;
- through national policy dialogues (NPD) regarding development and implementation of NAPs and relevant SDG target 6.5 on water, targets 13.1, 13.2 on actions to combat climate change and its impact and targets 17.6-9 on partnerships;
- encourage and assist in raising the awareness and knowledge of the population, politicians and experts on all matters of climate change and its negative impact, as well as mitigation or adaptation methods and approaches.

Taking those into account, the following two main actions could be recommended:

- To organize (in 2019), using recognized GWP role as a neutral platform, National Policy Dialogues in CACENA countries on selection of NAP quantitative targets TOGETHER with the process of national adaptation of global SDG targets:

6.5 By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate;

13.1 Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries;

13.2 Integrate climate change measures into national policies, strategies and planning;

17.6-9 on Technology and Capacity-Building on partnership for sustainable development.

- To organize (in 2019), using recognized GWP role in Knowledge sharing, training on project proposals development for Green Climate Fund (GCF) and Adaptation Fund (AF)

For adaptive events in the region, it is important to:

- Have the information on the climate change assessment in the region and the degree of its negative impact;
- Have approaches to adapt irrigated and non-irrigated agricultural production to all manifestations of climate change;
- Promote relevant institutions and organizations in the development and implementation of mechanisms and instruments of risk management related to changes in climatic conditions;
- Promote relevant organizations to establish effective irrigation water use system based on the principles of water conservation and taking into account the climatic conditions;
- Create an informational and methodological basis for climatic conditions of the region and its negative impact, adaptation mechanisms and instruments;
- Assist regional and national organizations and institutions to develop a system of continuous monitoring, consultations, improvement and dissemination of knowledge among all stakeholders, especially those who are under constant risk of negative impact of climatic conditions.