

Approved by
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NATIONAL STRATEGY FOR ADAPTATION TO CLIMATE CHANGE
OF THE REPUBLIC OF TAJIKISTAN
FOR THE PERIOD UNTIL 2030

Dushanbe- 2019

LIST OF ABBREVIATIONS

ABR	- Asian Development Bank
AF	- Adaptation Fund
GDP	- Gross domestic product
GABIK	- Global Alliance to Combat Climate Change
GEF	- Global Environment Facility
DMR	- Department for International Development
EBRD	- European Bank for Reconstruction and Development
EC	- European Commission
EU	- European Union
GCF	- Green Climate Fund
KGNSA	- National Strategy Advisory Group
adaptation	
ICF	- Investment Climate Fund
CEP	- Committee for Environmental Protection
ICF	- International Climate Foundation
M&E	- Monitoring and Evaluation of SIDS - Small Island Developing States
NDS-2030	- National Development Strategy of the Republic of Tajikistan for the period until 2030
NDS-2015	- National Development Strategy of the Republic of Tajikistan for the period until 2015
NGO	- Non-governmental organization
NDA	- National Authorized Body
NSAIC	- National Strategy for Adaptation to Climate Change
RPS 2016-2020	- Medium-Term Development Program of the Republic of Tajikistan for 2016-2020
PPCR	- Pilot Program for Climate Change Adaptation
UNDP	- United Nations Development Program
UNFCCC	- United Nations Framework Convention on Climate Change
SKBSI	- United Kingdom of Britain and Northern Ireland
SCCF	- Special Climate Change Fund
TSDC	- Technical Assistance for Capacity Development
ESG	- Environmental and social guarantees

GENERAL PROVISIONS

1. National strategy for adaptation to climate change of the Republic of Tajikistan for the period until 2030 hereinafter - NSAIC developed on the basis of the provisions of the Constitution of the Republic of Tajikistan, the Law of the Republic of Tajikistan, Article 18 of the constitutional Law of the Republic of Tajikistan "On the Government of the Republic of Tajikistan" and from the speech of the President of the Republic of Tajikistan, Leader of the Nation, respected Emomali Rahmon at the Conference of the Parties to the United Nations Framework Convention on Climate Change (COP -22) in Paris and at the plenary meeting of the 72nd session of the United Nations General Assembly. 2. Speaking at the 21st Conference of the Parties to the United Nations

Framework Convention on Climate Change (UNFCCC) in Paris, France, on November 30, 2015, the President of the Republic of Tajikistan, Leader of the Nation, respected Emomali Rahmon noted that although the share of the Republic of Tajikistan in The volume of greenhouse gas emissions on a global scale is small, however, Tajikistan is one of the most climate-vulnerable countries in the world to the impacts of climate change.

3. Tajikistan ranks first among the countries of Europe and Central Asia in terms of the calculated simplified climate change vulnerability index, being a particularly sensitive country according to this criterion due to its low ability to adapt. Given the worsening of existing problems and the emergence of new risks, climate change is likely to act as a barrier to Tajikistan achieving its development priorities.

4. Risks associated with climate change and adaptation measures to reduce the consequences of these risks for the population and key sectors of the economy are important elements of the National Development Strategy of Tajikistan until 2030. In anticipation of the signing of an international climate agreement at the UNFCCC Conference of the Parties (COP21) in December 2015 in Paris, Tajikistan has prepared Intended and Nationally Determined Contributions that assess

climate trends and develops various scenarios for further action to reduce emissions. On April 22, 2016, Tajikistan signed and the country's Parliament ratified the Paris Agreement on February 16, 2017.

5. The National Strategy for Adaptation to Climate Change (NSAC) also takes into account the international obligations of the Republic of Tajikistan on Agenda 21 and the Sustainable Development Goals (SDGs) related to the fight against climate change approved by the 70th session of the UN General Assembly in September 2015. The main focus of the SDGs is the concept of sustainable human development. Based on this, the complete eradication of poverty, the change of unsustainable and promotion of sustainable consumption and production models, the fight against climate change for the purpose of further economic and social development are the main tasks and vital conditions of Sustainable Human Development.

6. Climate change impacts occur at all system levels: global, regional, subregional, national and local. Climate change in Tajikistan, given its geographical location, exceptional diversity of climatic conditions, economic structure, demographic interests, requires the characterization of interests, the early development of a comprehensive, balanced approach to climate problems and related issues based on a comprehensive scientific analysis of the environment, economic and social factors.

and geopolitical

7. National consultations on the development of the NSAIC identified four sectors as priorities that are both climate sensitive and priority for development: (1) energy, (2) water resources, (3) transport and (4) agriculture , and also included seven cross-sectoral areas: (1) health, (2) education, (3) gender, (4) youth, (5) migration, (6) environment, and (7) emergencies.

8. NSAIC can contribute to the formulation and implementation of Tajikistan's policy in the field of climate change and adaptation to it. It is aimed at supporting economic growth and accelerating the modernization of all sectors of the economy, diversification and global

strengthening the market, competitiveness of the economy a also increase
of Tajikistan by increasing the adaptability and energy efficiency of the country. NSAIC will allow the
country

take a more comprehensive and dynamic approach to planning the sustainable development of the country as a whole, and in particular its economy, and take into account medium- and long-term forecasts for changes and climate variability.

9. At the international level, the NSAIC will become a key tool for Tajikistan to promote and publicize its position in the negotiations in the UNFCCC, reporting on the implementation of commitments made under the UNFCCC and further planning of the national economy in the context of changes

the climate.

CHAPTER 1. CLIMATE CHANGE AND ITS THREATS TO TAJIKISTAN

§ 1. Historical trends in climate variability

10. Climate change is a major challenge for Tajikistan, as the country is highly susceptible to it and has relatively low adaptive capacity. The World Bank lists Tajikistan as the most vulnerable country in Central Asia. Out of 180 countries ranked by the University of Notre Dame's Global Adaptation Index, Tajikistan ranks 111th. Tajikistan ranks 78th among the most vulnerable countries and 52nd

in place among less prepared countries. Compared to others countries in the index, its current state of vulnerability is manageable. However, improvement in preparedness is necessary if it is to be done in order to become better adapted to future climate changes and climate-related challenges. In the long-term climate risk index, Tajikistan ranks 29th.

11. Between 1940 and 2017, Tajikistan experienced a temperature increase of 0.1°C-0.2°C for each decade of this period. The number of days with temperatures of 40°C and above is increasing (Figure 1). The largest increase in temperature was observed in Dangara (1.2°C) and Dushanbe (1.0°C). Mountain areas experienced an increase of 0.3°C-0.5°C, while alpine zones experienced an increase of 0.2°C-0.4°C. Recent warming trends recorded between 2001 and 2010 show that the average temperature for each decade was 0.8°C higher than the average for areas located per 1000-2500 m above sea level. In the alpine zone, the observed increase was 0.2°C above normal. Temperatures were higher on average by 0.1°C-1.1°C in winter and by 0.1°C-1.3°C in spring. Autumn temperatures in all mountainous regions exceeded the average by 0.6°C-1.1°C.

Figure 1. Temperature changes in Tajikistan

12. Observed changes in the duration of the frost-free season, defined as the number of frost-free days (days exceeding 0.2°C) during the year, reflect an increase in the number of seasonal temperatures. Frost-free days reflect warming trends in winter temperatures. Every year there were 5-10 more frost-free days.

when average temperatures are recorded above zero, now occur in early spring and late autumn.

13. Annual precipitation increased between 1940 and 2017. by 5% -10%. The highest amount of precipitation was observed in 1969. There was a relatively significant increase in precipitation during the summer periods from 1976 to 2017. In most regions of the republic, the number of days with a precipitation intensity of 5 millimeters or more has increased, especially in the central high mountainous regions. The number of days with heavy precipitation (30 mm per day) has increased in the foothills of the country, such as in the Gissar Valley. The number of rainy days has increased and the number of snowy days has decreased. The rainiest years were 1969, 1998, 1999, 2011 and 2016, with more frequent mudflows. In 1998, a mudslide destroyed more than 7,000 houses and killed more than 130 people. Avalanches are a growing concern. IN

From 2002 to 2017, avalanches caused the death of more than 74 people. In 2010 and 2017, avalanches blocked a strategic road linking Dushanbe with northern Tajikistan.

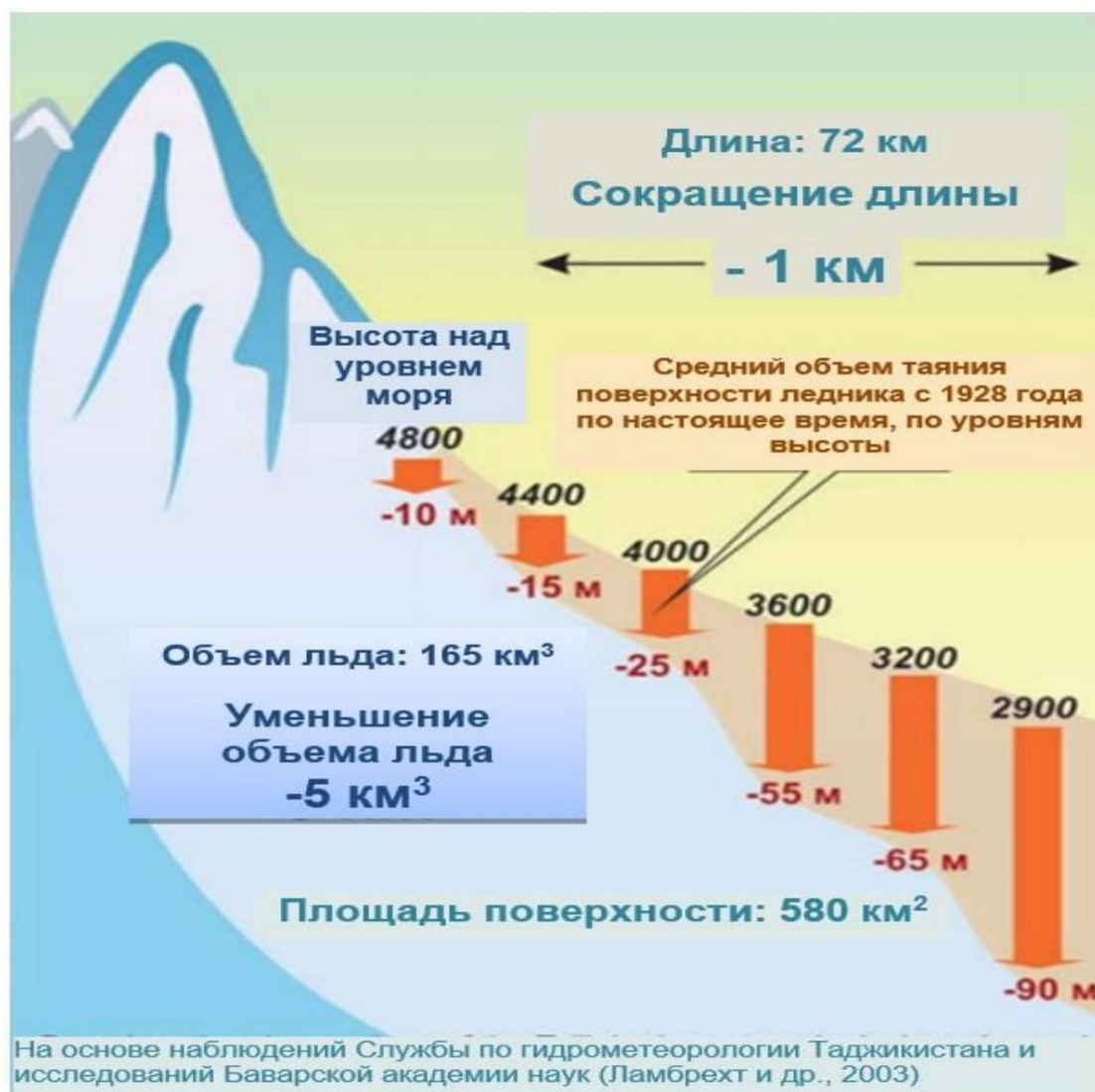
Figure 2. Changes in precipitation in Tajikistan



14. Continued melting and retreat of glaciers associated with climate change is a concern for Tajikistan, as Tajikistan's glaciers and snow reserves are the main sources of irrigation water. Approximately 30% of the ice sheet has been lost since 1930; The current melting rate is an annualized loss of 0.5%-0.8%. The largest glacier in Tajikistan, the Fedchenko Glacier, has retreated 1 km and has lost about 5 km of ice since the beginning of the 20th century (Figure 3). Small glaciers in the lower reaches are receiving the greatest impact from climate change and are melting at unprecedented rates. For example, in Diahandara, a glacier with a surface area of less than 1 km²

located in the upper reaches of the Karatag River, completely melted. The size of the Zeravshan Glacier decreased by 10% between 1927 and 2010, and retreated by 2.5 km.

Figure 3. Melting of the Fedchenko glacier



15. The wind speed has become stronger over the years. Wind speeds equal to or greater than 15 miles per second are observed at weather stations in narrow mountain valleys (for example, Khujand and Faizabad), in mountain passes (for example, Anzob Pass), and on high plateaus (for example, the Eastern Pamirs). The number of days with westerly winds has decreased,

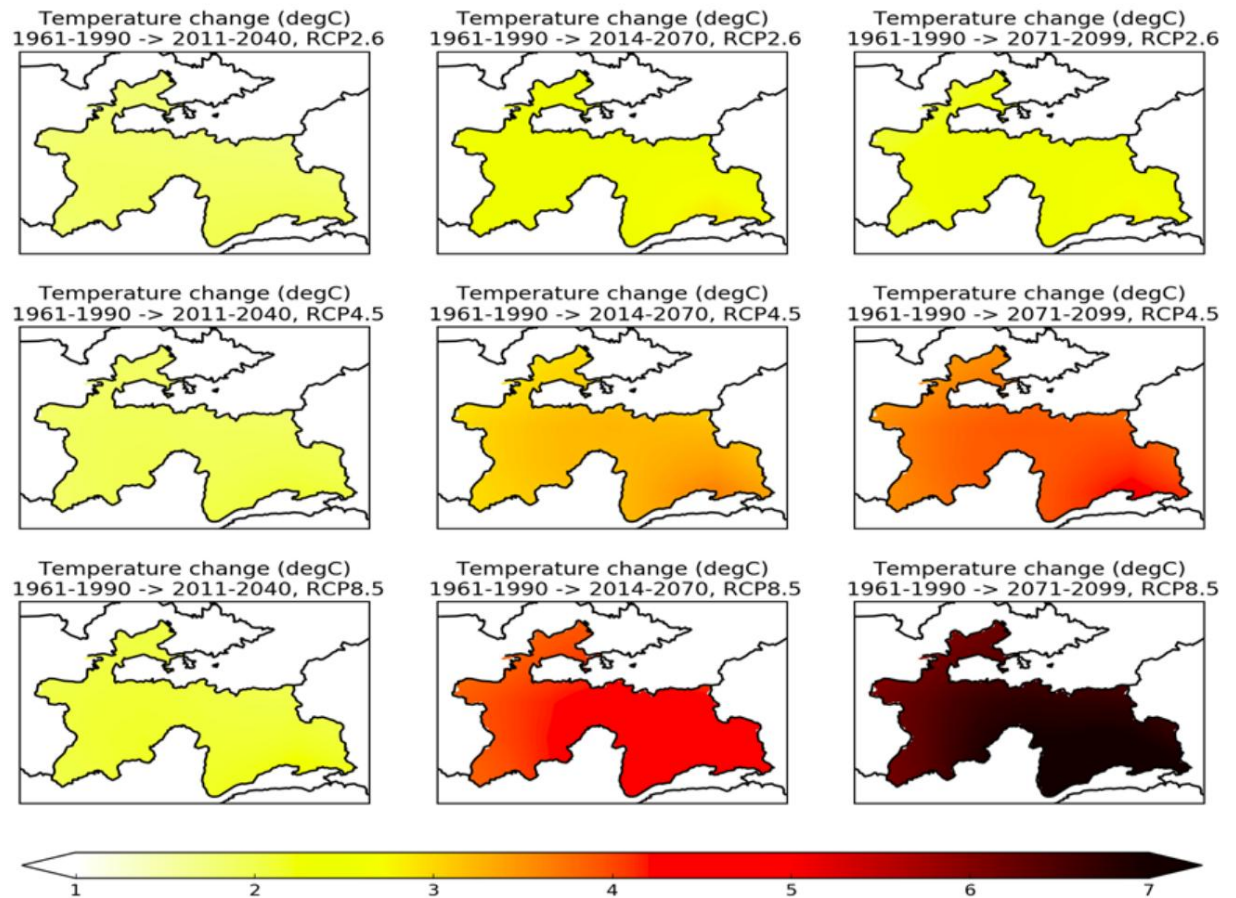
as a result of less intrusion of cold westerly air, but the number of days with easterly and northeasterly winds increased.

§ 2. Future climate change scenarios

16. According to Tajikistan's Third National Communication to the UNFCCC, climate change is expected to cause (i) increased air temperatures, (ii) greater variability in precipitation, (iii) accelerated melting of glaciers, and (iv) an increase in both the frequency and magnitude of climate-driven extreme weather events. Further details of the projected changes in climate are as follows:

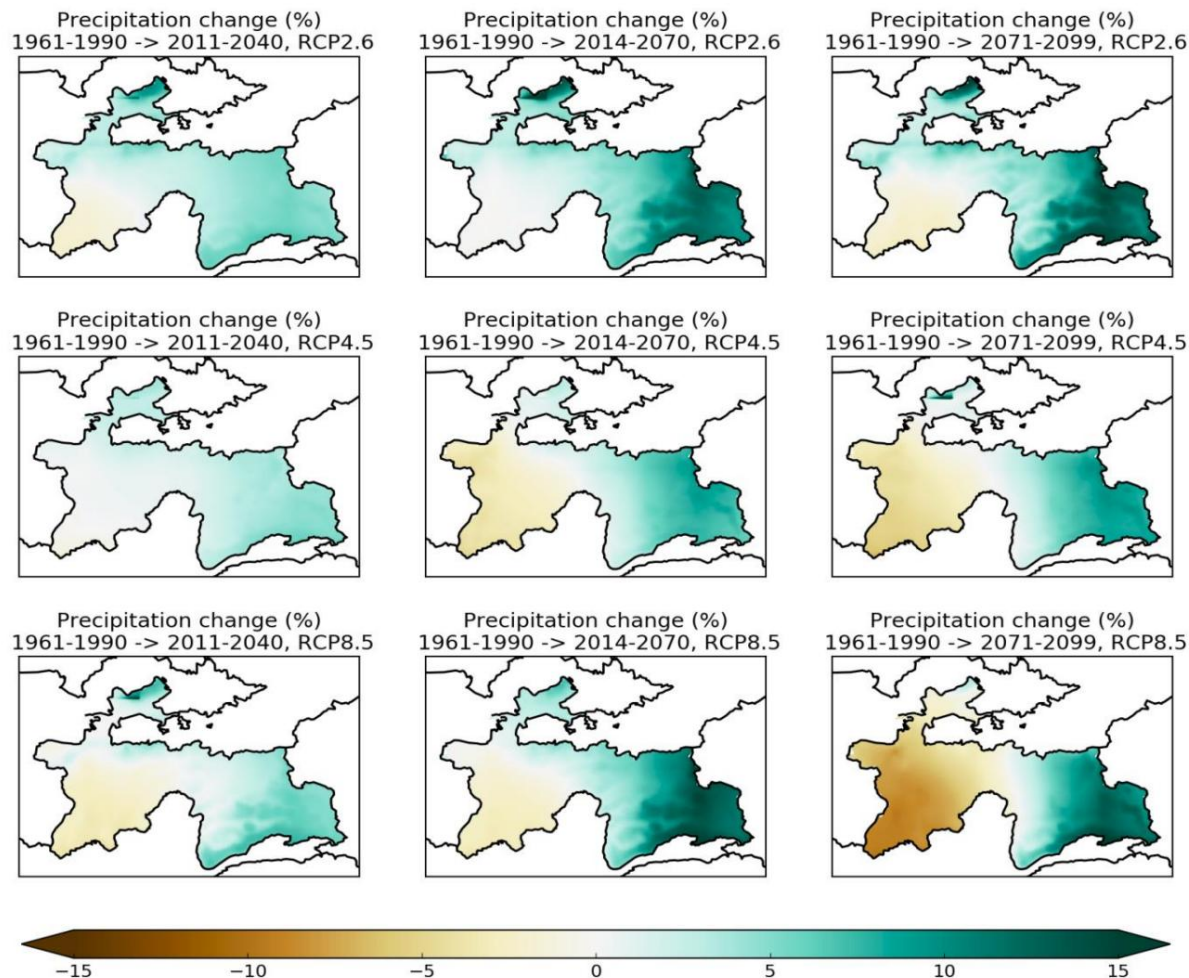
air temperature scenarios. Compared to 1961-1990 years, by 2030 annual average temperatures will increase by 0.2°C-0.4°C in all regions of the country; this is consistent with trends observed over the past 15-20 years. During winter, the maximum expected temperature increase is about 2°C. In both summer and winter, temperatures will rise even in the Pamirs and the Hindu Kush mountains. In fact, temperatures in mountainous areas will rise at a faster rate than in lowland and arid areas. By the end of the 21st century, the scenario expects warming to exceed 5°C in the southern regions of Tajikistan, as well as in the mountains of central Tajikistan and the western Pamirs (Figure 4).

Figure 4. Projected temperature change



precipitation scenarios. Precipitation scenarios are developed based on three emission scenarios (A1B, A2, B1) and it is assumed that there will be no significant changes in precipitation in large river basins such as Vakhsh and Pyanj (Figure 5). However, there will be increasing changes in maximum and minimum precipitation levels as rainfall increases and snowfall decreases. The scenarios suggest that there will be large changes in rainfall intensity and geographical distribution, with a decrease in annual rainfall in the southern regions of the country. Summers are forecast to be wetter and winters drier, which could lead to flooding and longer periods of drought.

Figure 5. Forecasted precipitation amounts



prone to drought. Projected increase

temperatures will lead to an increased risk of drought due to higher evaporation rates and early snowmelt. For example, by the middle of the 21st century, in the densely populated Fergana Valley, precipitation is projected to increase by 10 mm and evaporation by at least 70

mm.

glacier retreat. Glacial areas are projected to shrink by 15%-20% from current levels, with most small glaciers in Tajikistan projected to disappear completely within 30-40 years, based on current rates of glacier retreat. The reduction in the number of glacial zones will have a significant impact on fresh water reserves in the Zarafshan, Kafernigan, Karatag and Obikhingou rivers, which will further increase

will exacerbate tensions over water rights, both within and across state borders.

river flow. The recently observed increases in river flows are unlikely to continue until the mid-21st century in the rivers of the Western and Eastern Pamirs (Pyanj River basin). In the absence of adequate preventive measures, climate change could increase the average temperature of the basin from 0.7 °C to 1.40 °C–3.0 °C by the middle of the 21st century and reduce the volume of glaciers by 50%-70%;

Flows in the Vakhsh River basin are projected to increase by the middle or late 21st century. Models also predict a 10%-20% reduction in river surface area and runoff. Moderate scenarios predict an increase in surface runoff by the middle of the 21st century by 5%-10%. In the Vakhsh River basin, average annual temperatures are projected to increase from 3.3°C to 6.9°C in the mid to late 21st century.

17. Higher levels of temperature and precipitation will have a cascading effect on climate-sensitive sectors such as water resources, energy, agriculture and transport. For example, increasing tensions over water due to climate change will negatively impact overall agricultural productivity growth. Agricultural yields could fall by up to 30% by 2100 in some areas of the country, potentially affecting about 2 million people who are food insecure, and of whom 800,000 are at immediate risk of hunger.

18. Climate change-related threats to food security will increase unless action is taken as more people live in areas that are highly vulnerable to climate change and extreme weather events. By 2050, the population living in climate-sensitive areas will increase by 77.2% (Table 2).

19. Impacts may also be lower than predicted given that countries, including Tajikistan, are committed to meeting their intended nationally determined contributions. Tajikistan aims to reduce GHG emissions by 65%-75%, the volume of which will be 1.2-1.7 tons in CO₂ equivalent

per capita by 2030, through investment projects

and national programs in the fields of energy, transport, agriculture, forestry, water resources management, disaster risk reduction, promotion and diversification of renewable energy sources, reduction of energy losses, modernization and new technologies.

§ 3. Losses associated with climate change

20. Extreme climate events (such as floods, droughts, avalanches, landslides) periodically destroy land, crops, infrastructure and sources of income. Annual losses from climate change and extreme climate events are estimated at US\$600 million, or 4.8% of Tajikistan's gross domestic product (GDP). Losses caused by climate change will increase with increasing levels of temperature and precipitation. By 2030, the average temperature is projected to increase by 2.3 °C. Average precipitation is likely to increase by 8% in areas up to 2500 m above sea level and decrease by 3% in mountainous areas. Climate change could harm Tajikistan by affecting a number of

various social, cultural, economic and natural resources. More frequent extreme climate events could adversely affect the functioning and stability of both human and natural systems, as well as further exacerbating climate-related losses and damages. If they don't

If robust measures are taken to reduce vulnerability and enhance adaptation, the country is likely to experience significant additional economic losses, humanitarian challenges and environmental degradation.

21. Tajikistan's high dependence on climate-sensitive sectors makes the country extremely vulnerable to climate change and extreme weather events. Lack of human and institutional capacity to effectively reduce and manage the risks and impacts of climate change make efforts to reduce vulnerability to climate change and build the levels of resilience needed extremely difficult

to overcome looming climate challenges. Projected climate changes could not only reverse past development gains, but also push more people into extreme poverty by reducing agricultural yields, increasing food costs and increasing the spread of vector-borne diseases.

22. Some parts of Tajikistan could see agricultural yields fall by 30% by the end of this century. Reduced agricultural productivity and pasture productivity will have a negative impact on the nutrition of the population. Changes in biodiversity and ecosystems can cause infectious diseases and outbreaks of diseases spread through water and food. As Tajikistan prepares to deal with climate-related threats and impacts, greater knowledge is needed about likely situations and adaptation options to reduce their harm. Successful adaptation to climate change at the country level depends on several factors, such as adaptation projects that require the collaboration of both national and local governments and policymakers, the availability of finance and the effective sharing of climate information between sectors for planning activities and investment decisions.

§ 4. National risks and threats of climate change

23. The Central Asia Climate Risk Management Program (CA-CRM) prepared the results of a joint climate risk assessment in Tajikistan in 2014. This report assessed and projected a) the potential damage from each type of climate-related natural disaster, by region Tajikistan; b) vulnerability of the population and impacts on it by region and economic sector; c) the frequency of occurrences (return period) of each climate-related event by region; d) predicted losses from each climate event in US dollars per year, broken down by region for the period 2015 and 2030.

24. The CA-UKR workshop carried out a country-wide assessment, during which climate disasters and natural disasters were ranked in descending order of priority:

- pasture degradation
- reduction in temperature and freezing
- dust storms
- drought
- hurricanes
- temperature increase
- agricultural insects
- sat down
- duration of snow cover
- heavy precipitation
- take advantage
- floods and seasonal floods
- avalanches
- clogging.

25. Based on analysis by region, impact and frequency of natural disasters, the cost of annual national losses from climate change is estimated to increase annually from US\$50.4 million in 2014 to US\$132.3 million in 2030 . Although rising temperatures, drought and pasture degradation over time cause the largest annual losses, from 2014-

2030 rising water levels and flooding, agricultural

Pests, avalanches, landslides and mudflows are expected to collectively cause the largest increase in annual losses.

§ 5. Impacts by industry

26. Knowledge of the impacts and devastation caused by climate change at the national level is essential to better prepare for climate change, but more importantly to have a thorough understanding of climate change issues and impacts

on priority climate-sensitive sectors that are critical to the overall development of the country. It is important to provide opinion leaders, policymakers and the public with the best available scientific evidence to make decisions about

options for adaptation to climate change. Thematic Working Groups (TWGs) identified priority and climate-sensitive sectors (energy, water, transport and agriculture), sectoral impacts, and climate change adaptation options and investment projects for each priority sector.

27. Many of these industries and issues overlap. As a result of the climate change risk management framework discussed below, additional cross-sectoral categories have been selected for consideration and inclusion in the NSAIC. They should be

considered for individual investment projects.

28. In Tajikistan, the electricity generation and transmission sectors are sensitive to climate change and extreme climate events. Since energy and water systems are interconnected, changes in precipitation, high risk of drought,

reduction in snow cover and different times of snow melting may negatively affect the production and supply of electricity. For example, thawing permafrost and strong winds can damage power lines and negatively impact power distribution throughout the country.

29. Agriculture is another priority sector on which a significant part of the population of Tajikistan depends, How source acquisitions funds livelihoods, incomes and employment - may be affected by climate change. Droughts caused by climate change, reduction of rain-fed lands, decrease in crop yields and production, and

Also, crop failures and losses in livestock production can negatively affect farmers in Tajikistan. Rising temperatures and changes in rainfall patterns may force farmers to leave their lands in search of more suitable agricultural areas. Higher evaporation rates can force farmers to spend more water to grow the same variety and volume of crops in new cultivation areas. They might

Traditional growing methods and yields will have to change to accommodate longer growing seasons. Reduced water supplies in dry areas can potentially lead to significant economic losses for farmers, especially small farmers who are already facing

consequences of climate change and extreme climate phenomena.

30. The transport sector may also be directly affected by climate change impacts due to infrastructure problems. Roads and railways will be subject to more frequent or severe flooding. Increased rainfall and flooding can accelerate the deterioration of road infrastructure (for example, boreholes due to loss of water seals). In the highlands, thawing permafrost can damage roads and bridges. Due to elevated temperatures and sunny

Radiation may cause asphalt to become brittle and crack, resulting in temporary or permanent road closures.

31. Climate change will affect other important sectors, including health, gender roles, biodiversity and education. For example, it can lead to more common cardiovascular, respiratory and infectious diseases such as diarrhea, hemorrhagic fever and malaria. Internal displacement and migration caused by climate change, coupled with increased household workloads for women, could negatively impact gender equality and equity in the country. Loss of agrobiodiversity could worsen food security, which is already a serious threat in Tajikistan. Infrastructure problems caused by climate change may negatively impact access to education, as it may make it difficult for teachers and students to travel to schools and other learning centers.

32. Identifying climate risks and impacts is a critical component of an iterative risk management framework, which is useful for decision-making in complex situations with large potential impacts,

ongoing uncertainties, long time frames, learning potential, and multiple climatic and non-climatic impacts changing over time. Knowledge of climate risks is important for properly understanding climate variability and developing future adaptation controls for climate risks and impacts. Knowledge about historical

interactions between climate hazards and society, including the adaptation measures that have been developed to cope with these threats, are an important initial step in developing adaptation measures to manage future

climate risks.

33. Potential risks, and associated impacts and adaptation options were identified and reviewed by the ministries and consultants of the Capacity Development Technical Assistance (CDTA) project funded by the Asian Development Bank (ADB) and approved by the Committee on Environmental Protection (CEP). This was done for each priority sector and each cross-sectoral area of activity or sub-sector. The purpose of this work to identify risks, impacts and adaptation options was to: (a) brainstorm various climate risks for the sector; (b) identify any possible impacts or losses associated with each risk; and (c) identify a range of adaptation options to prevent or mitigate impacts. Below is an example that was prepared for agriculture.

Agricultural risks:

	-	rising average temperatures more frequent extreme
	-	temperatures
	-	extreme precipitation
	-	drought
	-	seasonal changes in river flow
	-	possible disappearance of glaciers and reduction of water
streams		
	-	increased weather variability
	-	changes in the timing, magnitude, distribution of rainfall and
precipitation		
	-	frost and thaw cycles
	-	dust storms
	-	water scarcity
	-	changes in the population of agricultural insect pests and vectors of dangerous plant diseases
	-	shifts in seasons
	-	cold temperature changes.

Agricultural impacts:

- increased need for irrigation due to drought
- reduction in productivity and potential yields, losses in pasture and agriculture
- changed growing conditions and seasons increased yield losses due to insects and diseases
- food insecurity, hunger, malnutrition and poverty
- loss of livelihoods and income in the village
- impacts on all elements of the food system from production to consumption, especially grains
- increase in local and regional food prices
- nutrition
- possible displacement from one's own land
- loss of productive lands due to land degradation, caused by climate
- increased demand and costs for irrigation
- disruption to farmers and labor
- commodity price volatility

Adaptation options for agriculture:

- study, disseminate and implement more effective water management and storage practices
- increase water availability through small reservoirs or other sector projects
- improve irrigation efficiency by improving irrigation infrastructure, rehabilitation and maintenance, drip irrigation for higher value crops, land leveling
- adapt and implement local knowledge systems and practice
- research and distribute drought-resistant seeds and skills
- promote soil improvement and protection against erosion, water resources and drainage management
- improving vertical drainage on farms to reduce soil salinity

structural and vegetative measures such as terracing, small-scale water harvesting to increase productivity and reduce erosion and associated impacts

Ensure improved research and extension of agricultural services through small mobile on-farm units and increased farmers' access to information, skills and technology

introduce crop diversity and plant breeding knowledge, other varieties, planting methods, frost and drought protection, or salt-tolerant plants.

provide communities and farmers with a "toolkit" of appropriate planting options applicable to the predicted seasonal forecast for rainfall and water availability (see Water Adaptation.)

provide free land as test plots where farmers can experiment with new seeds, water management techniques, and other recommended practices. (Government agencies have specific tests for varieties in accordance with international standards.)

provision of microloans
Improving the yield and storage of products in order to
reducing losses

promoting water reuse on farms
or reuse from other sources

planting trees as natural protection
communities and farms from the wind

implement programs and incentives to expand agriculture in areas where conditions are predicted to be more suitable to changing climate conditions.

- assistance in improving the education of farming families,
so that they can diversify their family's sources of income.

diversify crop insurance options from
drought

Improvement of irrigated lands and wetlands
supporting farmers to grow traditional
crops during drought

creation of insurance stocks of seeds and principles for control over them.

train farmers to prevent emergencies situations and responses to them.

34. Based on a literature review and stakeholder consultations, members of the CGNA identified the climate risks and impacts facing priority sectors in Tajikistan. The CEP reviewed and approved the list of adaptation risks and impacts. They were in

subsequently prioritized by the participants of the first national consultation workshop, among whom were members of the KGNA, academia, technical experts, civil society, employees of relevant ministries/departments, independent experts, etc. Risk prioritization participants were selected based on their specialization and industry affiliation (energy, water, agriculture, transport, health, environment, education, etc.) and their ability to understand the severity of the risks and impacts faced. Scoring, risk and impact verification were based on subjective expert assessments. Participants were asked to assess and verify risks, taking into account: (a) the nature of the impacts (loss of life, disease, barriers to economic development, etc.), (b) the magnitude of the potential impacts of climate change, (c) the likelihood possibility and level of certainty, and (d) urgency of action.

35. Ranking climate change risks according to priority sectors and cross-cutting areas for Tajikistan could provide a starting point for policymakers to develop the sectoral plans and frameworks needed to reduce

the climate risks and impacts facing priority sectors and cross-sectoral areas of action. Risk ranking is important from both a resource limitation and risk management perspective. For a resource-constrained country like Tajikistan, if the risks are low rated and do not pose a serious threat to human life, development and well-being, then there is low incentive or

a measurable reason for allocating limited resources to manage these risks.

36. In addition to the issue of understanding climate risks, priority sectors face, it is also important to understand how sectoral risks rank among themselves. This helps design and sequence adaptation interventions that can reduce climate vulnerabilities faced by more than one sector. For example, knowledge of how hydrological drivers of water supply interact with changing patterns of water demand and evolving water management practices helps to better understand drought risks and plan the effectiveness of adaptation and mitigation options. Identifying and prioritizing risks and impacts is important because efforts to respond to

climate change must be based on local perceptions climate risks and existing strategies to overcome them. Risk information is essential to support adaptation. It helps policymakers determine

appropriate risk management and adaptation techniques, and prepare action plans and programmes.

37. As a second step in the selection process, KGNA members, as well as participants from academia, civil society and development partners, prioritized the impacts of climate change on sectors and cross-sectoral areas of action. 38. Identifying and ranking climate risks and impacts helps organizations gain a better understanding of climate change risks across sectors and develop effective climate change adaptation

plans and programs. For example, information about the impact of warmer temperatures and changes in precipitation patterns can motivate transportation and civil engineers at the Department of Transport to responsibly plan and manage the country's transportation infrastructure, better understand the pathways of climate impacts and the knock-on effects of changes in the sector, and design climate-resilient road infrastructure. The literature states that in many respects

adaptation occurs autonomously and gradually, often in response to experienced impacts from climate change. 39. Climate change impacts are key elements of

adaptation and have a more prominent role in early stages of planning and implementation. The degree of certainty associated with planning for different climate parameters is important for developing appropriate adaptation measures.

climate change, but just as importantly, if any impacts from these changes are no longer significant in natural and social systems. To make decisions about how much they should invest in planning or updating adaptation responses in particular, development project planners often need to rank impacts. Identifying and ranking climate impacts is also important to ensure that there is a strong relationship between the goals of the NSAIC, current disaster risk management goals and

national development goals.

CHAPTER 2. NEEDS AND OPTIONS FOR ADAPTATION TO CLIMATE CHANGE

40 Climate change adaptation needs (or adaptation needs) refer to circumstances that require new or different sets of information, resources and actions to ensure the safety of property and people. Adaptation needs are the gaps between what might happen as climate changes and what we would like to see happen. Gaps may include: information needs, capacity needs, financial needs, institutional needs and technological needs. The adaptation needs of a country, region or city often include the combination of resources, capacity, information, finance, etc. needed to effectively implement

adaptation options to mitigate the impacts of climate change. Availability of information, access to technology and financing determine the successful implementation of adaptation measures. Identifying adaptation needs in NSAIC is important because

that local governments play a significant role in enhancing adaptation, but often do not have the time or expertise needed to identify adaptation needs or options. They often face multiple challenges, such as backlogs in the provision of basic and essential services such as housing and water supply, which limit their ability to identify needs and pursue adaptation options.

41. As a second step in selecting adaptation measures, Capacity Development Technical Assistance (CDTA) project consultants and members of the National Adaptation Strategy Advisory Group (NASSA) identified adaptation needs and options by sector. An assessment of needs and adaptation options was made based on stakeholder analysis and expert assessment. TSRP consultants and KGNSA members identified adaptation needs and options in Tajikistan, based on a literature review and consultation with stakeholders

parties. A list of adaptation options was reviewed and approved by the CEP.

42. The assessment and inspections were carried out on the basis of subjective expert assessments. Participants were asked to evaluate and test options based on: importance (i.e. effectiveness in preventing climate change-related disruption), urgency (i.e. whether the adaptation option needs to be implemented immediately or whether it can be deferred to a later date), availability of low costs or no costs (adaptation options that are beneficial regardless of future climate change), as well as cross-sectoral co-benefits (options that have the potential to reduce climate change-related vulnerabilities across cross-sectoral activities and produce additional benefits unrelated with climate change).

43. Some adaptation options are better than others because they provide cross-sector benefits. For example, cross-sector adaptation options such as integrated water resources management (IWRM) and ecosystem-based adaptation are considered more effective than stand-alone efforts to reduce climate-related risks. In this case, priority is given to adaptation measures that have “low cost” and “medium cost”, which combine high adaptive potential and high technical feasibility. The reason for giving higher priority to “low cost” and “medium cost” approaches is that they will not so much reduce climate risks as they will provide other social, economic or environmental benefits. The adaptation options below provided the basis for proposed climate change adaptation investment projects.

§ 1. Energy sector

44. Tajikistan's energy sector is extremely vulnerable to climate change and extreme climate events. Its vulnerability is of concern due to its strong

dependence on the hydropower sector for energy production:

More than 98% of electricity in Tajikistan is generated by hydroelectric power plants. Hydroelectric power plants account for 93.9% of the total installed capacity, generating 16.5 billion kilowatt-hours (kW) of electricity. Since most hydroelectric power plants were built decades ago, their existing levels of productivity may decline with increasing risks and impacts of climate change if they are not built to withstand climate change. Changes in

climate and extreme climate events may affect energy production and energy delivery facilities and lead to supply disruptions. Rising summer temperatures will increase electricity consumption, leading to higher summer peak loads and exacerbating the country's energy shortages. Changes in water availability, both occasional and long-term, can alter hydropower potential. Despite continuous progress towards expanding energy sources, Tajikistan experiences a significant electricity deficit of 2.2-2.5 billion kWh in winter. The electricity shortage in the winter months amounts to 15.5% of annual energy production. Climate change-induced decline in energy production in

hydropower sector could have a negative impact on both access and the use of energy, which is already limited.

45. Diversification of energy sources would reduce Tajikistan's heavy dependence on hydroelectricity. Propagation of renewable energy sources when

occurs at a relatively slow pace and is important for adaptation to climate change. For a country like Tajikistan that is already dealing with the impacts of climate change, adaptation and development are not necessarily mutually exclusive. The development of renewable energy sources can contribute to both of these goals. The climate of Tajikistan is very favorable for the use of solar energy: on average, there are 280-330 sunny days a year. The total intensity of solar radiation ranges from 280-925 MJ/m² in the foothills and 360-1120 MJ/m² in mountainous areas.

46. Like solar energy, small hydropower provides predictable, reliable, affordable, clean energy that is produced locally. By adopting a long-term commitment to small hydropower development, Tajikistan can largely eliminate the existing energy deficit faced primarily by rural populations and strengthen the sustainability of the energy sector. The potential of wind energy is not fully used. The potential for wind energy development is estimated at 1000-3853 MW and exists in areas such as Khujand, Kairakkum, Faizabad, Shahrstan, where wind speeds are 5-6 miles per second at an altitude of about 10 meters above the surface.

47. Table 1 presents several adaptation options for reducing the vulnerability of the energy sector to climate change and climate extremes, and addressing existing adaptation gaps and needs. Adaptation options were put together by TSRP project staff in close consultation with KGNA members. During the second national consultation workshop, members of the thematic groups rated each adaptation option (0-10) based on their ability to reduce the risks and impacts of climate change and strengthen adaptation. The averages were

used to rank adaptation options.

§ 2. Water resources sector

48. The water sector intersects with several key sectors such as agriculture, health, energy and infrastructure. However, planning for adaptation to climate change in the water sector of Tajikistan is not comprehensive and cross-sectoral. There is a lack of consistency in sectoral plans regarding the rational use of water resources. Key gaps

exist at multiple levels - system, organizational and individual levels - that must be addressed to make the water sector resilient to climate change. Examples of gaps in systemic, organizational and individual

levels include:

Gaps at the system level:

- climate change issues are not included in legislation related to water management
- promotion of water-saving technologies is still not is a priority

At the organizational level:

- Water user associations (WUAs) lack the necessary information about the risks, impacts of climate change and adaptation skills
- lack of necessary institutional potential and funding to promote water management policies, especially in remote areas

At the individual level:

- lack of information and knowledge about water saving measures
- lack of incentives for integrated management water resources
- lack of incentives for the introduction of water-saving technologies and agricultural practices taking into account water-saving skills

49. Table 2 presents several adaptation options that can (i) bridge existing adaptation gaps and needs, (ii) reduce the water sector's vulnerability to climate change and climate extremes, and (iii) improve the sector's adaptability to future changes climate. As in the cases with the energy sector, adaptation options for the water sector were brought together by the TSRP project consultants in close consultation with the members of the KGNA. Ministry of Energy and

Water Resources highlighted the importance of small water reservoirs and other options to protect communities and their property from landslides. During the second national consultation workshop, members of the thematic groups rated each adaptation option (0-10) based on their ability to reduce the risks and impacts of climate change and

strengthen adaptation. Average scores were used to rank adaptation options for the water sector.

§ 3. Agricultural sector

50. The Government of Tajikistan recognizes the need to reduce the vulnerability of the agricultural sector to climate change, especially given that agriculture makes a significant contribution to the country's GDP and employment: it accounts for 21.9% of GDP and employs more than 60% of Tajikistan's population . The Government of Tajikistan is promoting pasture management and farming skills (e.g. no-till, perpendicular tillage on slopes, downhill cultivation with terraces, growing cover crops, increasing the use of organic fertilizers), and rehabilitating pasture lands. With the support of development partners, the Government of Tajikistan is accelerating the spread of low-cost, climate-resilient agricultural technologies. Despite these concerted efforts by the Government of Tajikistan, Tajikistan's agricultural productivity is declining. Without careful planning and management of climate change and increasing climate extremes, declines will only worsen.

51. Climate change may increase irrigation needs, accelerate land degradation, and increase crop losses and damage due to harmful insects, pathogens, fungi and weeds. Post-harvest losses are already a growing concern for farmers who have endured declining productivity for years. Higher temperatures can increase the number of infectious vectors and pests. Extreme weather events and heat stress caused by climate change may increase morbidity and mortality in livestock production. Building resilience in the agricultural sector requires investment in agriculture and rural infrastructure development,

economic diversification and preventative health care.

52. Currently, a number of gaps and needs hinder the agricultural sector's efforts to successfully adapt. Agricultural reform should focus on removing the constraints that tie farmers to growing cotton, creating incentives for efficient water management, and securing land ownership.

53. Table 3 proposes several adaptation options that can help reduce the current and future vulnerability of the agricultural sector to climate change and extreme climate change and address existing gaps and needs of the agricultural sector were compiled by the TSRP project consultants in close consultation with members of the CGNA.

V	adaptation.	Adaptation options	for
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§ 4. Transport sector

54. Tajikistan's transport network is critical to the delivery of goods, services and people. It includes 500 km of rail links and 1296.2 km of all-weather road links

roads suitable for year-round traffic flows. Recognizing the threats posed by climate change and extreme weather events, the Government of Tajikistan has created 10 support facilities to minimize transport disruptions. Lateral drains and spillways are constructed to protect transport infrastructure from recurrent floods and landslides. Mudflow bridges are built to minimize damage caused by mudflows in mudslide-prone areas. Slopes around transport routes are also periodically treated and

technical support.

55. Continued progress improves the sector's adaptation and reduces its overall vulnerability to climate change. However, progress may not be sufficient to make the sector fully resilient to climate change and climate-driven extreme weather events. The first step towards

In order to build the necessary resilience, there is a need to fully understand the climate risks and vulnerabilities facing the transport sector.

56. Table 4 proposes adaptation options that can reduce the risks and vulnerability of the transport sector to climate change and climate extremes and overcome existing sector adaptation gaps and needs. Adaptation options were drawn up by TSRP project consultants in close consultation with KGNSA members.

§ 5. Healthcare

57. Climate change can negatively affect people's health through adverse impacts on the social and environmental determinants of health - clean air, safe drinking water, adequate food and safe housing. Even if the entire population is hit by the impacts of climate change, some will feel the effects more than others. For example, children, older adults, and people who have pre-existing health problems and are therefore less mobile will be susceptible to health-related consequences longer. The data clearly shows that increased mortality rates among vulnerable groups (children, elderly) are a consequence of exposure to heat waves. In 2000-2001, a sharp

rising temperatures and prolonged drought have led to an increase in deaths across the country. The increase in death rates averaged 2,500 in 2001, 2002 and 2003. Climate change is likely to increase the number of malaria cases in the country, as the area of potential malaria transmission in the country is likely to increase.

58. For the health sector in Tajikistan, in order to effectively respond to the increasing impacts of climate change, it is very important to close existing gaps. Gaps at the system, organizational and individual levels (Table 5) collectively represent a significant barrier to the paradigm shift from responding to the impacts of climate change to proactively managing climate risks. Existing

Gaps have resulted in poor integration of climate change adaptation into health planning, design and management processes.

§ 6. Education

59. Climate change directly and indirectly affects the education sector. Damage to educational infrastructure is an example of direct impact. Destruction of schools or related infrastructure may cause children to miss classes or drop out of school. They may also skip classes or drop out of school to help their families recover from climate-related extreme events. Indirect impacts will occur in the event of a decline in academic performance and the overall efficiency of the education system. Decreases in water and firewood following extreme weather events may cause children, especially girls, to spend more time searching for these resources. Girls also typically care for the sick and elderly in the family after the effects of extreme weather events. Spending more time collecting water and caring for the sick,

also means that girls will have less time for education. Lower education reduces girls' access to health care, information or early warning systems, and when they grow up, they have poor access and fewer opportunities in the labor market. 60. Poor education among girls will have a lasting adverse impact on a community's vulnerability to climate change. The more people in a society with limited access to early warning

systems and labor market opportunities, the less likely the community is to be well prepared to manage climate risks and impacts. Access to an early warning system allows communities to prepare for impending extreme events. Increased labor market opportunities enable vulnerable populations to diversify their livelihoods. Diversification of options and strategies for securing funds

existence, increase adaptive capacity and reduce vulnerability.

61. The lack of education and awareness about climate change is a concern because if people do not know that they are at risk, they will be at even greater risk because they will not take proactive steps to minimize their risks and losses. Education and awareness-raising play an essential role in increasing the adaptive capacity of communities to change

climate change because it allows people to take proactive action planning to reduce and adapt to climate risks. In Tajikistan, much remains to be done to raise awareness about climate change through educational programs and training. Climate change curriculum must be introduced into the school curriculum at all levels to ensure effective learning and enhanced understanding of the causes, consequences and potential responses to the risks and impacts of climate change.

§ 7. Gender

62. Climate change affects everyone, but this does not mean that everyone has the same vulnerability to it. Some groups are more vulnerable than others. For example, climate change impacts and adaptive capacity are not gender neutral. Depending on their physical

location and social status, individuals and certain groups have differential capabilities to cope with climate change and climate-induced extreme weather events. For example, compared with men, women who work in agricultural fields and walk long distances to fetch water and firewood are more susceptible to transmitted diseases and heat stroke. Because of their position in society, women, children and the elderly are more likely to be victims of extreme weather events such as floods, landslides and mudslides.

§ 8. Migration

63. Currently, there is great activity in regulatory legislative and research in the field of migration in the Republic of Tajikistan is relatively concentrated around external labor migration. Numerous studies have proven that migration is caused by economic and socio-ecological consequences/factors. There are only some facts that in certain areas of the republic, environmental problems contribute to a high level of migration. Environmental migrants are persons living in environmentally hazardous areas who are subject to planned resettlement in order to prevent loss of life from natural disasters. The basis for the relocation of farms from environmentally hazardous areas is a real threat to the lives of people living in areas prone to landslides, landslides, avalanches, mudflows, and other natural disasters. In total, during the period from 2000 to 2015, in the territory of the Republic of Tajikistan, 8,293 families with a total number of more than 50,000 people were resettled from environmentally hazardous zones to safe places of residence. However, there are no comprehensive studies yet for

assessing and predicting the relationship between aspects of migration and climate.

Environmental degradation is having an increasing impact on the migration behavior of the population of Tajikistan. Although the main migration strategy remains, including temporary labor migration plus agriculture at home with a high level of participation of women and children, environmental factors

gradually change it;

The choice of migration form depends on the extent of destruction and losses incurred during natural disasters, the likelihood of recurrence, loss of livelihoods, the amount of assistance, poverty levels, remittances, potential opportunities in places

appointments;

In areas prone to environmental degradation, migration rates are highest. However, in situations of extreme impoverishment, such as due to a natural disaster, households cannot finance the initial costs of migration and choose internal migration or casual work.

64. As a result of climate change (for example, sudden and rapid melting of glaciers), the risk of floods, mudflows and avalanches increases, because they already occur regularly during the spring snowmelt months. Drought, floods or extreme weather conditions, through increasing the problem of poverty (destruction of crops and deprivation of income), contribute to an even greater intensification of migration processes - the population is forced to move in search of work. Climate change can increase both external and internal

migration:

loss or decrease in income become factors of external labor migration. Currently, external labor migration is one of the key factors in the development of the republic. Remittances are an important part of income for many households. Due to extreme situations, the flow of migration to Russia is likely to increase

relatively large-scale population movements, likely to intensify as climate change forces people to leave areas that are flooded or dry and uninhabitable. As a result, migration can create serious problems affecting health directly - due to

various stresses associated with the migration process, and indirectly -

Because of the potential for unrest that could be caused by the uncontrolled movement of people, the reasons why people migrate are complex, making it difficult to predict how

climate change will affect migration in the future. However, climate change is likely to be an important driver of future migrations

65. It is necessary to develop a national policy for adoption measures on population movement related to environmental factors. All national adaptation programs of action

migration issues have not yet been included, and national migration management strategies still do not cover issues related to environmental factors and

climate change.

§ 9. Vulnerable groups of the population

66. Vulnerability to climate change and climate-induced extreme weather events are socially differentiated. For example, poor and elderly people and children are disproportionately affected by climate change and extreme climate events due to their position in society and their differential access to benefits and rights. The need to reduce vulnerability

also recognizes that the current state of vulnerability of these groups similarly affects their ability to respond effectively to the impacts of climate change. Identifying the gaps and needs that hinder the ability of these groups to effectively cope with growing climate risks and impacts, and promoting targeted actions to strengthen climate resilience, are fundamental to developing effective adaptation strategies.

§ 10. Environment

67. The Committee for Environmental Protection (CEP) coordinates environmental protection activities and implements and monitors and evaluates the environment, natural resource use, land conservation, and other environmental and natural resource projects and programs. Also oversees projects and programs in the field of climate change. Although

As various adaptation projects and programs are implemented, efforts are needed to integrate biodiversity and ecosystem management into development planning and productive sector activities to conserve biodiversity and maintain ecosystem services that support human well-being. Table 9 lists several gaps at the system, organizational and individual levels that must be addressed for the sector to reduce current and future risks and impacts of climate change.

68. Table 10 lists several adaptation options, that can help reduce the vulnerability of these cross-sectoral

areas of activity to climate change and extreme weather events, and overcome existing gaps and needs in adaptation of this area of activity. Adaptation options were compiled by TSRP project consultants in close consultation with members of the KGNSA.

CHAPTER 3. PRIORITY PROJECTS FOR ADAPTATION TO CLIMATE CHANGE

69. NSAIC aims to guide the Government and development partners towards investments that will reduce Tajikistan's vulnerability to climate change and extreme climate events and increase the adaptive capacity of the population of Tajikistan. It proposes climate change adaptation options and investment projects with beneficial climate impacts. The strategy has three goals:

- reduce the vulnerability of the most vulnerable population groups, priority sectors and cross-sectoral areas to climate change and extreme climate events;

- prioritize investments for climate adaptation that can be financed through sectoral investment plans and budgets, private sector investments, multilateral and bilateral development partners; lead design, implementation, monitoring, and

- Assess climate risk management and adaptation measures needed to reduce current and future vulnerability to climate change and extreme weather events

phenomena.

70. The NSAIC covers strategic, actionable adaptation options and investment projects that need to be implemented in order for Tajikistan to strengthen its resilience and

reduced the vulnerability of its natural and social systems to climate change. For implementation purposes, the NSAIC includes: (a) an implementation strategy, (b) an analysis of funding opportunities to support implementation of adaptation options, and (c) strategies for monitoring implementation and assessing effectiveness

climate change activities. By identifying and prioritizing risks, impacts, and adaptation options and interventions, NSAIC has laid out a credible path to managing climate risks and building resilience for Tajikistan.

§ 1. List of projects accepted for inclusion in the NSAIC

71. The following were used to select projects:
criteria:
- saving human life, health and sources
life activity;
- environmental protection (land, forest, water);
- protection of vital infrastructure (hydroelectric power generation, communications
systems, industry, cultural sites and tourism); And
- sustainable development, interaction with multilateral
environmental agreements

72. Proposed projects may be assessed according to the following
indicators:
- saving human life, health and sources
means of life;
- environment protection;
- protection of necessary infrastructure;
- Creation interaction V implementation of
multilateral cooperation packages for sustainable development.

Table 11 provides an initial list
proposed projects by sector and their evaluation.

§ 2. Share of climate adaptation costs in proposed projects

73. Based on the initial sectoral list of projects, additional screening was carried out and agreed upon with all stakeholders, ministries and government departments. The final selection of projects, both by sector and cross-sectoral areas of activity, is shown below in Table 19.

The projects include an estimated basis for the financial (non-economic) costs of the projects and the share of costs and allocations between development and climate change adaptation activities. For each sector, the priority of each project, after multiple ranking criteria, is given on the left side. All 33 projects proposed for inclusion in the NSAIC are geographically diverse and cover national, regional, district and local scales. They cover 10 different technical and specialist sectors, and include varying levels of useful detail. It was not possible to conduct the same level of economic analysis for each project.

74. An incremental analysis was prepared for the selected projects and focused on the extent to which adaptation activities could produce significant benefits to cover their costs. The decision method is used to determine the actual cost difference between the alternatives. It was conducted to determine the extent to which an adaptation investment project could generate sufficient benefits to cover its costs. For 15

projects, the estimate turned out to be possible quantitatively incremental costs and benefits for the cost-benefit ratio, and the internal rate of economic return for the climate adaptation component of the project. Project benefits were calculated based on the cost of climate impacts that the project would prevent or mitigate. Benefits were calculated for the specific location, scope and timing of the project. No further efforts were pursued once the feasibility study for the project was completed. For example, if maintaining the potato crop fully justified climate-adapted irrigation, then additional cropping was not analyzed to calculate the total benefits. This "conservative" approach should not reflect the final outcome of the project once additional information has been collected. It was decided to minimize assumptions where there was plenty

75. In all cases, the following were identified and analyzed in detail: (i) the relevance of the climate change adaptation project; (ii) losses and impacts that might otherwise arise; and (iii) the benefits that would result from adaptation. Where there was not enough time and information to

to quantify the benefits of adaptation to climate change, multiple criteria analysis was applied. Eventually:

- 33 projects were assessed using multi-criteria assessment;
- 13 projects have cost-benefit analysis and internal rate of economic return;
- 2 projects were assessed according to economic average additional costs.

76. Because the level of detail and description of projects varied widely, economic analysis should not be used to compare the rationale of one project with another. Some project descriptions include details of adaptation measures or their costs as part of larger development projects. There was also insufficient detailed information regarding the underlying conditions and benefits or types of beneficiaries.

77. The selected projects from the priority sectors were not compared with projects from other sectors, as each sector was considered important in relation to national goals. This means that the analysis and ranking were not cross-industry. To carry out the analysis for each sector, the PPCR and TSDP project consultants took the following steps, which were then reviewed by thematic working groups:

- identification of all potential climate risks in Tajikistan by sector;
- ranking potential risks for each sector in order of importance;
- identification of all associated climate impacts and damages by sector;
- ranking of associated impacts and damages for each sector in order of importance
- identification of all adaptation options and mitigation measures or eliminating impacts and damage;
- physical assessment of additional losses and damages for each impact by sector;
- assessment of the cost of each unit (land, crops, etc.) for each type of loss; And
- a written description and projected economic gain or loss depending on the type of impact and

damages for a specific project location, as well as for climate events from 2015 to 2030, taking into account the increase over five years for each proposed sector project.

CHAPTER 4. IMPLEMENTATION STRATEGY

78. The NSAIC provides a framework for adaptation action to guide Tajikistan towards a low-carbon, climate-resilient future. Adaptation to climate change requires concerted action from many sectors of Tajik society, including politicians and leaders, government agencies, public organizations, scientists, academia and the private sector, as well as communities and households on the front lines of the impacts of climate change .

79. The consultation process produced a list of national, provincial and local organizations to coordinate and mobilize stakeholders around priority climate change adaptation actions and implementation of the NCAIC. The list includes:

National level:

- Committee for Environmental Protection;
- Committee for Emergency Situations and Civil Defense;
- Ministry of Energy and Water Resources; - Agency for Hydrometeorology; - Academy of Sciences;

- Agency for Land Reclamation and Irrigation;
- Main Department of Geology;
- Ministry of Agriculture; - Ministry of transportation; - State Unitary Enterprise "Housing and Communal Services"; - "OAHK" Barki Tojik;

- Ministry of Education and Science;
- Ministry of Health and Social Protection population;
- Committee on Women and Family Affairs;

- Ministry of Economic Development and Trade;
- Ministry of Finance;
- State Committee on Investments and Management

state property;

- Ministry of Labour, Migration and Employment.

Regional level:

- Local government authorities;
- Regional and district institutions dealing with environment;
- Regional and district authorities involved in irrigation and land reclamation;
- Regional and district departments for emergency situations and civil defense;
- Division of OJSC "Barki Tojik".

Local level:

- Local authorities;
- Local community organizations;
- Private business, Water Users Association, dekhkan (farmer) farms.

80. Taking into account existing mechanisms for coordinating adaptation to climate change in the country, the CEP and the Agency for Hydrometeorology will lead the implementation of the NSAIC. The Hydrometeorological Agency should provide technical advice to the CEP on climate risks and impacts, while the CEP should: (1) serve as a focal point on climate change issues and concerns, (2) provide programmatic and strategic advice to the Government of Tajikistan on the implementation of investment projects, and (3) ensure that climate change issues are included in the overall national planning process through coordination with relevant ministries, departments and government agencies. The implementation of specific adaptation options and investment projects will be carried out by relevant ministries and departments, as well as regional and local authorities, according to their functions and responsibilities in accordance with state powers for environmental and climate protection.

81. With regard to reporting rules, the NSAIC will be the established government follow

reporting system. In accordance with the legislation of the Republic of Tajikistan, the NSAIC should be updated every 10 years due to changes in: (a) risks, climate change impacts, adaptation activities, (b) government structure and sectoral priorities, and (c) development priorities.

In order to support the implementation of the NSAIC and overall development, the Government should:

- attract and retain competent specialists in areas of climate change;
- study and implement interactions between various directions of climate change policies and programs;
- update climate change issues in local environmental planning and programs;
- carry out coordination between ministries implementing projects and programs to reduce the risk of natural disasters and adapt to climate change;
- provide the necessary support to ministries and departments interested or working in the field of climate risk reduction and management;
- raise awareness of climate change among regional institutions;
- programs aimed at reducing and managing climate risks, between interactions to explore;
- conduct trainings on updating climate change issues in regional and local authorities;
- create regional/local adaptation funds;
- Conduct climate risk and opportunity assessments adaptation planning;
- support local government authorities, both with funding and technical assistance, in the implementation of a project and/or program to combat climate change.

82. Implementation of the strategy will also depend to some extent on financial support from multilateral development banks. Some domestic funding from the government budget, the private sector, and individual contributions may contribute, but the resources needed to effectively implement the NSAIC will require external support from

donor side. Although the actual cost of implementing the NSAIC has not been established, a key determinant in estimating the cost of building climate change resilience can be indirectly derived from the designated climate change activities, i.e. investment projects in priority sectors and cross-sectoral areas of activity.

83. Adaptation strategies are always dynamic in nature, given their relevance to changing climate risks and adaptation potentials, and are therefore regularly updated. The NSAIC should be updated periodically based on new knowledge, advances in technology, and future climate projections.

§ 1. Relationship with national strategies, concepts and programs

84. The purpose of the NSAIC is to provide a major guide to the coordination and implementation of adaptation initiatives through a collaborative approach to the problem and the creation of synergies with other relevant national policies, concepts and programs. It was developed on the basis of the provisions of the Constitution of the Republic of Tajikistan and in accordance with the long-term goals and priorities of the country's development. NSAIC also takes into account the international obligations of the Republic of Tajikistan to address the problem of climate change, as provided for by Agenda 21 and the Sustainable Development Goals (SDGs), approved by the 70th session of the UN General Assembly in September 2015.

85. Linking with national strategies, concepts and programs is critical, as creating synergies allows for efficient use of resources. The nature and impacts of climate change intersect across different sectors and demographic levels, and require the use of interdisciplinary and multi-stakeholder approaches in programming and action, and to create synergies between different existing policies and programs. The strategy will also ensure that Tajikistan's existing goals, strategies, institutions, policies, plans and treaties/agreements form

basis for supporting investment projects listed in the NSAIC.

86. The National Development Strategy of the Republic of Tajikistan for the period until 2030, adopted at the end of 2016, sets three strategic goals: (1) ensuring energy security and efficient use of electricity, (2) ensuring food security, (3) breaking the communication impasse and turning the country into a transit country. The objectives of the NSAIC are priority climate sectors and a selected list of proposed investment projects in the field of adaptation, supporting the country's goals in the field of energy and food security. Issues of adaptation to climate change are reflected in the National Development Strategy for almost all key sectors of the economy. For example, NSAIC is considering the technical possibilities of using non-traditional (renewable) energy sources (solar, wind, biological, geothermal).

87. NSAIC also agricultural proposes to diversify production, including introducing innovative approaches, taking into account ensuring minimal impact on the environment and land quality. Significant risks for agricultural development are associated with long-term global climate change. The low level of environmental sustainability of agricultural development is associated with increased land and water degradation, with specific and indirect consequences for arable land as a result of erosion, pollution, salinization, waterlogging, increased groundwater levels, areas, decreased agricultural use, as well as changes in climatic factors

forest seizure lands from

88. The medium-term development program of the Republic of Tajikistan for 2016-2020 includes indicators for monitoring the efficiency of use of natural resources, environmental sustainability and climate change for the period 2016-2020. (SEA) The Strategic System provides for poverty reduction through solving environmental problems and efficient use of natural resources. Environmental protection and environmental assessments formation

strategic environmental assessment systems (SEA), as well as adaptation to climate change, are included in the 2016-2020 RPS as cross-sectoral priorities.

89. The goal of the State Program for the Study and Conservation of Glaciers is to study the state and conservation of glaciers in the Republic of Tajikistan in the period from 2010 to 2030. There is a need to create an effective system of glaciological monitoring of the condition of glaciers and snowfields in all river basins of the republic. This will allow us to quickly take effective measures to reduce the impact of climate change on people and the economy of the country and region. The tasks set in this program correspond to the tasks set by NSAIC in the field of climate monitoring and research work.

90. Agricultural Reform Program (for 2012-2020) also aims to reduce vulnerability to climate change through (a) widespread adoption of successful practices based on the principle of co-management of rangelands and forestry, with an emphasis on restoration and conservation of natural resources, as well as reuse; (b) promoting sustainable land management and fertilizer use; (c) promoting methods and technologies for economical water storage, such as rainwater harvesting, drip irrigation, mulching; (d) development of nurseries to produce the necessary seedlings and seedlings, with special emphasis on the cultivation of indigenous, drought-tolerant species; and (e) promotion of drought and flood resistant varieties, etc.

91. National strategy for natural disaster management. Linking with the National Disaster Risk Management Strategy is equally important as the overall focus of both the National Disaster Management Strategy and the NRIS is to reduce vulnerability and strengthen resilience to weather and climate hazards. An excellent opportunity for interaction (synergy) comes from the fact that both groups of specialists in both areas apply a risk management approach. Experience gained from implementing a national disaster risk management strategy over many years can inform the implementation of priority adaptation options and projects.

92. Linkages with the above strategies and programs will help in the implementation of the NSAIC because they also aim to reduce national vulnerability to climate change and extreme weather events caused by climate change. For example, the strategic goal of the National Development Strategy is to ensure food and energy security, which coincides with the goals of the NSAIC.

§ 2. Barriers to implementation

93. NSAIC proposes a portfolio of prioritized investment projects that need to be implemented urgently to enable vulnerable communities and sectors to build resilience and reduce their vulnerability to climate change and extreme weather events.

phenomena related to climate change.

94. To successfully implement the NSAIC and achieve the desired level of adaptation to climate change, it is necessary to eliminate some legal, institutional barriers and capacity gaps. For successful implementation of NSAIC, these barriers need to be addressed in the long, medium and short term, through consistent technical assistance programs from MDBs.

95. Legal barriers. Legal barriers pose fundamental challenges to long-term sustainability and overall development. In general, in Tajikistan:

- existing laws, regulations and codes on environmental protection, energy, drinking water supply, construction and disaster risk management do not include climate change issues;

- programs, strategies and other legislative conditions do not encourage government agencies to take measures to reduce vulnerability and strengthen adaptation measures;

Legal reform requires a responsible approach from a wide range of stakeholders to produce sustainable policy dialogue and technical assistance that reflects political realities and adapts to changing political structures, priorities and personalities. Legal reforms require long-term strategic commitment.

96. Institutional barriers. The capacity of Tajikistan's institutions to address climate risks and ensure equitable resilience is hampered by a lack of:

- mechanisms for integrating climate change issues into national and sectoral action plans;

- coordination and cooperation in the field of collecting information on climate change issues between key ministries and departments;

- coordination between institutions managing disaster risk reduction projects and programs;

- basis for long-term development plans and effective distribution of resources, both from donors and the state.

97. The twin challenges of poor coordination and cooperation undermine synergies and mutual benefits between programs. Reforming institutions with clear roles, responsibilities, and communications to adapt to climate change requires a medium- to long-term strategy, as such work inevitably faces resistance, territorialism, and the practicality of government agencies with limited resources and limited incentives to change. .

98. Barriers/obstacles regarding potential. Gaps in awareness, skills and technology can be addressed in the short term through targeted, well-resourced technical assistance. Tajikistan needs to continue the work begun under the PPCR to develop and support:

- raising awareness on climate change issues among the population, as well as on the benefits of adaptation among specialists;

- institutional flexibility of for implementation innovative projects and programs in the field of adaptation;

- institutional capacity for collection and processing hydrological and meteorological data and information;

- knowledge and skills of government officials who work on climate change issues;

- a dedicated climate change research institute to support the collection and dissemination of climate change data and information;

technical capacity of sector specialists to implement projects and programs in the field of adaptation;

financing for the implementation and monitoring of projects and programs in the field of adaptation to climate change.

§ 3. Recommendations for removing barriers to implementation

99. The donor community has helped Tajikistan implement meaningful reforms that are essential to building long-term resilience to climate change. To address the complex institutional and capacity barriers and support subsequent implementation of the NSAIC, investment projects and associated technical assistance programs must support reforms, with

aim:

- mainstreaming climate change issues into national, regional and local planning processes;

- improve institutional capacity to improve coordination and collaboration between institutions involved in the collection and dissemination of climate change information;

- improve coordination between ministries in the field of risk reduction, climate change management and the implementation of projects and programs in the field of adaptation;

- establish a climate change research center and promote data collection, research and analysis to combat climate change;

- improve the method of developing long-term development plans in order to eliminate duplication of activities and improve interaction;

- ensure adequate and timely provision of financial resources necessary to raise climate change awareness, reduce vulnerability and implement the project;

- increase the number of employees working on climate change issues in relevant ministries and departments;

- increase climate change awareness and technical capacity of industry experts working on climate change projects in sensitive sectors.

100. Implementation of the NSAIC requires additional support along three general recommendations: a) promoting coordination and interaction at regional and local levels; b) improving access to climate data and dissemination of climate information; c) strengthening human, educational and scientific potential to combat climate change.

101. Promote coordination and interaction at regional and local levels. Coordination and synergy between agencies and programs is essential if proposed investment projects are to achieve their full potential and minimize potential duplication. Institutional fragmentation leads to unnecessary duplication of efforts to reduce and manage climate risks. At times, institutional fragmentation can lead to failures in coordination, especially during and after extreme weather events such as floods and droughts. A given investment project will be more effective when one government agency takes the lead coordinating position to oversee progress. 102. At the national level, the CEP will provide general policy and technical oversight for the prioritization and implementation of proposed investment projects. It will work in close cooperation with relevant ministries in the implementation and monitoring and evaluation of priority projects. The collaborating industry agencies will be responsible for day-to-day project management and administrative functions through their contact persons for the various projects. At the regional level, policy and technical oversight of the project will be carried out by local government authorities, as well as regional and

district units responsible for the environment, irrigation and reclamation, as well as emergency situations and civil defense.

103. To improve the coordination mechanism, the Government and development partners should continue the work begun under the PPCR and other climate change adaptation initiatives, with
aim:

- create an appropriate framework for the implementation of the climate change adaptation program and establish a lead coordinating body for better coordination;
- identify potential areas of interaction between different climate-sensitive sectors;
- develop and maintain a system of business relations to disseminate information about climate change;
- increase the capacity of the local level (for example, Water Users Association, Farmers Association)
- develop a coordination mechanism for regional and local bodies involved in disaster risk reduction/ management and adaptation to climate change;
- improve relations with civil society, NGOs and local vulnerable communities;
- create and maintain an information portal for the exchange of information on adaptation to climate change;
- involve civil society in the process of implementation, monitoring and evaluation of projects and programs for adaptation to climate change; And
- strengthen the potential and business connections of workers in the agricultural services sector.

104. Improving access to climate data and dissemination of climate information. Lack of access to reliable climate data and information is the main barrier to the adaptation process in Tajikistan. Measures to be taken include:

- strengthening the Hydrometeorology Agency's data collection methods and dissemination capacity;
- mapping and communicating community-level climate risks and impacts;
- creation of a knowledge base on local changes climate change, including adaptation measures for local populations;
- increasing the capacity of vulnerable groups to use technology (e.g. SMS, climate maps, seasonal weather forecasts);
- creation of a central climate information database storing data and information covering all climate-sensitive sectors;

- conducting climate change awareness campaigns on a regular basis;
- creation and maintenance of information centers in the field of climate change;
- encourage information exchange on climate change between various government bodies; And
- identify and better communicate best practices in adaptation to climate change.

105. Strengthening human, educational and scientific capacity to combat climate change. To strengthen human, educational and scientific capacity to address climate change needs, initiatives initiated under the PPCR and other initiatives need to be continued to:

- develop the necessary educational programs for schools and universities;
- create fully funded government climate change research programs;
- create research and training centers for climate change;
- develop fellowship programs for scientists interested in pursuing graduate degrees in the field of climate change; And
- organize periodically scientific and practical conferences, seminars, round tables, as well as systematic exchange of experience and practices.

CHAPTER 5. FINANCING OPTIONS AND STRATEGIES TO SUPPORT NAIC

106. To address climate change problems, various sources of financing are needed, including national and international, as well as public and private funds. The strategy includes the financial support required from multilateral development organizations and the Government for the implementation of investment projects in the area

the climate.

107. National financing for climate resilience. A review of the national budget found that it was not possible to determine the level of expenditure that could be allocated to climate change adaptation activities. Whereas in 2015, the Republic of Tajikistan officially submitted proposals to the Secretariat of the UN Convention on changing the INDC (National Contribution to the Implementation of Global Goals) and on April 22, 2016 signed and the country's Parliament ratified the Paris Climate Agreement on February 16, 2017. For developing countries, this Agreement defines measures to provide specific assistance in adapting to climate change. The development of legal protection mechanisms, provision of financial support and meeting the need for new technology will be carried out taking into account the prevention of the risk of climate change.

108. Funding for NNAIC differs from other national strategies. The key difference is the essence of the strategy, which lies in the fact that this strategy acts as a road map for investing in development. Its financing is likely to be gradual, in line with the complementary priorities of the multilateral development banks and complemented by partner government funds.

109. International climate assistance. Total global climate-related aid per year between 2010 and 2012 reached US\$21.5 billion; only 58% is aimed at mitigation, just 25% is aimed at adaptation, and 18% is aimed at both mitigation and adaptation. Experience shows that Tajikistan is at an early stage of accessing various international sources of financing for adaptation processes.

110. In addition to international climate funds, there are important adaptation projects supported through official bilateral development assistance. Countries supporting these adaptation projects are Switzerland (<\$7.5 million), Germany (<\$4 million), and Finland (<\$1 million) as reported by the Organization for Economic Cooperation and

development, by climate finance flows from bilateral and multilateral sources allocated to the Government of Tajikistan in 2014.

111. In addition to these projects, the Government of Tajikistan also received funding for the adaptation project from two international climate funds: the Global Environment Facility (GEF) and the Climate Investment Fund (CIF) under the Pilot Program for Climate Resilience (PPCR). There have not yet been any appeals to the Adaptation Fund (AF) or other funds.

112. In 2014, approved funding for Tajikistan from the PPCR was US\$60.7 million, with funding expected to be US\$84.4 million. Additional World Bank financing of US\$2.83 million was approved in June 2015.

113. PPCR stands out among all others as one of the large sources of funding, which receives a certain share of its co-financing from the state budget of the Government of Tajikistan. This is a very important element that can be used to convince donors to finance investment projects included in the NSAIC.

This chapter provides an overview of the climate finance mechanism and recommended options for Tajikistan to consider for financing the NCAIC.

§ 1. Green Climate Fund

114. The GCF is a financial mechanism adopted by the UNFCCC in 2011. The Fund intends to become the primary conduit for public climate finance to achieve the international community's mitigation and adaptation goals (the "Fund of Funds").

115. The GCF plans to increase its investment in international efforts to US\$100 billion per year by 2020. Countries have now committed a total of US\$10.3 billion to the GCF, of which US\$10.1 billion has been deposited and US\$2.2 billion has been distributed. Accredited intermediaries will have access to these financial resources primarily in the form of subsidies or concessional loans in several areas.

116. Access to GCF resources is carried out through national, regional and international implementing agencies, after

accreditation by the GCF Board of Management. Recipient countries determine the mode of access, and the mechanisms can be used simultaneously. The GCF Board of Directors at its 13th meeting approved (\$19 million for the World Bank's Climate Change Adaptation and Mitigation Program for the Aral Sea Basin (CAMP4ASB)), in Tajikistan and Uzbekistan.

117. The Government of Tajikistan has appointed the CEP as the focal point for the GCF (as well as for the Adaptation Fund) and has established a National Designated Authority (NAB) under the CEP. The NDA has a secretariat and a technical expert group with appointed representatives from various ministries and civil society. Project proposals will be submitted to the NDA secretariat, which will convene a technical expert group to review the proposals, and screen project proposals for consistency with national and sectoral priorities.

118. The NDA recommends funding for the project proposal to the GCF Governing Board, thereby ensuring that the activities are developed in the right direction and are consistent with the recipient country's national climate strategies and plans. To improve national capacity, governments may seek support from the GCF and other donors to prepare to access and effectively use GCF funds in accordance with the strategic objectives of the GCF.

§ 2. Adaptation Fund

119. The Adaptation Fund (AF) is the financial mechanism under the Kyoto Protocol for the UNFCCC. AF was created for financing national and regional adaptation projects and programs in developing countries committed to the Kyoto Protocol. The AF is funded by 2% of Certified Emission Reductions allocated to Clean Development Mechanism projects, as well as voluntary contributions from donor governments (mainly Germany, Sweden and Spain).

120. Currently, \$471.6 million has been deposited in the AF and \$112.5 million has been disbursed. Since 2010, the AF has committed US\$318 million to climate change adaptation and resilience activities in 50 countries. The AF's financial position is difficult given the high volatility in the Certified Emissions Reductions market and the preponderance of funds from voluntary contributions going to the GCF. The AF is therefore considering acceptable institutional arrangements for an arrangement with the GCF.

121. Activities eligible for the AF include: water resources management, land management, agriculture, health, infrastructure development and vulnerable ecosystems. The AF also supports projects related to improving disease monitoring and forecasting, establishing early warning systems for climate change, building capacity to combat climate change, and strengthening existing or creating national and regional centers and information networks for rapid response to extreme weather events.

122. In addition to being a party to the Kyoto Protocol, the countries concerned must be particularly vulnerable to the adverse effects of climate change. These include small island developing States and low-lying countries, countries with fragile mountain ecosystems, countries with arid and semi-arid regions, and countries prone to floods, drought and desertification. The criteria also include the level of vulnerability to climate change, the level of urgency and the risks associated with delaying action.

§ 3. Global Environment Facility Trust Fund

123. The Global Environment Facility (GEF) Trust Fund is a multi-coordination project consisting of 183 partner countries, international institutions, civil society organizations and the private sector. The GEF Trust Fund is the financial mechanism of the UN climate regime and has been operating since 1991. Since the World Bank's initial \$1 billion pilot program, the fund has provided \$14.6 billion in grants and \$74.3 billion in loan match financing for 4,032 projects in more than 165 developing countries peace. Funds are available to developed and developing countries for mitigation and adaptation projects and programs in areas such as biodiversity, climate change, international waters, land degradation,

chemicals and waste.

124. Countries that are eligible to receive loans from the World Bank and receive technical assistance from the United Nations Development Program (UNDP) can apply for different project areas, mainly in the form of grants, such as:

- full-scale projects worth more than \$2 million in funding.

- medium-scale projects up to \$2 million.

enabling activities to assist countries in preparing national inventories, strategies, action plans and reports on various conventions, up to US\$0.5 million.

programmatic approaches that include partnerships between countries, the GEF and other stakeholders (eg private sector, donors and/or academia) of US\$5-150 million.

small grant program of up to \$50,000, funded by the GEF as a corporate program.

CHAPTER 6. MONITORING AND EVALUATING ACTIVITIES

125. Addressing the impacts of climate change on key sectors and societies through adaptation requires a coordinated response across multiple sectors and communities.

levels. Given the complexity of these measures and the technical issues involved in assessing their effectiveness and impact, establishing a useful and relevant monitoring and evaluation (M&E) system is critical to measuring NSAIC's success in achieving its goals and indicators. The M&E system will place particular emphasis on knowledge generation through collaborative approaches, identification and sharing of lessons learned. It will support a long-term learning process to determine -

“what works” in adaptation and will provide tools for managing climate change adaptation activities in the face of uncertain climate change impacts. Good practices, lessons learned, gaps and needs identified from ongoing and completed projects, policies and programs will inform future actions, thereby creating an iterative and inclusive adaptation process.

126. NNAIC offers broader national guidance on establishing and strengthening a national M&E framework for climate change adaptation, with a view to integrating the framework into national development planning processes. Strengthening and mainstreaming M&E activities will be a long-term effort to ensure: (a) effective implementation of adaptation policies, measures and actions; (b) compliance with international reporting obligations; (c) sharing information on best practices; and (d) will demonstrate Tajikistan's commitment to climate finance by providing a reliable platform for attracting international climate finance

the climate.

Appendix for

the National Strategy of the Republic of Tajikistan
for the period up to 2030 on adaptation

*

Table 1. Assessment of climate change impacts by sector

Risk	Energy	Water resources	Transportation	Agriculture	Border sectoral areas activities
Clearing dirt roads			10		
Damage roads, railway paths, Vehicle			9		
Bad regulation reservoirs	8.5	8.5			
Increased erosion high level of subsidence	8	8			
Decline in energy production, water consumption, mobility and loss of life decline	7.5	7.5	9		
Operation rescue delay			8		
Decline in the supply of irrigation water, and decline agricultural productivity due to drought		7.5		10	
Higher surface evaporation rate water due to drought	7.5	7.5			
Mismatch between current use and future availability due to seasonal changes in precipitation	7.5				
Damage perishable goods due to transport infrastructure problems associated with climate			9		
Increased costs of restoration work			9		
Death of people			9		10
Reduction rainy farming method				10	
Decrease in yield and				10	

production					
A neurosurgeon and death livestock				10	
Degraded fresh quality water from glacial runoff and sediment		7.5			
Road surface wear			8		
technical Infrastructure maintenance disruption			8		
Increase in infectious diseases such as diarrhea, hemorrhagic fever, malaria, etc.					10
Internal movement and migration, caused climate change					9
Increase volume domestic work for women					9
Increase cordially- vascular and respiratory diseases					9
Loss of soil and its nutrients					8
Loss of biological diversity					7
Loss of access to education					6

*1=low priority, 10=highest priority

Table 2. Prioritized adaptation options for the energy sector

ȳ	Adaptation options	Ranking (0-10)			Average
		1	2	3	
1	Develop short-term models to cope with the consequences of extreme weather phenomena. Developing cost-effective adaptation options to mitigate drought and energy impacts on GDP	9	9	9	9
2	Infrastructure protection: Raise the height of the dam, add bypass channels, regulate water release	10	9	8	9
3	Train energy authorities on the use and methodologies required to conduct assessments climate risks and vulnerabilities	8	8	7	8
4	Review maintenance procedures and technical incentives to improve the safety of distribution transmission networks from extreme weather events and	8	8	8	8
5	Promoting energy efficiency policies through demand management and energy efficiency incentive systems	8	8	8	8
6	Improving energy access and energy security in rural areas (for example, through expansion of the rural electrification program, energy-efficient stoves, and development of ethanol-based stoves)	8	8	8	8
7	Enhance adaptation and planning tools for long-term hydropower generation to address ongoing changes in water and energy availability	8	5	7	7
8	Promotion of energy efficient industries	7	7	7	7
9	Incorporating other (less climate-sensitive) energy sources into the energy mix to ensure greater reliability	7	7	8	7
10	Investing in climate-resilient infrastructure to improve the sustainability and productivity of hydropower, for potential of hydropower	7	7	7	7

Table 3. Prioritized adaptation options for the water sector

No.	Adaptation options	Ranking (0-10)			Average
		1	2	3	
1	Eliminate future water shortages by improving use efficiency water resources, reuse, processing and demand management	10	10	10	10
2	Improve water potential associations users (WUAs) and provide recommendations on effective methods water use	10	10	10	10
3	Increase adaptation and planning tools for long-term hydropower generation to cope with constant changes in water and energy availability	9	9	9	9
4	Consideration of issues regarding the deployment of a regional water distribution system resources or use of transboundary water resources for economic and environmental benefits	9	9	9	9
5	Development of fisheries, introduction of fish ponds; implementation of Creation legislation and regulation of the use of fishery resources by	8	9	10	9
6	Establishing stricter cleaning rules wastewater and effluent regulation to preserve water quality and maintain cleanliness	8	9	9	9
7	Supply of water supply systems through a system of market relations	9	9	9	9
8	Through vulnerability updating, notify communities vulnerable to floods and landslides, engage communities in the construction of climate-safe buildings and areas, and provide technical and financial help	8	9	9	9
9	Providing a backup system for water storage and a storage system through pumping	8	8	8	8
10	Improvement control systems groundwater resources	8	8	8	8

Table 4. Prioritized options for the agricultural sector

adaptation

for

No.	Adaptation options	Ranking (0-10)			Average
		1	2	3	
1	Help improve soil health and protection against erosion, as well as management of water resources and drainage systems	10	10	10	10
2	Facilitating the development of pasture management schemes	10	10	10	10
3	Introduction of crop diversity and knowledge of plant breeding, combined plant cultivation, structure and planting method	10	10	10	10
4	Establishment of seed banks in communities, especially for drought and disease resistant crops	10	10	10	10
5	Repair and improvement methods irrigation, such as drip irrigation with for the purpose of economical use of water or more expensive crops	10	9	10	9,7
6	Improve community storage systems for storing crops and food to reduce wastage	9	10	10	9,7
7	Improve research and extension of agricultural services through small mobile devices reaching farms to provide and improve farmers' access to information, practices and technologies. Provide communities and farmers with a range of training tools on appropriate cropping options applicable to the forecast regime climate and water availability.	9	9	9	9
8	Promote drought-tolerant seeds and practices, as well as knowledge about plant frost protection	9	8	10	9
9	Plant trees to protect the community and farm from wind	9	10	10	9
10	Develop options for crop insurance against drought	9	9	9	9

Table 5. Prioritized adaptation options for the transport sector

No.	Adaptation options	Ranking (0-10)			Average
		1	2	3	
1	Improving long-term transport operation infrastructure	8	8	8	8
2	Development of construction of civil facilities and natural plant protection methods cover to prevent landslides in mountainous areas, on roads and river banks	8	8	8	8
3	Install Best practice engineering by standards and construction guidelines ensure that the resilience remains to the highest infrastructure's possible standards. values temperature, precipitation intensity and landslides.	8	8	8	8
4	Carry out structural modernization existing transport infrastructure	9	6	9	8
5	Protecting mountain road infrastructure from landslides that destroy roads	9	6	9	8
6	Providing support for improving infrastructure, access roads in the country, especially in dangerous and vulnerable areas	9	6	9	8
7	Promotion of incentives, rules for economical vehicles	8	6	8	7
8	Introduce new legislation to strengthen the guarantee of national standards for the quality of materials, road construction manuals/ codes and practices and law enforcement.	8	7	6	7
9	Consideration of climate impacts on bridge design or strengthening	8	5	7	7
10	Providing warning signs in high-risk road areas	8	5	5	6

Table 6: Health sector gaps by capacity level

Level potential	Spaces
System	1. Lack of necessary powers to address climate-related health risks and impacts
	2. Lack of population surveys hinders data generation on the prevalence of infectious diseases
	3. Lack of early warning and response systems for extreme weather events that threaten human health (for example, heat strokes or floods).
Organizational	4. Difficulties in retaining qualified personnel in the regions
	5. Lack of funding for medical education and laboratory training needed to properly understand climate-related risks and impacts
Individual	6. Health professionals are not sufficiently trained to implement adequate monitoring of climate-related diseases (eg, vector-borne diseases) and/or impacts.
	7. Some people in some regions are not used to temperature changes and do not have the knowledge of how to protect themselves

Table 7: Gaps in education by capacity level

Level Gaps potential	
System level	1. Climate change is not taken into account in laws and policies in areas of environmental education
	2. Climate change is not included in the curriculum, even if laws and policies support it as part of environmental education.
	3. Various environmental education initiatives overlap, spreading limited resources even more narrowly
	4. Ongoing support for national campaigns raising awareness of climate change and adaptation to climate change is not sufficient
	5. Awareness-raising campaigns rely heavily on donor funding and lack sustainability
	6. The lack of coverage of environmental issues in media news limits the opportunities for journalists genuinely interested in finding stories about climate change
Organizational level	7. Lack of coordination and duplication of authority hamper the ability of government agencies to provide environmental education and climate change
	8. Educational institutions do not have access to materials in the Tajik language that are relevant to local conditions
	9. Lack of climate change curriculum in universities and post-secondary institutions across the country
	10. Lack of equipment and/or laboratories to support implementation of climate change curriculum
Individual level	11. Lack of funds in government agencies and NGOs to conduct ongoing outreach, training, and activities undertaken by them are largely dependent on donors
	12. Teachers and government officials working in the education sector do not have sufficient knowledge about climate change
	13. The growth of knowledge about climate change among students and trainees is limited due to the lack of materials on climate change in the Tajik language. Students often lack the language skills needed to use specialized materials that are available in other languages

Table 8: Gender Sector Gaps by Capacity Levels

Level potential	Spaces
System level	1. Low level of women's representation in all branches of government
	2. Social foundations limit women's rights in decision-making, both at the household and farm levels
	3. Social norms hinder the presence and level of women's participation in trainings, especially in groups where both genders participate
Organizational level	4. Women's associations are not involved in government affairs. solutions to climate-related issues
	5. Women's NGOs have a very low level of awareness of climate change and adaptation issues
	6. Organizations fail to recognize the scale of climate threats to women, especially in rural areas
Individual level	7. Lack of awareness on climate change issues among women
	8. Lack of decision-making power among women to take adaptation measures
	9. Lack of information on preparing for and responding to extreme weather events among women, including knowledge of evacuation procedures and basic survival skills such as swimming
	10. Lack of opportunity to attend seminars and trainings on climate risk reduction and management

Table 9: Migration Gaps by Capacity Level

Level potential	Spaces
System level	1. Internal migration creates additional labor and financial costs for both the Government and households 2. Programs fail to recognize the rise in extreme weather. climate-induced impacts
Organizational level	3. Organizations working with internal and external migration do not link migration to climate change, despite the fact that the number of people in areas susceptible to moving from extreme weather events is increasing
Individual level	4. Lack of awareness of climate change among internal migrants, especially those displaced by floods, mudslides and avalanches

Table 10: Vulnerable Groups Sector Gaps by Capacity Levels

Potential level	Spaces
System level	1. Climate change and adaptation issues are not fully integrated in the Social Sector Strategic Documents
Organizational level	2. The Ministry of Labour, Migration and Employment does not have the necessary financial resources related to adaptation, even when they would like to reduce the threats faced by vulnerable groups 3. NGOs and community-based organizations (CBOs) working with Vulnerable groups often lack adequate levels of awareness of climate change and adaptation to it
Individual level	4. Vulnerable people lack the necessary benefits and empowerment to become climate resilient 5. Vulnerable people do not have access to climate information and knowledge

Table 11: Environmental Gaps by Capacity Level

Level potential	Spaces
System level	1. Lack of an action plan to assist in ecosystem-level adaptation
Organizational level	2. Compared to other ministries, the CEP has limited authority and the least strength 3. Insufficient necessary funding to implement large-scale ecosystem-based adaptation actions needed to reduce the increasing climate risks and threats facing the environment
Individual level	4. People living in areas with fragile ecosystems lack the necessary awareness of climate change and support to build resilience

Table 12: Prioritized adaptation options for cross-sectoral areas of action

No. Adaptation options	Ranking (0-10) Average			
	1	2	3	
1 Diversify income-generating activities, improve infrastructure for market access and improve interdepartmental linkages	10	10	10	10
2 Strengthening forestry, agroforestry, a joint forest management, preservation natural resources and management skills	10	10	10	10
3 Create awareness of climate change in all levels	10	10	10	10
4 Development and implementation of an increase program awareness of adaptation issues to potential impacts from climate change for cross-sectoral areas of action	10	10	10	10
5 Improving early warning systems to minimize climate impacts across sectors	10	10	10	10
6 Strengthening health care institutions to effectively prevent cardiovascular and respiratory diseases in people vulnerable to climate change and possibilities of extreme climate events	9	9	9	9
8 Providing grants to support local NGOs, microfinance and microcredit organizations working in cross-sectoral areas	9	8	10	9

9	Development of small dams and other storage facilities for flood risk reduction, water storage and development of fish farming and community fish farming	9	8	9	8.6
10	Promoting weather proper use information at all levels	10	5	10	8.5

Table 13. Ranking of adaptation projects

		Criteria for ranking (from 0 to 10)				C b
		Rescued human life, health, sources of funds vital activity	Environmental protection (land, forest, water)	Vital infrastructure facilities (hydroelectric power station, communications, systems industry, cultural facilities, tourism)	Sustainable development, interaction with motor vehicles	
Project code	Project	1	2	3	4	
Energy sector						
01	Emergency tunnel on the Vakhsh River in the area of the Baipazinsky landslide	10	10	10	8	
02	Modernization, reconstruction Varzob hydroelectric power station	8	8	8	8	
03	Modernization, reconstruction of the Central Hydroelectric Power Station	7	8	8	6	
04	Modernization and reconstruction of Perepadnaya HPP	7	8	8	6	
05	Installation of 37 kW photovoltaic solar power station in the village of Okuchashma	6	8	6	6	
06	Construction of a 4.7 MW hydroelectric power station in the Nazarmegan area in the Jirgital region	5	5	5	5	
07	Construction of a 15.5 MW Dombarchi hydroelectric power station in the Jirgital region	5	5	5	5	
08	Increase in useful potential Nurek reservoir	4	4	4	4	
Water sector						
01	Strengthening the material and technical base state unitary enterprise for "protection from mudflows" flows"	9	10	9	9	
02	Machine irrigation on an area of 24,000 hectares in the town Mizorawat-Samgard in Bobojon Gafurov district of Sughd region	9	6	8	7	

03	Reconstruction of the hydraulic engineering facility of the Great Gissar Canal	9	8	8	7
04	Construction, reconstruction of irrigation systems for development of new waters, existing land reserves in Jirgital region	9	7	7	8
05	Construction of the Punuksay reservoir (reservoir for mudflows) in the Asht district of the Sughd region with a capacity of W = 3.8 million m ³	9	6	8	6
06	Reclamation, water supply of the existing area of the Matpari territory in the Isfara region, Sughd region	10	5	7	7
07	Transfer of the Dakhkat part flow into the Daganayskaya reservoir in the Ganch district, Sughd region	9	5	7	6
08	Construction of the Kafernigan reservoir (first stage)	8	6	7	6
09	Monitoring glaciers Tajikistan from the air	6	7	6	8
10	Atlas of glaciers of Tajikistan	6	7	6	8
11	Provision of equipment, provision consumables to improve monitoring water quality in rivers of Tajikistan	7	7	7	6
12	Needs assessment,	7	7	7	6

	technological opportunities for storage of water under changing conditions the climate				
13	Construction of a reservoir in the Isfanai Jabor area of the Rasulov district of the Sughd region	6	5	7	6
14	Scientific research glaciers of Tajikistan	6	6	6	6
15	Reclamation new lands, water supply for existing lands of Karadum in Kumsangir district of Khatlon region	5	2	4	6
Agriculture					
01	Development highly productive crops (export-oriented and import-substituting)	10	10	10	10
	in the context of change the climate				
02	Technology development in areas of agricultural adaptation (for example, the introduction of drought-resistant crops)	10	10	10	10
03	Repair, improvement of existing warehouses, construction of new modern warehouses for crops and products	10	10	8	10
	livestock farming				
04	Creation of a security monitoring system	8	10	8	10
	food products in context of change the climate				
05	Increased efficiency land use due to agricultural diversification	10	10	8	8
	production				
06	Introduction of new	10	10	8	8

technologies/methods in agriculture					
production					
07	Development of seed production in the face of climate change	8	8	8	7
08	Creation industrial associations, in the form of industry associations for machine development tractor stations	10	5	5	8
09	Integration of pest control methods, control of plant diseases in the context climate change	10	10	8	8
10	Agrotechnical measures against secondary salinization	10	10	8	8
11	Raising public awareness, free information about agricultural producers in the context of change the climate	8	7	7	8
12	Strengthening the food supply based on sustainable use, natural resource management in the context of change the climate	8	8	8	6
13	Creation of a guarantee fund for agricultural insurance sectors in the context of climate change	8	8	7	6
Transport sector					
01	Construction dams for railway bridge over the Kafirnigan river in the city of Vahdat	8	6	7	7
02	Recycling worn tires, lubricants	7	8	7	6
03	Reconstruction of the Guliston-Farkhor highway Pyanj-Dusti	8	6	6	7
04	Reconstruction of the Rushan-Basid-Savnob highway	7	6	7	7
05	Reconstruction of the highway	7	6	7	7

	Khorog - Rostkala - Guzbulak				
06	Construction of new bridge, in order to replace existing in the Vakhdat region, passage of the Dushanbe- Kulma highway	8	5	6	7
07	Reconstruction of Kolkhozabad -Kubadiyan highway - Shaartuz - Ayvaj - Mazar Sharif construction of bridges on the Amu Darya River near the village of Aivadzh	8	6	5	6
08	Construction of a bridge on the Muksu River, Mingbulak village, Jirgital district	6	4	6	7
09	Construction of a highway in the Yagnob Valley Construction of a highway	7	6	5	6
10	Muminabad -	6	5	7	6
	Childukhtaron				
11	Reconstruction of the Baljuvan-Sari Khosor-Guldara highway	6	4	5	6
12	Reconstruction of the Baljuvan-Kangurt highway	6	4	5	6
13	Reconstruction of the Baljuvan-Khovaling highway	5	5	5	5
14	Reconstruction of the Kangurt-Temurmalik highway	4	4	4	4
Intersectoral areas of activity					
01	Organization, implementation systematic socially - hygienic monitoring activities on provision of services for state sanitary - epidemiological supervision in the context climate change	10	9	9	9
02	Implementation international standards for management of risks associated with drinking water	10	10	9	9

	water in conditions climate change				
03	Women for survival	10	8	7	10
	in conditions climate change				
04	Increasing learning	10	8	8	8
	potential to adapt to climate change				
05	Environmental	10	8	8	8
	migrants, internal migrants in the context climate change				
06	Providing equipment and consumables to improve monitoring of water quality in open	10	8	8	8
	reservoirs for home use				
07	Reconstruction of the KOOS training center	10	6	7	9
08	Raising youth awareness of climate change, training volunteers	8	7	8	9
09	Tajik youth against the negative impacts of change	10	7	8	8
	the climate				
10	Revision, development of physiological norms for food consumption in the context of change	10	7	6	9
	the climate				
11	Climate Change: Women, Employment, Development	10	8	4	9
12	Promoting the health of vulnerable groups	10	7	6	7
	population for cardiovascular and respiratory diseases				
13	The family of migrant workers and change	9	7	7	8
	the climate				
14	Development methodology for calculation of economic losses from morbidity, mortality in context of change	9	6	6	7
	the climate				
15	Organization	9	6	3	6

broad information educational campaigns in context					
climate change					
16	Promotion	10	8	2	8
awareness of vulnerable segments of the population, especially women, heads of households, families of migrant workers on issues					
climate change					
and its consequences					