

Terms of reference

Position:	National expert to assess the influence of climate change on the Ili-Balkhash basin.
Project name and reference number:	#00106780 Development of the Kazakhstan's Eighth National Communication and Preparation of Two (Fourth and Fifth) Biennial Reports to the UNFCCC
Contract type:	Individual contract
Duty station:	Home based
Period:	September 2021 – January 2022 (80 working days)

Introduction:

The project "Development of the Kazakhstan's Eighth National Communication and Preparation of Two (Fourth and Fifth) Biennial Reports to the United Nations Framework Convention on Climate Change (UNFCCC)" is being implemented jointly by the United Nations Development Program and the Government of the Republic of Kazakhstan with the Global Environment Facility's financial support.

The project will enable Kazakhstan to prepare and submit its national reporting to the UN Framework Convention on Climate Change - the Eighth National Communication (8NC) and two Biennial Reports (BR4 and BR5). Among other things, the project will prepare information on the Kazakhstan's national climate change circumstances, estimated amount of greenhouse gas (GHG) emissions and national measures to reduce them, assess climate change vulnerabilities and adaptation efforts, public awareness raising, outreach and staff training etc. The project will also strengthen the civil society engagement in climate change issues by building the technical and institutional capacities in the field of GHG inventory, GHG emissions projections, vulnerability assessment and NC/BR preparation, at the same time supporting the Government in mainstreaming climate change into the sectoral and national development priorities.

Rationale:

Water is one of the most important elements for human life, and water resources are one of the major drivers of the country's economy. The issue of water shortage has long been recognized all over the world and is being actively studied, especially in the light of climate change and ensuring country's security.

An important point to mention here is that more than 50% of Kazakhstan's total water resources originate outside the country, including the largest rivers of Kazakhstan: the Ural, Irtysh, Syrdarya and Ili originate or partly flow in other states. Meanwhile, those originating in Kazakhstan are mostly small. Climate change also significantly changes the volume of water resources.

The Ili-Balkhash basin and Zhetysu region, to which the basin belongs, play a crucial role in the development of the country's southeastern region. The natural landscapes, formed by the rivers and Lake Balkhash, are a national treasure and home to a variety of flora and fauna, including endemic ones. The region also plays a very significant economic role. The Ili River, which feeds Lake Balkhash, is transboundary (China-Kazakhstan), so economic activities on the river are carried out by both countries. For Kazakhstan, the biggest problem is, apparently, irrational water consumption, while China is actively withdrawing water for industrial and agricultural needs, which threatens the entire region and Lake Balkhash. The rest of the watercourses feeding Balkhash are rivers that begin in the glaciers of the Zailiyskiy Alatau and depend on climatic conditions, which will continue to be affected by global warming and glacier degradation.

Considering the above, it is necessary to assess the impact of climate change on water resources in the Ili-Balkhash region and assess the threats.

Objective:

Assess the impact of climate change on the Ili-Balkhash basin, assess the threats to the region and prepare a summary for journalists and decision makers from relevant ministries and departments

Specific tasks:

The Expert shall perform the following tasks:

Stage 1: Climate.

1. Prepare an analytical report: Climatic features of air temperature and precipitation distribution in the Ili-Balkhash basin;
2. Study fluctuations in average monthly air temperature and precipitation;
3. Model changes in air temperature and precipitation patterns:
 - a. according to the intermediate climate change scenario (RCP 4.5);
 - b. according to the "worst-case" scenario (RCP 8.5);
4. Study how winters with heavy snow and little snow are formed.

Stage 2: Balkhash.

1. Prepare a report: Lake Balkhash. General information. Peculiarities of its geographical location and economic importance, indicating region's value for the economy and environmental protection;
2. Analyze and select existing methods for calculating the water balance and identify the main water balance components for Lake Balkhash;
3. Study the inflow of surface waters into Lake Balkhash and the main sources feeding it
4. Determine water input from precipitation;
5. Determine methodology and calculate water evaporation from the water surface;
6. Determine the change in water volume caused by wind-induced setups/setdowns;
7. Study changes in the main water balance components of Lake Balkhash under the influence of climate change.

Stage 3: Ili and other important rivers feeding Lake Balkhash

1. Forecast the river's runoff using the HBV hydrology model, including calibrate model parameters to the conditions of the Balkhash basin;
2. Long-term river flow modeling:
 - a. according to the intermediate climate change scenario (RCP 4.5);
 - b. according to the "worst-case" scenario (RCP 8.5);

Stage 4: Recommendations.

1. Conduct a comparative statistical analysis of water consumption and water losses in Kazakhstan and other countries in similar conditions;
2. Develop recommendations for decision makers;
3. Create a summary for journalists;
4. Prepare at least 4 draft articles for a wide range of readers (one per stage)

No.	Tasks and outputs	Deadline	Expected time period	To be reviewed and approved by:
Stage 1: Climate.				

1.	<p>Analytical report: Climatic features of air temperature and precipitation distribution in the Ili-Balkhash basin</p> <p><i>Output: Analytical report including:</i></p> <ul style="list-style-type: none"> -Features of the annual variation in air temperature and precipitation -Trends in extreme weather events 	September 27 2021	20 working days	Project Manager
2.	<p>Study fluctuations in average monthly air temperature and precipitation;</p> <p><i>Output: Analytical report including:</i></p> <ul style="list-style-type: none"> -Multi-year fluctuations in air temperature and precipitation -Catalogue of the greatest air temperature and precipitation anomalies 			Project Manager
3.	<p>Model changes in air temperature and precipitation patterns</p> <ul style="list-style-type: none"> a. according to the intermediate climate change scenario (RCP 4.5) b. according to the “worst-case” scenario (RCP 8.5); <p><i>Output: Model estimates of changes in air temperature and precipitation patterns</i></p>			Project Manager
4.	<p>Study how winters with heavy snow and little snow are formed</p> <p><i>Output: Analytical report including:</i></p> <ul style="list-style-type: none"> • <i>Catalogue of winters with heavy and little snow (W calculation)</i> • <i>Atmospheric circulation features affecting how winters with heavy snow and little snow are formed</i> 			Project Manager
Stage 2: Balkhash.				
5.	<p>Report: Lake Balkhash. General information. Peculiarities of its geographical location and economic importance, indicating region’s value for the economy and environmental protection</p> <p><i>Output: Features of the geographical position and hydrological regime of Lake Balkhash.</i></p>	30 October 2021	20 working days	Project Manager

6.	Analyze and select existing methods for calculating the water balance and identify the main water balance components for Lake Balkhash <i>Output: Methodology for calculating the water balance of Lake Balkhash.</i>			Project Manager
7.	Study the inflow of surface waters into Lake Balkhash and the main sources feeding it <i>Output: Analysis of the main sources feeding the lake and surface water inflow</i>			Project Manager
8.	Determine water input from precipitation <i>Output: Report including the weighted average precipitation level, taking into account the areas of the Western and Eastern Balkhash</i>			Project Manager
9.	Determine methodology and calculate water evaporation from the water surface <i>Output: Data on water evaporation from the water surface of Lake Balkhash</i>			Project Manager
10.	Determine the change in water volume caused by wind-induced setups/setdowns <i>Output: Data on changes in water volumes</i>			Project Manager
11.	Study changes in the main water balance components of Lake Balkhash under the influence of climate change <i>Output: Analysis of changes in the water level under the influence of climate change and other factors</i>			Project Manager
Stage 3: Ili.				
12.	Forecast the river's runoff using the HBV hydrology model, including calibrate model parameters to the conditions of the Balkhash basin <i>Output: HBV model adapted for the River Ili</i>	November 30, 2021	20 working days	Project Manager
13.	Long-term river flow modeling <ul style="list-style-type: none"> • according to the intermediate climate change scenario (RCP 4.5) • according to the "worst-case" scenario (RCP 8.5); <i>Output: Assessment of changes in rivers' runoff (the Balkhash basin) under climate change conditions</i>			Project Manager
Stage 4: Recommendations				

14.	<p>Conduct a comparative statistical analysis of water consumption and water losses in Kazakhstan and other countries in similar conditions</p> <p><i>Output: Statistical analysis of water consumption and water losses in the region compared with other countries and regions.</i></p> <p><i>Analytical report on the future of the Ili-Balkhash basin, taking into account climate change and water management</i></p>	January 30, 2022	20 working days	Project Manager
15.	<p>Develop recommendations for decision makers</p> <p><i>Output: Document containing recommendations for decision-makers (no more than 15 pages)</i></p>			Project Manager
16.	<p>Create a summary for journalists</p> <p><i>Output: Summary for journalists (no less than 15 pages and no more than 30 pages)</i></p>			Project Manager
17.	<p>Prepare at least 4 draft articles for a wide range of readers (one per stage)</p> <p><i>Output: 4 draft articles for a wide range of readers</i></p>			Project Manager

Organizational structure:

The Expert will work closely with the Project team:

- The Expert shall perform tasks within the Terms of reference timely and with due quality;
- The Expert shall plan activities timely and rationally, perform work and achieve results set within the Terms of reference;
- If necessary, the Expert will hold online consultations with the Project team during the entire period of the Terms of reference;
- The Expert is responsible for the quality of the materials prepared within the Terms of reference;
- The Expert shall fulfill the requirements of the individual contract.

Deadline to perform tasks:

The contract will be signed for a period of 5 months (September 2021 - January 2022). All the tasks specified above shall be performed within this time period. The Project Manager and experts will provide their comments and recommendations / approvals within 2 weeks from the report submission dates

Duty station

Home-based

Qualifications and work experience required

- A degree in Geography or Environmental Science;
- Experience of at least 5 years doing research work on the topic;
- Experience of working with hydrology models (at least 3 years);
- Experience in assessing hydrological data and the impact of climate change and other factors on hydrological resources (at least 3 years);
 - Computer skills and skills in data processing tools;
 - Experience of working under similar research projects with international organizations;
 - Excellent proficiency in Russian;

Price proposal

Under the contract, the Expert is to be paid in the national currency (KZT) with a fixed payment (any amount) covering all expenses attributed to task performance (remuneration and any other direct/indirect costs). This shall include daily fee, the number of working days to complete the tasks and any other relevant costs under the Terms of reference. Payment will be made in tranches after the tasks are successfully completed, the expected results are achieved (see Specific tasks and Deadline to perform tasks) and upon approval of the results by the UNDP Project Manager.

The contract price will be fixed regardless of changes in cost components.

Payment schedule:

%	Output
25%	Stage 1
25%	Stage 2
40%	Stage 3
10%	Stage 4

APPROVED BY:

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 Date: 15-Jul-2021