This project is funded by the European Union

Central Asia Nexus Dialogue Project: Fostering Water, Energy and Food Security Nexus and Multi-Sector Investment (Phase II)

Sixth meeting of the Technical Working Group for implementation of the transboundary demonstration project at Tuyamuyun Hydroelectric Complex

26 October 2022 |15:00-17:15| Zoom conference

MEETING SUMMARY

The sixth meeting of the Technical Working Group (TWG) established to implement the transboundary demo project at Tuyamuyun Hydroelectric Complex (hereafter – THC) took place online within the framework of the Central Asia Nexus Dialogue Project (hereafter – Project) implemented by the Regional Environmental Centre for Central Asia (hereafter – CAREC) with financial support of the European Union (EU).

This demo project is co-financed by the project "Laboratory of Innovative Solutions for the Water Sector of Central Asia" under the Central Asia Water and Energy Program (CAWEP) implemented through the Multi-Donor Trust Fund administered by the World Bank, as well as by the World Bank's Climate Adaptation and Mitigation Program for Aral Sea Basin Project (CAMP4ASB), and the Global Nexus Secretariat.

The purpose of the meeting was to present and discuss the draft deliverables of international consultants Deltares and Altus Impact related to recommended approach to clean-up and processing of sediments in the Ruslovoe reservoir and profit and loss analysis on dredging and recycling the sediments.

The meeting was attended by the TWG members nominated by the Ministry of Water Resources of the Republic of Uzbekistan, THC and State Committee for Water Resources of Turkmenistan.

Representatives of the EU Delegation to Kazakhstan and the World Bank also participated in the meeting. In total, there were 24 participants.

For details, see the meeting concept and agenda, list of participants in *Annex 1*.

The meeting was opened by **Dr Johannes Baur,** the Head of Cooperation at the EU Delegation to Kazakhstan. In his welcome speech Dr Baur highlighted that the EU is promoting the Nexus approach as part of the EU Green Deal to ensure efficient use of such vital resources as water, energy and food. He expressed a hope that technical solutions and business opportunities for using the sediments as a valuable resource, which are proposed by the experts for this transboundary facility, will be also useful for other reservoirs in the region and beyond. Dr Baur shared the EU's plans to facilitate mobilization of much-needed investments in the water sector through the European Fund for Sustainable Development (EFSD+).

Kurbanbai Babajanov (TWG Head for Uzbekistan, Head of THC Operational Division) welcomed the participants and expressed his confidence that the TWG meeting would bring a new momentum for further actions. Mr Babajanov highlighted that THC is a unique facility with clear standards and operational rules. However, the sedimentation has been an acute problem and must be tackled urgently. The experts' reports contributed to facility operation and clean-up and emphasized the severity of the problem. The TWG Head summarized that activities at THC are relevant for Central Asia and reflect the development priorities of the region as a whole. In this regard, he encouraged all parties to consider continuing the efforts in this area, which will help find an optimal solution for reservoir clean-up in near future.

In his welcome speech, **Merdan Nazarov** (Head of Digital Technology Division, State Committee for Water Resources of Turkmenistan) informed that thanks to the work done by the project the Committee now recognizes the relevance of the inter-sector approach to Turkmenistan. Moreover, the Nexus approach was recommended by the President of Turkmenistan and is being actively promoted at the national level as part of the National Social and Economic Development Strategy for 2009-2025. Mr Nazarov stated that all completed activities were successful and the Committee is ready to continue efforts in this area and search for solutions to address sedimentation at THC. In addition, Mr Nazarov shared that Turkmenistan and Uzbekistan signed a number of intergovernmental agreements on THC operation, which also considered key recommendations and conclusions of the demo project.

The first session was dedicated to the presentation of the experts' draft deliverables for the last quarter. These deliverables are the last analytical deliverables according to the demo project's ToR. As the next step, the project team will develop an investment proposal for THC on the basis of all completed analytical deliverables.

I. Presentation of draft final report: Recommendations for management of sediment-induced problems at THC

Dr Sanjay Giri, an international expert with over 25 years of experience in reservoir management, also acknowledged that sedimentation challenges at the Ruslovoe reservoir are rather severe by scale. The expert distinguished two categories of challenges:

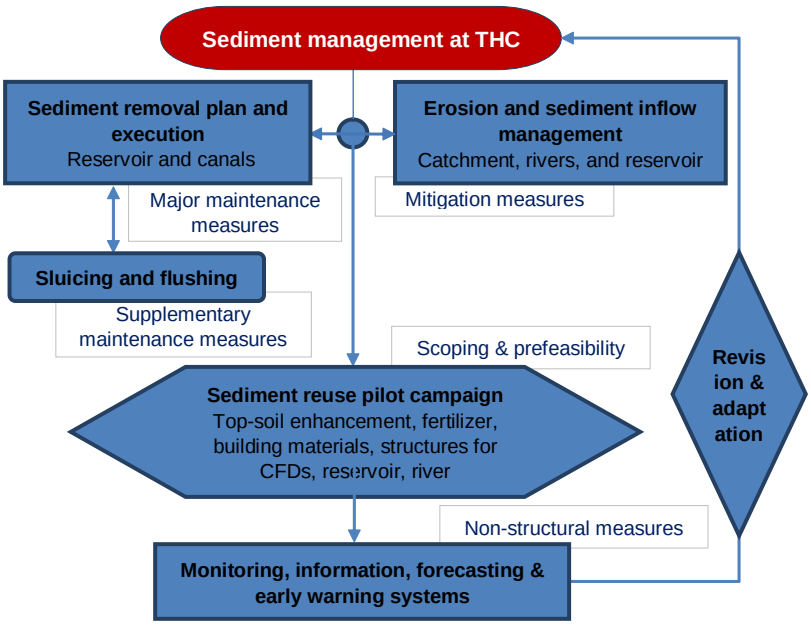
i) **First-category problem** is related to significant sedimentation in front of the hydropower plant and canal intakes, which leads to poor functioning of the hydropower plant and clogging of under sluices and intakes of the irrigation canal. This also includes sedimentation at the right-bank canal located at the inner bend of the river, which has negative morphological impact.

The first category problem should be addressed urgently. For this purpose, the expert recommends removing the sediments in the Ruslovoe reservoir in combination with reservoir sluicing and flushing (Fig. 1). As the first step, the expert proposes developing a short-term (5-year) plan of sediment removal as an urgent measure to prevent further hazards for the structures, consisting of:

- ✓ Maintenance dredging near the hydropower and canal intakes;
- ✓ First phase of sediment removal (around **10-12 million m^3** over 5 years);
- ✓ Acquiring equipment for excavation and dredging (with operation and maintenance contract and training of local staff for 3-5 years);
- ✓ Optimization of reservoir operation and reservoir sluicing and flushing;
- ✓ Pilot processing of sediments into a marketable product with its further sale.

The proposed solutions do not require large investments ranging between USD 2.4 million to USD 4.4 million (compared to losses faced by THC in the past several years).

Figure 1: Comprehensive sediment management program at THC with beneficial reuse.



ii) **Second-category problem** is related to large deposition along the Ruslovoe reservoir (particularly within 50 km upstream of the dam), which resulted in significant storage loss in the Ruslovoe reservoir (about 63%, or 1.5 billion m^3)[1] thereby affecting the agriculture, water supply and flood management.

Addressing this problem requires large-scale measures to regain the storage capacity. Three potential options are proposed:

- ✓ Capital dredging in the Ruslovoe reservoir with beneficial reuse of sediment (Option 1);
- ✓ Construction and/or extension of the existing off-channel reservoir (Option 2);
- ✓ Renovation of structures (for example, heightening or replacement of the dam) (Option 3).

[1] There is no specific data and information on problems in other off-channel reservoirs of THC, because the demo project was focused on the Ruslovoe reservoir due to the limited resources.

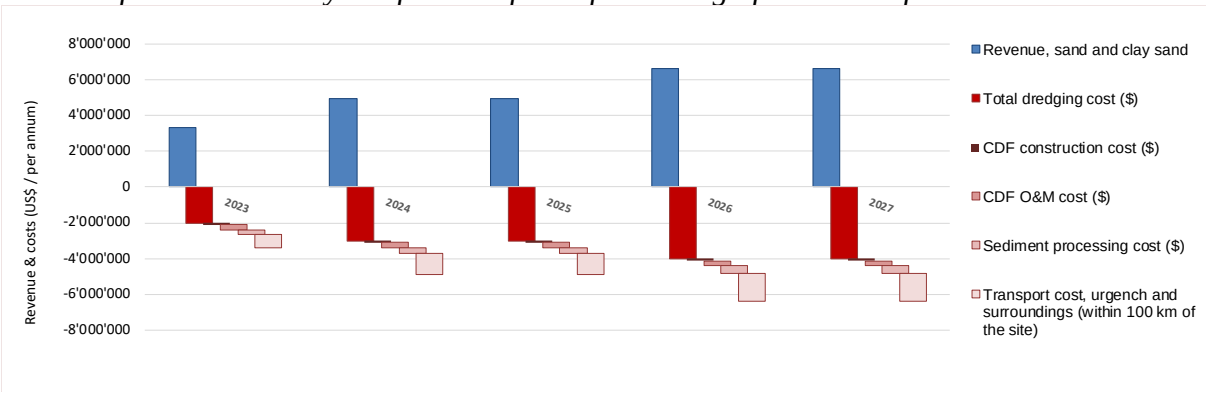
All the above-listed options require large technical, engineering and financial resources. Besides, before selecting any of these measures, it is necessary to conduct thorough assessment of their social, environmental, and economic implications and risks. Therefore, the expert suggested starting with first-category problem measures as the first step and in parallel initiating detailed technical and financial estimates for second-category problem measures, which can be implemented following the capacity building and lessons of the first-category problem measures.

II. The economic case for sediment re-use from the Ruslovoe reservoir

Dr Vanja Westerberg, Economist of international consulting firm Altus Impact, presented draft profit and loss analysis of the clean-up and processing of sediments from the Ruslovoe reservoir for first-category problem measures proposed by Dr Sanjay Giri.

The analysis includes detailed calculations for dredging of 1-2 million m^3 of sediments in strategic locations over the first 5 years, construction of a facility for processing of sediments into sand and clay and their further marketing to the construction industry. According to the economist's calculations, cost of sediment dredging and removal increases from USD 2.4 million to USD 4.4 million as the dredging volumes increases from 1-2 million m^3 to 2-4 million m^3 (based on dredging cost of USD 2 / m^3). Sediment processing and sand transportation increase total average annual costs from USD 3.3 million to USD 6.3 million (Fig. 2). However, revenues from sand and clay sand will be USD 3.3-6.6 million based on the current market price of USD 10 / m^3 for sand and USD 6 / m^3 for clay sand. Therefore, revenues from processed sand and clay sand can cover all costs associated with all phases of maintenance dredging. According to the conservative estimate of the economist, 40% of sediments can be used and sold to the construction industry.

Figure 2: Profit and loss analysis of clean-up and processing of sediments from the Ruslovoe reservoir



Dr Westerberg highlighted that there is an imminent global supply crisis of sand, whilst reservoirs are reaching their economic life-time due to sediment build-up. Specifically, it is projected that demand for sand will increase by ~300% across lower and middle-income regions from 2020 to 2060. Locally, demand for sand, considering the needs of concrete production alone, is at least 20 million m^3 in Uzbekistan and Turkmenistan. Average annual growth of the construction industry in Uzbekistan has been at least 4%.

In this context, the international expert suggested transforming the sedimentation challenge in the Channel Reservoir into an opportunity and demonstrated the value of reservoirs as sources of sustainably produced sand and clay sand, while ensuring food, water and energy security and promoting the circular economy in the region, especially considering that THC sediments contain a significant share of substances that can be used in the construction industry, including gravel, sand and clay sand (>30% clay). Precise proportions of gravel, sand, clay and silt in the reservoir are not known and require further investigation.

In conclusion, the economist drew attention to the need in efficient use of any reservoir resources, in particular water. When analyzing the contribution of irrigation water from THC to the hydropower capacity, she determined that each additional m^3 of water supplied to cotton fields with ridge-and-furrow irrigation generates in total USD 0.35 of incremental profit for the farm, while drip irrigation generates USD 1.1 of incremental profit for m^3 of water used. Considering that recovery of THC storage will be expensive, and climate change makes water resources increasingly scarce, it is critical to use water resources reasonably and effectively.

In addition to presentations of international experts, **Dr Adylkhan Tovasarov** (General Director of Central Asian Institute for Environmental Research) shared scientific insights about production of marketable materials made of sediments from the Ruslovoe reservoir, which his laboratory continued testing on voluntary basis. Over the past five months, a team of researchers led by Dr Tovasarov studied physical and chemical properties of the sediments and held field-scale tests. Upon the laboratory's order, a local construction firm produced 10cm*10cm foam concrete block using the sediments from the Ruslovoe reservoir, which was sent to the State Sanitary and Epidemiological Service of the Republic of Kazakhstan together with a burnt brick sample, and both products received a positive resolution with assignment of the first category, i.e. suitable and safe for residential construction (Fig. 3). At present, the laboratory is testing bending strength and cold resistance of the foam concrete block.

Figure 3: Foam concrete block and opinion of the State Sanitary and Epidemiological Service of the Republic of Kazakhstan

Топырақ және өсімдіктердің радиобелсенділігін зерттеу
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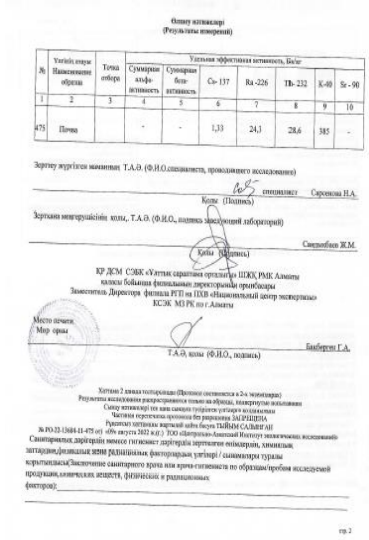
Исследования радиоактивности почвы и растительности
№ РО-22-13682-11- 473
(от) «09» августа 2022 ж.(г.)



For more information about the experts' findings can be found at the *Annex 2*.

At the end of the meeting, **Snejana Popova** (Project Officer, Delegation of the European Union to Kazakhstan) thanked all the speakers and participants for the constructive and engaging discussion and acknowledged the tremendous work done by the project so far. Ms Popova expressed high satisfaction with the work done by the experts in finding practical solutions to prevent the environmental degradation as a result of the sediments' disposal on the river banks and to use the sediments as a valuable resource instead, e.g., for the construction industry. The analysis by Dr Vanja Westerberg which shows that the revenues from the use of sediments can exceed the cost of the sediment clean-up and that the project has good investment potential is very inspiring.

Due to the extensive scope of the demo project activities, Ms Popova recommended to disseminate the demo project's findings on sediment management and commercial use among relevant competent authorities in Uzbekistan and Turkmenistan. In conclusion, Ms Popova stressed the need to continue the project's efforts in this area to develop an investment proposal in consultation with international experts.

Main outcomes of the TWG meeting:

1. Draft deliverables of the international experts were endorsed and supported by the TWG members from Uzbekistan and Turkmenistan for continuation of work in these areas;
2. Development of an investment proposal concept on the basis of the calculations done by the international experts was supported as the next step.

It was agreed that CAREC would send draft reports of the international experts through official channels to the Ministry of Water Resources of the Republic of Uzbekistan, THC and State Committee of Water Resources of Turkmenistan for detailed review and comments. Final reports reflecting the comments of TWG members will be presented at the 5th Meeting of the Regional Coordination Committee to be held on 5 December 2022 in Almaty, Kazakhstan.

Annexes:

Annex 1: 6th TWG meeting – Concept, agenda, and list of participants;
Annex 2: Draft reports and presentations of the international experts (WeTransfer).

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26 October 2022 |15:00-17:15| Zoom conference

General Information

The European Union funded "Central Asia Nexus Dialogue Project: Fostering Water, Energy and Food Security Nexus and Multi-Sector Investment" (hereinafter the Nexus Project) continues to implement small demonstration projects in Central Asia to display the potential of the Nexus approach, including investment project[2] planning.

The Tuyamuyun Hydroelectric Complex (hereinafter THC), proposed by the Ministry of Water Resources of the Republic of Uzbekistan and the State Committee for Water Management of Turkmenistan as a demonstration project, is a prime example of a challenge common to all water reservoirs in Central Asia. This demonstration project focuses on the siltation issue in order to identify threats and prospects and to find modern and sustainable technical solutions acceptable to both riparian countries, including but not limited to the use of silt as a raw material. In parallel, the demonstration project helps to identify a business plan and partnerships to elaborate the investment project to implement the technical solutions.

The implementation of the transboundary demo project started in January 2021 and will continue until December 2022 with the support of the European Union funded "Nexus Dialogue in Central Asia" project, the project "Laboratory of Innovative Solutions for the Water Sector of Central Asia" under the Central Asia Water and Energy Program (CAWEP) and the Global Nexus Secretariat.

Objectives of the sixth Technical Working Group meeting

The goal of the sixth Technical Working Group (TWG) meeting is the presentation and discussion of draft deliverables developed by international experts over the last quarter, in particular:

1. **Presentation** of the draft final report of the international consultant "Deltares" concerning the recommended approach to the treatment and recycling of silt in the Ruslovoe reservoir;

[2] For more information on the Project, visit the CAREC website.

2. **Presentation** of the draft analysis on the profit and loss of the treatment and recycling of silt in the Ruslovoe reservoir and its continued processing by the international consultant "Altus Impact";
3. **An agreement** on further steps on working out investment proposal concerning the treatment and recycling of silt in the Ruslovoe reservoir.

Format

The sixth meeting of the TWG will be conducted in the format of interactive discussions through online videoconferencing.

Zoom link: https://us06web.zoom.us/j/8179182155?pwd=RXp4bkkrQkNhYks3dVBjeDdFdENEdz09
Conference code: 817 918 2155; access code: 1234
Start of the meeting: 26 October 2022 at 15:00 Almaty time

Location	Start of the meeting in local time
Almaty (Kazakhstan)	15:00
Ashkhabad (Turkmenistan)	14:00
Moscow (Russian Federation)	12:00
Tashkent (Uzbekistan)	14:00

Language of the meeting

The working language of the meeting is Russian with a simultaneous translation into English.

Participants

- Representatives of the Technical Working Group from Uzbekistan and Turkmenistan;
- European Union Delegations to Kazakhstan, Turkmenistan and Uzbekistan;
- International and national experts;
- CAREC.

Agenda

Sixth meeting of the Technical Working Group

26 October 2022 |15:00-17:15| Zoom conference

Time	Description
15:00-15:20	**Welcome speech:** • **Dr Johannes Baur,** Head of Cooperation, EU Delegation to Kazakhstan • **Kurbanbay Babajanov,** Head of TWG for Uzbekistan, Head of the Division of Operation of the THC • **Merdan Nazarov**, Head of Digital Technologies, State Committee of Water Resources of Turkmenistan
15:20-15:25	**Group photo**
SESSION 1: DRAFT DELIVERABLES OF INTERNATIONAL EXPERTS *Moderator: Aksulu Kushanova, Energy Investment Specialist, CAREC*	
15:25-16:35	**Presentation of the draft final report: Recommended approach to the treatment and recycling of silt in the Ruslovoe reservoir** (30 min) ***Dr Sanjay Giri, Hydraulic engineer, consulting company "Deltares"*** **Economic feasibility assessment of the case for re-using sediment from the Ruslovoe reservoir** (30 min): • Overview of the direct and indirect benefits of sediment re-use from the Ruslovoe reservoir; • Monetary benefits and costs of sediment extraction, treatment and processing and sale of materials for the construction industry; • The case for using recovered reservoir capacity efficiency. ***Dr Vanja Westerberg, Economist, Altus Impact*** *Questions and answers* (10 min)
16:35-16:55	**Update on the progress of the laboratory experiments on producing the burnt bricks out of the silt of the Ruslovoe reservoir** (15 min) ***Dr Adylkhan Tovasarov, General Director of LLP "Central Asian Institute for Ecological Research"*** *Questions and answers* (10 min)
CONCLUSION:	
16:55-17:15	**Closing speech:** • **Ms Snejana Popova,** Project Officer, Delegation of the European Union to Kazakhstan (10 min) • **Ms Ludmila Kiktenko**, Project Manager, CAREC (10 min)

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LIST OF PARTICIPANTS

#	NAME, SURNAME	POSITION	CONTACTS
MEMBERS OF THE TECHNICAL WORKING GROUP FROM TURKMENISTAN			
1	Merdan Nazarov	Head of Division for Digital Technologies, State Committee of Water Resources of Turkmenistan	NA
2	Merdan Amansakhedov	Specialist, Division for Digital Technologies, State Committee of Water Resources of Turkmenistan	NA
MEMBERS OF THE TECHNICAL WORKING GROUP FROM UZBEKISTAN			
3	Kurbanbai Babazhanov	Head of the TWG from Uzbekistan, Head of the Division of Operation of Tuyamuyun Hydroelectric Complex	tuyamuyungu@minwater.uz
4	Khasanov A.	Chief Specialist of the Department for the Operation of Irrigation Systems and Large Hydraulic Structures of the Ministry of Water Resources of the Republic of Uzbekistan	NA
EUROPEAN UNION DELEGATION			
5	Johannes Baur	Head of Cooperation, EU Delegation to Kazakhstan	NA
6	Snejana Popova	Project Officer, Delegation of the European Union to Kazakhstan	Snejana.POPOVA@eeas.europa.eu
NATIONAL EXPERTS			
7	Malika Ikramova	Specialist in Water Resources Management and Engineering Hydrology, Research Institute of Irrigation and Water Problems under the Ministry of Water Resources of the Republic of Uzbekistan	malika.ikramova56@gmail.com
8	Adylkhan Tovasarov	General Director of LLP "Central Asian Institute for Ecological Research"	adil@asianecology.kz
9	Sanjay Giri	Hydraulic engineer, consulting company “Deltares”	Sanjay.Giri@deltares.nl
10	Erick Stern	Hydraulic engineer, consulting company «Tipping Point Resources Group»	Eric@tprgllc.com

11	Vanja Westerberg	Economist, consulting company “Altus Impact”	vanja@altusimpact.com
12	Merdan Karayev	National Expert from Turkmenistan	karayev.994@gmail.com
INTERNATIONAL PARTNERS			
13	Tatyana Leonava	Regional Development Advisor, World Bank	tleonova@worldbank.org
REGIONAL ENVIRONMENTAL CENTER FOR CENTRAL ASIA (CAREC)			
14	Lyudmila Kiktenko	Programme Manager, CAREC	lkiktenko@carececo.org
15	Irana Bagirova	Project Coordinator, Director of CAREC Project Office in Turkmenistan	ibagirova@carececo.org
16	Zebuniso Muminzoda	Project Coordinator in Tajikistan, Director of CAREC Country Office in Tajikistan	tajikistan@carececo.org
17	Azizov Dzhakhangir	Project Coordinator in Tajikistan, Director of CAREC Country Office in Tajikistan	uzbekistan@carececo.org
18	Olga Kharchenko	Assistant, CAREC Project Office in Turkmenistan	oharchenko@carececo.org
19	Aksulu Kushanova	Energy Investment Specialist, CAREC	akushanova@carececo.org
20	Aizhan Kossantayeva	Project Specialist	empspecialist@carececo.org
21	Botagoz Smagulova	PR Specialist	aamit@carececo.org
22	Dana Azhibayeva	Project Assistant	empassistant@carececo.org
Coordinator			
23	Ilkhom Zhuraev	Coordinator for the implementation of transboundary demo project from Uzbekistan	i.u.jurayev@gmail.com
Переводчик			
24	Sergei Medvetsky	Interpreter	smedvetsky@mail.ru

Annex 2: Draft reports and presentations of the international experts (WeTransfer).

https://we.tl/t-JBArbD7TJP