

DESCRIPTIVE REPORT

on the conduct of field studies in the transboundary river basins of the Republic of Uzbekistan

Project Title:	Enhancing the capacity for safe management of transboundary water resources in Central Asia through the use of innovative information and communication technologies
Location of field studies:	Ugam River basin, Tashkent Region; Zarafshan River basin, Jizzakh Region; Republic of Uzbekistan
Dates of the field studies:	October 17–26, 2024

General Information

Ugam River

From the perspective of transboundary risks, the greatest threats in the Ugam River basin are floods and high water events. On the territory of Uzbekistan within the Ugam River basin, the following settlements may be at risk of flooding during spring floods: Khumsan (Tashkent Region), Charvak (Tashkent Region), Gazalkent (Tashkent Region), and others. In addition, several hundred residential houses, 8 pedestrian and road bridges, numerous recreational areas, as well as key economic and infrastructure facilities—such as agricultural land, irrigation systems, the Charvak Reservoir, and road and bridge infrastructure—are located within the potential flood zone.

Zarafshan River

On the Zarafshan River, in the section between the border with Tajikistan and the city of Samarkand, there are hydrological risks such as floods and mudflows. Samarkand, being a major historical and cultural center, is particularly vulnerable to flooding, especially during periods of rapid increases in water levels in the Zarafshan River. Flooding can affect the city's infrastructure, including roads, buildings, and water supply systems. In addition, many small settlements near the river are exposed to risks of flooding and mudflows. These settlements heavily depend on the river for irrigation and water supply, and any hydrological disaster may lead to disruptions in water supply and damage to infrastructure.

Field Studies

From October 17 to 26, 2024, within the framework of the CESDRR and GIZ project *“Enhancing the capacity for safe management of transboundary water resources in Central Asia*

through the use of innovative information and communication technologies,” a team of experts—EWS expert V.V. Kuchkin, Chief Expert of the Center B.M. Ospanov, and System Administrator A.G. Ospanov—conducted field studies on the transboundary Ugam River in the Tashkent Region of the Republic of Uzbekistan and on the Zarafshan River in the Jizzakh Region of Uzbekistan.

Organizational and logistical support within the Republic of Uzbekistan was provided by the local project expert, hydrologist Nodirbek Tolibov.

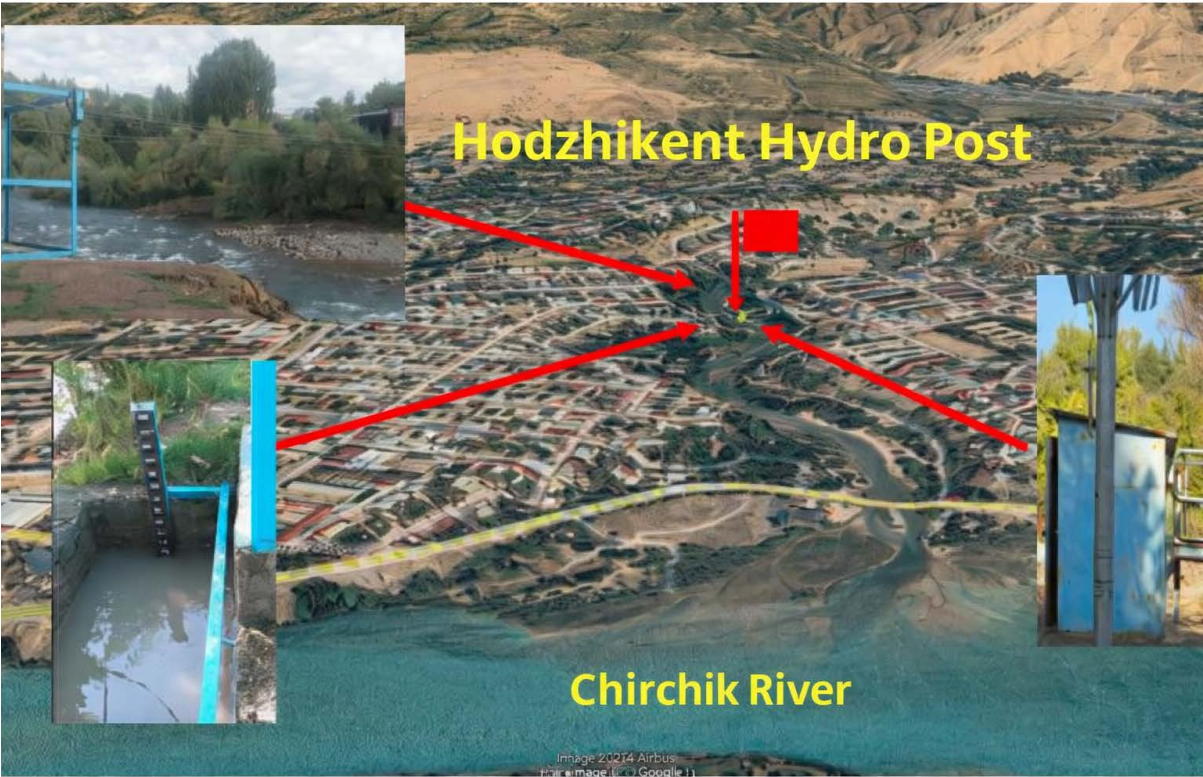
Ugam river

From the perspective of transboundary risks, the greatest threats in the Ugam River basin are floods, high water events, and mudflows. On the territory of Uzbekistan within the Ugam River basin, the following settlements in the Tashkent Region may be at risk of flooding during spring floods: Khumsan, Charvak, Gazalkent, and others. In addition, more than one hundred private houses, two recreational areas, 8 road and pedestrian bridges, as well as economic and infrastructure facilities—such as agricultural lands, irrigation systems, the Charvak Reservoir, and road and bridge infrastructure—are located within the potential flood zone.

From October 18 to 21, the experts conducted field studies of a section of the Ugam River, more than 5 km long, near the settlement of Khumsan using an unmanned aerial vehicle (UAV).



The length of the Ugam River within the territory of Uzbekistan, up to its confluence with the Chirchik River, exceeds 12 km. The hydrological post on the river is located almost at the point of confluence with the Chirchik River (the nearest post, "Hojikent," is situated 12 km from the border with Kazakhstan).



Currently, the Government of Uzbekistan is implementing a project to construct small hydropower plants (mini-HPPs) and a water intake structure (dam) to regulate and distribute the water flow between the HPP pressure pipeline and the main river channel.





Expert Recommendations

Taking into account the developed infrastructure of the region (availability of electricity and mobile network coverage) and the absence of a hydrological post, the experts proposed installing an automated monitoring station at the site of the dam under construction to improve hydrological monitoring and create a transboundary early warning system for hydrological hazards.

The station should transmit data in real time and be equipped with the following sensors:

- **Precipitation sensors (rain gauges / pluviometers)** – to measure the amount and intensity of precipitation;
- **Water level sensors** – to monitor river water levels;
- **Flow sensors (flow meters)** – to measure flow velocity and discharge volume;
- **Soil moisture sensors** – especially important for landslide prevention in mountainous areas;
- **Meteorological sensors**, including temperature sensors (for measuring air and water temperature) and anemometers (for measuring wind speed and direction);
- **Water pressure (hydrostatic) sensors** – for accurate measurement of changes in water level;
- **Water turbidity sensors** – to monitor the concentration of suspended particles, helping to detect the onset of mudflow processes;
- **Video surveillance cameras** – for visual monitoring of the condition of the river and its banks.



The installation of such a station in Kazakhstan and its subsequent integration with a station in Uzbekistan will enable prompt exchange of hydrological data and risk information, minimizing false alarms.

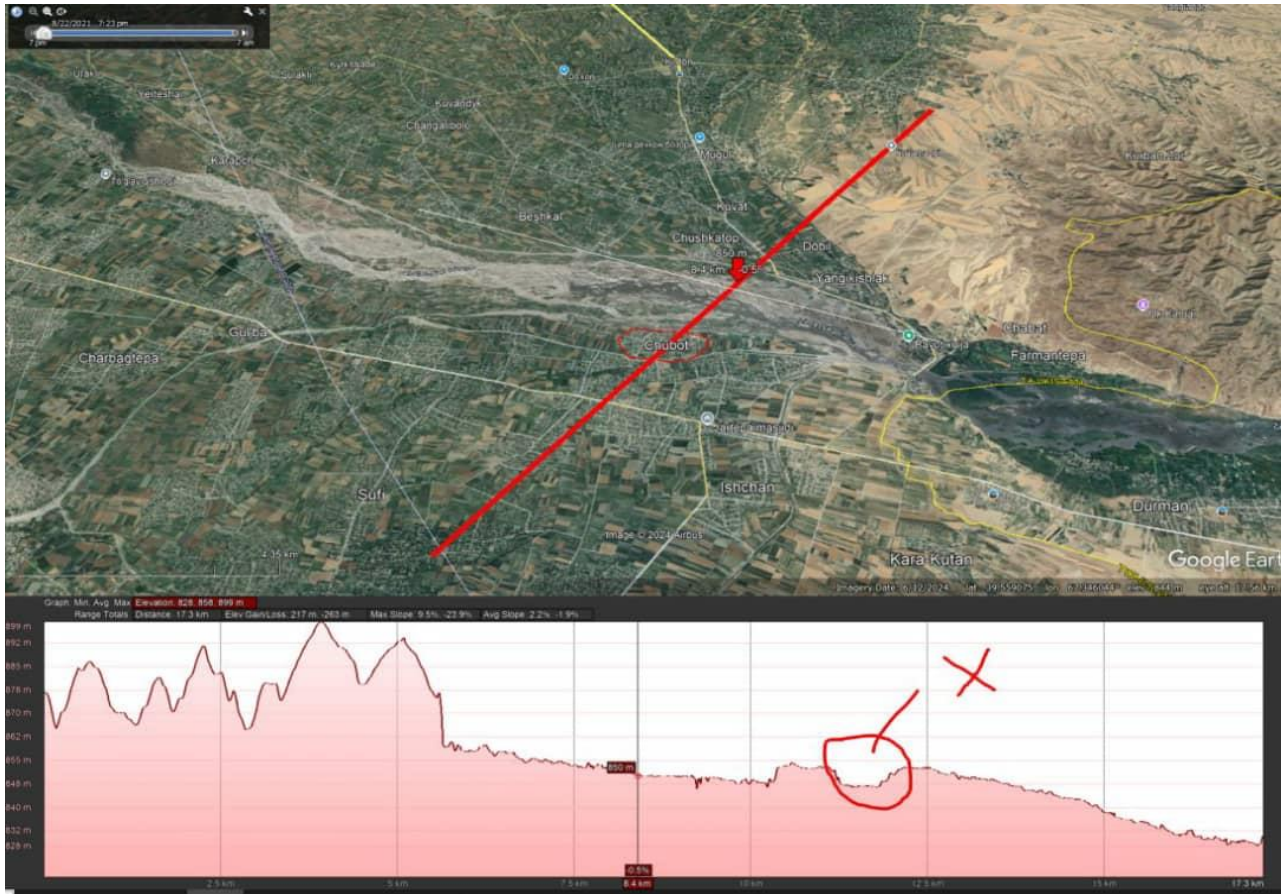
Experts also identified that settlements along the Ugam River are not equipped with siren and voice alert systems (SVA). To ensure effective public warning, it is proposed to install approximately 10–15 such systems along the Ugam River, taking into account its length, population density, and terrain. In addition, it is recommended to use mobile applications to notify the population about hydrological emergencies.

Zarafshan River

In the Zarafshan River basin, which extends across the territories of Tajikistan and Uzbekistan, several moraine lakes are located that pose a potential risk of outburst. In the event of a moraine dam failure, water from these lakes may trigger mudflows and floods, threatening populations and infrastructure located downstream.

In the section between the border with Tajikistan and the city of Samarkand, there are also risks of transboundary flooding that may affect urban infrastructure, including roads, buildings, and water supply systems. Small settlements located along the river depend on the Zarafshan for irrigation and water supply, and hydrological disasters may lead to significant damage.

From October 21 to 24, 2024, experts conducted field studies of a section of the Zarafshan River more than 6 km in length near the settlement of Chubot, located in a lowland area and highly vulnerable to hydrological risks.

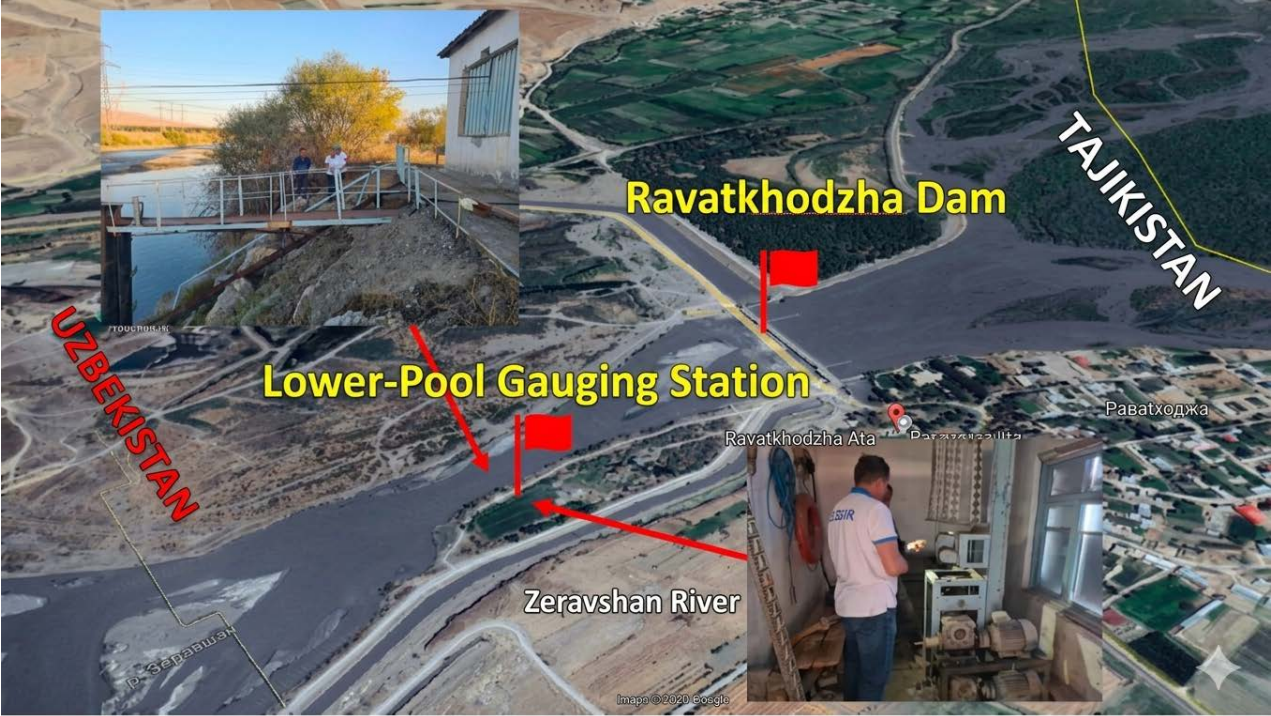


The existing hydrological post on the Zarafshan River is located downstream of the Ravatkhoja dam, at the border between Tajikistan and Uzbekistan. The station is equipped with the necessary monitoring instruments. However, part of the equipment requires modernization (for example, submersible depth recorders produced by the German company Seba Hydrometrie and hydrometric remote installations GR-64 developed in the USSR).



Expert Recommendations

For comprehensive monitoring of hydrological risks, experts recommend installing an automated station based on the existing post, which should be upgraded with sensors for water level, flow velocity, precipitation, water and air temperature, turbidity, soil moisture, as well as additional meteorological sensors.



Since the river section from the border with Tajikistan to Samarkand is densely populated (more than 15 settlements within 38 km), experts also proposed installing siren and voice

alert systems to warn the population about hydrological hazards. In addition, it is recommended to use mobile applications to inform the population about potential hydrological emergencies.



The recommendations developed within the framework of the GIZ project will be aimed at improving hydrological monitoring in transboundary river basins, enabling timely tracking and identification of hydrological threats. A key element of these recommendations will be the development and implementation of a transboundary early warning system, which will ensure prompt data exchange between countries and allow timely notification of potential hydrological risks, such as floods, high water events, mudflows, and sudden water level fluctuations.