"APPROVED"
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Concept
for the Establishment of a Regional Early Warning System for Hydrological Disasters in the Pilot Transboundary River Basins of the Central Asian Countries

Introduction

In Central Asia, there are tens of thousands of lakes, rivers, and reservoirs, some of which are classified as transboundary water resources. Nearly all such transboundary water resources are considered high-risk facilities for large-scale and cross-border disasters.

A significant reduction in the risk of transboundary disasters at transboundary water management facilities can be achieved by strengthening the capacity for safe water resource management through the use of innovative information and communication technologies, including the establishment of an effective regional early warning system.

This **Concept** serves as the foundation for developing a pilot model of transboundary monitoring, a geoinformation platform, and an integrated early warning system in the basins of the Ugam, Zeravshan, and Amu Darya rivers, as well as other rivers selected by government authorities of the Central Asian countries as pilot river sites within the GIZ project *"Climate Risk Management in Central Asia."*

Objectives

- Establish a pilot model for transboundary data exchange among the Central Asian countries;
- Modernize hydrological monitoring systems in pilot river basins;
- Develop and implement a unified regional geoinformation platform (GIS);
- Enhance the level of preparedness and cooperation among the countries of the region in case of hydrological disasters.

System Components

1. Improvement of Hydrometeorological Monitoring Systems and Development of a Pilot Model of Transboundary Monitoring

This component provides for the installation of automated stations at existing hydrological posts equipped with:

- Sensors for precipitation, water level, and discharge;
- Meteorological and soil sensors;
- Video surveillance systems;
- Satellite communication and computer equipment.

Under the pilot model, paired automated stations are installed on both sides of the border for each transboundary river and are integrated with each other. This ensures:

- Synchronized data collection and verification;
- Improved forecasting accuracy;
- Minimization of false alarms;
- Strengthened transboundary cooperation.

2. Regional Geoinformation Platform

(Based at the Center for Emergency Situations and Disaster Risk Reduction)

The automated stations transmit data in real time to a unified geoinformation platform hosted on the CESDRR server infrastructure, equipped with an access control system according to user authorization levels.

Platform functions:

- Centralized access to monitoring information;
- Visualization of the current hydrological situation;
- Analytical and forecasting support;
- Strengthening trust and transparency among stakeholders.

3. Hydrological Modelling System

The unified regional hydrological monitoring system using the *MODSNOW* tool aims to achieve the following:

- Real-time flood and inundation forecasting;
- Calculation of extreme event scenarios;
- Monitoring of glacial lake outburst flood (GLOF) risks;
- Drought assessment and decision-making support.

Key advantages include the use of harmonized models, standardized input data, and algorithms, which significantly increase the accuracy and reliability of forecasts.

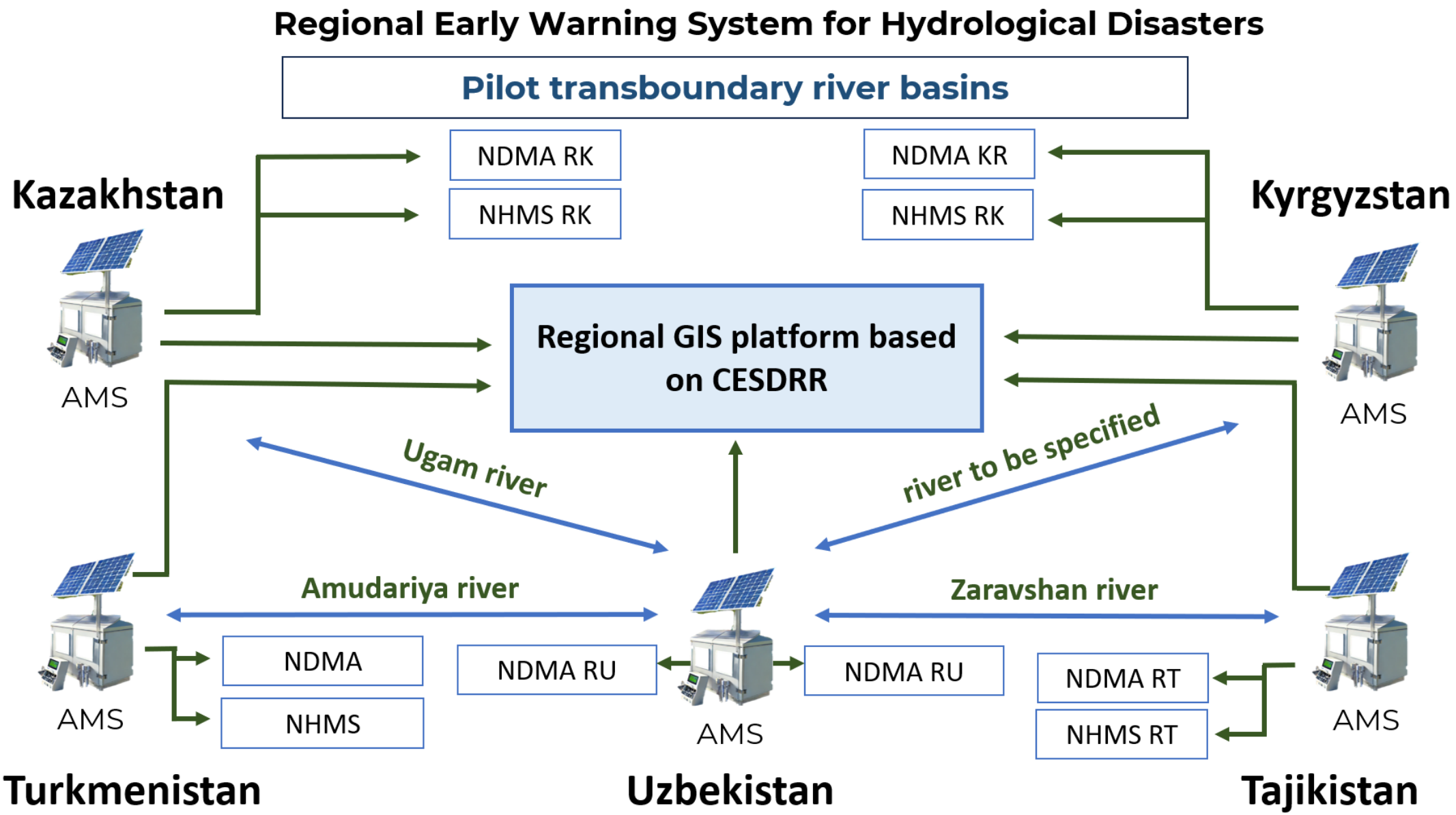
4. Early Warning System

Measures include:

- Installation of additional siren-voice devices;
- Use of mobile applications for public alerting;
- Support for rapid intergovernmental information exchange.

The establishment of a **Regional Early Warning System for Hydrological Disasters** in the pilot transboundary river basins of the Central Asian countries will allow for testing and refinement of key technical solutions and institutional mechanisms necessary for further regional scaling.

Overall, the implementation of this initiative will ensure timely detection and monitoring of hydrological threats, enhance the preparedness of the population and emergency services, strengthen interstate coordination, create a sustainable transboundary monitoring system, and improve forecast accuracy — all contributing to a significant reduction in the damage caused by floods, inundations, and droughts.


Regional Early Warning System for Hydrological Disasters
Pilot transboundary river basins
Kazakhstan
NDMA RK
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NHMS RK
Kyrgyzstan
AMS
Regional GIS platform based on CESDRR
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Ugam river
river to be specified
Amudariya river
Zaravshan river
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