ANNEX B TERMS OF REFERENCE
Title: Development of a data management Information WMIS (Water Management Information System) to Monitor the Quality of Drinking Water in the Republic of Karakalpakstan

1.   BACKGROUND:

The Republic of Karakalpakstan faces critical water security challenges exacerbated by the shrinking of the Aral Sea, resulting in desertification and ecological degradation. Over 37% of the population, and almost 50% of rural communities, lack centralized water supply systems. The "Aralkum" desert generates over 75 million tons of dust and salts annually, contributing to high concentrations of pollutants in water sources. According to studies, more than 60% of water samples from the region fail to meet chemical standards, and 20% do not meet bacteriological safety norms. This situation is linked to adverse health outcomes, including high prevalence rates of anemia, respiratory illnesses, and tuberculosis.

The Multi-Partner Human Security Trust Fund (MPHSTF) identified key barriers to addressing water safety, including limited infrastructure for water quality testing, lack of reliable data management systems, and insufficient capacity among local authorities for evidence-based interventions.

UNICEF, through its climate-resilient WASH programming in Karakalpakstan, aims to strengthen systems for monitoring drinking water quality as part of broader efforts to enhance health outcomes and climate resilience. The project proposal, "Enhancing Climate-Resilient and Safe Water, Sanitation, Hygiene, and Health Services for the Most Affected Communities in Four Districts of Karakalpakstan," highlights the need for a comprehensive data management system to enable real-time monitoring and improve decision-making. The initiative aligns with the goals of Sustainable Development Goals (SDG) 6 and 13 and builds on previous investments in the region. Specific to this activity, the project emphasizes:
- Strengthening water quality monitoring systems in collaboration with the Karakalpakstan Board of the Committee for Sanitary Epidemiological Wellbeing and Public Health.
- Developing a centralized, digital data management platform to streamline the collection, analysis, and reporting of water quality data.
- Enhancing the ability of local governments and mahallas to implement data-driven interventions to address drinking water quality issues.

2.   PURPOSE:
The purpose of this ToR is to outline the objectives, scope, and expected deliverables for the development and implementation of a **Water Management Information System (WMIS)** in the Republic of Karakalpakstan. This initiative aims to strengthen the capacity of local authorities, communities, and stakeholders to monitor and address the quality of drinking water in real-time.

The WMIS will serve as a centralized digital platform for:
- Collecting, storing, and analyzing water quality data.
- Supporting evidence-based decision-making to address health and ecological challenges.
- Enhancing climate resilience through effective water resource management.

By providing clear guidance on the technical and operational requirements of the system, the ToR ensures a structured approach to addressing water safety challenges in Karakalpakstan, contributing to improved public health outcomes and the achievement of Sustainable Development Goals (SDGs).

3.   MAIN OBJECTIVES:
1.   **Design and Implementation of a Centralized WMIS**

Develop a robust, scalable, and user-friendly **Water Management Information System (WMIS)** to enable real-time monitoring and reporting of drinking water quality across the Republic of Karakalpakstan.

2.   **Integration of Advanced Digital Technologies**

Utilize advanced digital tools, including geospatial analysis, automated data processing, and interactive dashboards, to enhance the accuracy and efficiency of water quality monitoring.

3.   **Customization for Local Needs**

Tailor the WMIS to meet the specific socio-environmental and technical needs of Karakalpakstan, ensuring compatibility with existing water management systems and infrastructure.

4.   **Capacity Building for Local Stakeholders**

Equip local government authorities, mahallas, and public health committees with the knowledge and tools to operate, maintain, and leverage the WMIS for evidence-based interventions and policymaking.

5.   **Support Climate Resilience and SDG Alignment**

Contribute to achieving **SDG 6 (Clean Water and Sanitation)** and **SDG 13 (Climate Action)** by enhancing the region's ability to monitor and mitigate water-related health and environmental risks effectively.

6.   **Sustainability and Scalability**

Ensure the WMIS is designed for long-term sustainability, with capabilities for expansion to other regions and integration of additional functionalities as needed in the future.

7. Development and transfer of knowledge and technology to Sanitary-Epidemiological welfare and public health Committee or Uzinfocom.

8. Post deployment support to address identified system shortcomings in the first 12 month after acceptance of final version.

The selected company will be responsible to accomplish the following tasks in close collaboration with **UNICEF** Uzbekistan Health section and **the Committee for Sanitary Epidemiological Wellbeing and Public Health of the Republic of Uzbekistan, Uzinfocom and the Board of the Committee for Sanitary Epidemiological Wellbeing and Public Health in the Republic of Karakalpakstan**:

4.   DEVELOPMENT OF WMIS

The Republic of Karakalpakstan, located in the ecologically fragile region near the Aral Sea, faces severe challenges in ensuring access to safe and clean drinking water. Decades of environmental degradation, desertification, and pollution have rendered many water sources unsafe for consumption, with more than **60% of tested water samples** failing to meet chemical standards and **20% failing bacteriological safety norms**. Rural communities, where nearly half of the population lacks access to centralized water supply systems, are particularly vulnerable.

The **Water Management Information System (WMIS)** is envisioned as a transformative digital platform to address these challenges by streamlining water quality monitoring, enabling real-time data-driven decision-making, and enhancing the resilience of water resources to climate-related and anthropogenic pressures.

Rationale for the WMIS Development

Water quality management in Karakalpakstan is currently hindered by several critical issues:
•   **Fragmented Data Systems:** Existing water quality data is scattered, poorly integrated, and often outdated, making it difficult to respond promptly to emerging risks.
•   **Limited Monitoring Infrastructure:** There is insufficient access to modern tools and technologies for systematic water quality monitoring.
•   **Capacity Gaps:** Local authorities and community organizations lack the technical expertise to analyze data and implement effective interventions.

• **Health and Environmental Risks:** Polluted water sources contribute to widespread health problems, including anemia, respiratory diseases, and waterborne infections.

The WMIS will address these gaps by providing a centralized, efficient, and accessible system for managing water-related data and improving collaboration between stakeholders.

1. Hold workshops with the stakeholders (Ministry of Health, Regional Health Departments, Central office of the Committee for Sanitary Epidemiological Wellbeing and Public Health of the Republic of Uzbekistan (Sanepidcom), their Board in the Republic of Karakalpakstan) and prepare a detailed Software Requirements Specification (SRS).
2. Prepare and approve the detailed requirements specification for all necessary hardware infrastructure.
3. Defining data sets from other Sanepidcom in the Republic of Karakalpakstan Systems needed for the implementation of electronic data exchange.
4. Preparation of the detailed plan for software development and implementation of the System.
5. Preparation of the final set of priority functional requirements that will be configured for the pilot use of the System.

5. FEATURES AND FUNCTIONALITIES OF THE WMIS

1. **Centralized Data Platform**
- A unified repository to collect, store, and manage all water quality data across Karakalpakstan.
- Supports integration of data from laboratory tests, field sensors, and satellite imagery.
2. **IoT-Based Data Collection**
- Deployment of IoT-enabled water quality sensors at key locations to provide continuous, real-time monitoring of critical parameters such as pH, salinity, turbidity, and microbial contamination.
- Remote access to sensor data, reducing the need for manual testing in hard-to-reach areas.
3. **Real-Time Alert Systems**
- Automated alerts for deviations from safety thresholds, enabling rapid response to contamination events.
- Notification systems for authorities, health officials, and local communities via SMS and mobile applications.
4. **Geospatial Analysis**
- GIS-based mapping tools to visualize water quality trends and identify contamination hotspots.
- Spatial correlation analysis to understand the impact of environmental factors on water quality.
5. **Data Analytics and Predictive Modeling**
- Advanced analytics for trend detection, root cause analysis, and forecasting of water quality deterioration.
- Machine learning models to predict contamination risks based on historical data and environmental variables.
6. **User-Friendly Interfaces**
- Role-specific dashboards for different stakeholders, including policymakers, health officers, and community leaders.
- Mobile and web-based access for enhanced usability across diverse user groups.
7. **Customizable Reporting Tools**
- Generate automated and customizable reports to support decision-making and compliance with regulatory standards.
- Shareable insights to facilitate collaboration between local governments, NGOs, and international organizations.

6. STRATEGIC GOALS OF THE WMIS DEVELOPMENT

1. **Improved Monitoring and Decision-Making**
By providing real-time and reliable data, the WMIS will enable evidence-based interventions to mitigate water quality risks and enhance resource allocation.

2. **Empowering Local Communities**

The system will equip local mahallas and authorities with actionable insights, empowering them to address water safety issues proactively.

3. **Climate Resilience**

The WMIS aligns with climate-resilient WASH programming, helping the region adapt to and mitigate the impacts of climate change on water resources.

4. **Sustainable Development**

The initiative supports national and global efforts to achieve **Sustainable Development Goal (SDG) 6**, ensuring availability and sustainable management of water and sanitation, and **SDG 13**, taking urgent action to combat climate change.

7. DEVELOPMENT AND TRANSFER OF KNOWLEDGE AND TECHNOLOGY TO REPUBLIC SES UZBEKISTAN AND UZINFOCOM.

Create of video tutorials how to work in the system in Uzbek, Karakalpak and Russian languages, as well as developing training materials is an important aspect of implementation of an WMIS in Uzbekistan.

Training of end users on developed WMIS system will positively impact on adoption rate. It is requested that the Company will complete following tasks within this pillar:

- Develop detailed training program, including the training materials for target groups. The program and training materials should be approved by Project Board and should be in Uzbek and Russian languages.

- Conduct separate trainings for IT staff for which curriculum should include detailed architecture, functionality and the maintenance of the system.

8. POST DEPLOYMENT SUPPORT TO ADDRESS IDENTIFIED SYSTEM SHORTCOMINGS IN THE FIRST 12 MONTH AFTER ACCEPTANCE OF FINAL VERSION.

Post deployment support phase starts after the Final Acceptance is signed by UNICEF and will last for period of 12 months. This phase includes technical support to address any shortcomings related to system functionalities and features.

The Company is required to complete following tasks within this pillar:
- Solve technical all line support of functional problems related to the System for a period of 12 months after the acceptance of the operational version.
- Deploy any available updated and upgrades to the System, including DBMS and other third-party software deployed as part of WMIS solution.

9. TIMELINE

Start date of the assignment: January 2025
End date of the assignment: April 2025

Table 1. Timeframe & Deliverables

PHASE	TASK	DELIVERABLES	DURATION	PAYMENT
Phase 1	Design of the System and work plan	Deliverable 1.1. Develop a system based on the development of the Terms of Reference. Make Business analyze of WMIS.	45 Calendar days	40% payment of the total contract amount
		Deliverable 1.2. Write SRS&SDS based on business analysis and write ToR with Government standard (O`zDsT 1986:2018/ O`zDSt 1985:2018/ ISO/IEC 27002) and take agreement from Ministry		

		Digitalization and State Unitary Enterprise "Cybersecurity Center"		
		Deliverable 1.3. Detailed specifications of the required virtual servers and other needed hardware infrastructure.		
		Deliverable 1.4. Detailed implementation plan of the WMIS.		
		Deliverable 1.5. Project Management. Monthly Status Reports.		
		Deliverable 1.6. The Minutes with key findings of Weekly online meetings between work group/meeting to the needs		
Phase 2	System development/configuration of the Pilot version	Deliverable 2.1. Established development and test environments on Sanepidcom or Uzinfocom cloud infrastructure.	30 Calendar days	25% payment of the total contract amount
		Deliverable 2.2. Developed and configured WMIS priority functionalities (Pilot version) according to the prepared detailed requirements specification.		
		Deliverable 2.3. The pilot version is integrated with ready-made other Sanepidcom systems and relevant external information systems		
		Deliverable 2.4. Initial versions of Training materials: Training curricula;		
		Deliverable 2.5. Initial version of the User's Manuals		
		Deliverable 2.6. Development on the preferred Content Management System (CMS)		
Phase 3	Piloting phase and final Development/Adjustments/Users' Training and Quality Assurance	Deliverable 3.1. Report on Piloting Period, which includes discovered bugs, concerns, proposals on how to fix them and conclusions	15 Calendar days	25% payment of the total contract amount
		Deliverable 3.2. Report on corrective changes of the software as a result of piloting		
		Deliverable 3.3. Report on implemented functionalities (all functionalities according to ToR document), including compiled and documented source-code must give to Sanepidcom in the Republic of Karakalpakstan and Uzinfocom		
		Deliverable 3.4. Final versions of User's Manual and Administrator's manual, Training presentations for IT staff from Sanepidcom in the Republic of Karakalpakstan and Uzinfocom		
		Deliverable 3.5: Testing scenarios		
		Deliverable 3.6: Reports on performed testing (functional testing, performance (Load and Stress) testing and Security Testing).		

Phase 4	Support and maintenance	Deliverable 4.1: Report on provided support and maintenance services during an agreed period of time	365 Calendar days upon completion of Phase 3	10% retention payment of the total contract amount
Total		19 Deliverables	90 Calendar days (Without support period time)	100% Payment

10. MANAGEMENT:

The developer company will work with UNICEF stuff and under direct supervision of Health section Chief and in close collaboration with Wash Officer and IT Specialist as well as with identified national partners. UNICEF has right to appoint the independent IT specialist for quality monitoring and project implementation.

11. RESOURCE REQUIREMENTS:

This assignment will be funded through OR/SC 240397, the MPHSTF funded UNICEF "Enhancing Climate-Resilient and Safe Water, Sanitation, Hygiene, and Health Services for the Most Affected Communities in Four Districts of Karakalpakstan".

12. REQUIRED QUALIFICATIONS AND AREAS OF EXPERTISE (ALL MANDATORY):

The Contractor must satisfy the following requirements:

- Mandatory minimum 5 years of experience in the field of design, development and implementation of complex software solutions for public authorities.
- Successful experience as prime contractor in execution of at least two successful projects (contracts) of complexity comparable to proposed contract within the last 3 (three) years, were the beneficiaries of the projects are public authorities;
- The Contractor shall provide at least 4 (Four) customer signed project reference of national and international successfully implemented ICT projects designed for central public authorities.
- The Contractor needs to have a local office in Uzbekistan;
- The Contractor must have developed any management information system in the health sector and should be able to demonstrate the software that was successfully deployed in any country.

The Contractor and each partner in case of JV shall demonstrate his strong financial position and long-term profitability by providing audited balance sheets and profit and loss statements for the last three years.

13. KEY PERSONNEL

The minimum required experience of proposed professional staff to be employed by the Contractor is at least for 5 years. Other requirements are specified in the following table. Contractor team will include at least the following key members: a team leader and members of the team, based on the most appropriate formula, proper for the assignment. The minimum qualification requirements for the key staff members are described at Annex 1

14. SELECTION PROCESS

The selection of the Contractor will be based on evaluation of technical and financial proposals. The scoring ratio between technical and financial proposals is 70/30 respectively. The following criteria will be used for technical assessment of the application:

1. Bidder qualification, capacity and experience (300 points)
2. Proposed methodology, Approach and Implementation plan (300 points)
3. Management structure and Key Personnel (200 points)
4. Demonstration of any successfully developed and deployed web application (200 points)

Details of criteria for technical evaluation are provided in the Annex 1 below. In summary winner should obtain up to 1000 points which will be equal to 70% allocated to technical proposal.

Financial Evaluation – 30 points

Total score allocated for the financial evaluation is 30 points. Maximum points will be given to the technically qualified bidder offering the lowest price. All other financial proposals will receive points in reverse proportion to the lowest price submitted; e.g.:

Score for price proposal for Bidder X = Maximum score for financial proposal (30) * Price of lowest priced
proposal Price of proposal X

15.   PROCEDURES AND WORKING CONDITIONS

The Contractor is expected to work in close cooperation with the UNICEF and MOH. All travel expenses occurred during implementation of the contract should be considered as a part of financial proposal and no additional payment from UNICEF is expected. UNICEF undertakes no liability for taxes, duty or other contribution payable by the Contractor on payments made under this contract.

16.   SUBMISSION

Legal entities interested in participating shall submit their proposals in response to the tender documents as published by UNICEF not later than 14 December 2024. Applicant should submit the technical and financial proposals (need to be locked by password) in rar files, containing the following:

-        Detailed description of the enterprise (experience, human resources, specialized management and technical capacities, etc.);

-        Copy of registration documents;

-        Certificate confirming that the company has no arrears to the budget;

-        The portfolio of the company showing similar projects;

-        References of beneficiaries of the company for the last 3 years;

-        CVs of key personnel involved in the project;

-        Brief description of similar information solutions or ICT solutions;

-        Detailed technical description of the proposed software solution, including hardware operational restrictions, estimation of activities and their duration;

-        Guarantee period and technical assistance period;

-        Detailed financial proposal;

-        Other relevant documents.

Files should be submitted by the closing date in the tender to the tashkentsupply@unicef.org

17.   RESERVATIONS

UNICEF reserves the right to withhold all or a portion of payment if performance is unsatisfactory, if deliverable(s) incomplete, not finalized or for failure to meet deadlines. UNICEF will reserve copy right of all developed materials and own primary data collected through this assignment. The materials cannot be published or disseminated without prior written permission of UNICEF. UNICEF will be free to adapt and modify them in the future. The contractor must respect the confidentiality of the information handled during the assignment. Documents and information provided must be used only for the tasks related to these terms of reference.

Annex 1
CRITERIA FOR TECHNICAL EVALUATION

		SUMMARY OF TECHNICAL PROPOSAL EVALUATION FORMS POINTS OBTAINABLE		
			Minimum (required)	Maximum
1		Bidder's qualification, capacity and experience	150	300
2		Proposed Methodology, Approach and Implementation Plan	100	200
3		Management Structure and Key Personnel	100	200
4		Demonstration of any successfully developed and deployed web application	150	300
		Total	**500**	**1000**
		SECTION 1. BIDDER'S QUALIFICATION, CAPACITY AND EXPERIENCE		
1.1		Successful experiences as prime contractor in execution of at least two successful projects (contracts) of a complexity comparable to proposed contract;	35	70
1.2		Successful experiences as prime contractor in execution of successful projects (contracts) of a complexity comparable to proposed contract, more than 2 projects (by 15 points per each project)	15	30
1.3		Three years of experience in the field of design, development and implementation of complex software solutions for public authorities (by 20 points per each year)	30	60
1.4		Experience in the field of design, development and implementation of complex software solutions for public authorities more than three years (by 15 points per each year)	15	30
1.5		Two reference letters confirming successful completion of the project by the company as a prime contractor (by 25 points per each project)	25	50
1.6		Experience in the area of e-health/ICT in the education field is considered as a strong asset (by 30 points per each project)	30	60
		Total Section 1	**150**	**300**
		SECTION 2. PROPOSED METHODOLOGY, APPROACH AND IMPLEMENTATION PLAN		
2.1		Understanding of the requirement: Have the important aspects of the task been addressed in sufficient detail and reflected properly in the proposal	20	40
2.2		Offeror's approach and methodology meets or exceeds the requirements of the Terms of Reference	20	40
2.3		Presence of the detailed plan on how the different service elements shall be organized, controlled and delivered	15	30
2.4		Presence of the performance monitoring and evaluation mechanisms and tools; how they shall be adopted and used for a specific requirement	15	30
2.5		The activities in the proposed preliminary implementation plan are sequenced logically and time bound	15	30
2.6		Presence of the clear structure in the proposal addressing needs for planning, implementing, monitoring and sustainability measures	15	30
		Total Section 2	**100**	**200**
		SECTION 3. MANAGEMENT STRUCTURE AND KEY PERSONNEL		
3.1		**Project Manager:**	**15**	**30**
		At least 5 years of overall professional experience in the IT field	5	10
		Specific professional experience proved through participating in at least one similar project for implementation of an integrated information System, in which he/she held a position of Project Manager.	2,5	5
		Ability to speak, write and read Uzbek and/or Russian language is an advantage;	2,5	5
		Ability to speak, write and read in English	2,5	5

	University degree in areas such as computer sciences, engineering, and telecommunications or related;	2,5	5
3.2.	**Lead Business Analyst**	*15*	*30*
	At least 5 years of experience in the field of IT Business Analysis, user requirements elicitation;	*5*	*10*
	Specific professional experience proved through participating in at least one similar project for implementation of an integrated information System, in which he/she held a position of Lead Business Analyst;	*5*	*10*
	Ability to speak, write and read Uzbek/ Russian and English language is an advantage;	*2,5*	*5*
	University degree in areas such as computer sciences, engineering, and telecommunications or related;	*2,5*	*5*
3.3.	**Senior Software Development Engineer**	*15*	*30*
	At least 5 years of overall professional experience in the IT field.	*5*	*10*
	Specific professional experience proved through participating in at least one similar project, for implementation of an integrated information System, in which he/she held a position of senior Technical Leader.	*2,5*	*5*
	Ability to speak, write and read Uzbek and/or Russian language is an advantage;	*2,5*	*5*
	Ability to speak, write and read in English	*2,5*	*5*
	University degree in areas such as computer sciences, engineering, and telecommunications or related;	*2,5*	*5*
3.4.	**Middle Software Development Engineer**	12,5	25
	At least 3 years of overall professional experience in the IT field.	5	10
	Specific professional experience proved through participating in at least one similar project, for implementation of an integrated information System, in which he/she held a position of middle Technical Leader.	2,5	5
	Ability to speak, write and read Uzbek and/or Russian language is an advantage;	2,5	5
	University degree in areas such as computer sciences, engineering, and telecommunications or related;	2,5	5
3.5	**Database Developer**	15	30
	At least 5 years of experience in the field of Software Development.	5	10
	Specific professional experience proved through participating in at least one similar project, for implementation of an integrated information System, in which he/she held a position of Database Developer Designer.	2,5	5
	Certificate recognized at international level, proving knowledge regarding database administration/design/development is an asset;	2,5	5
	Ability to speak, write and read Uzbek and/or Russian language is an advantage;	2,5	5
	University degree in areas such as computer sciences, engineering, and telecommunications or related;	2,5	5
3.6.	**Software Tester Engineer**	15	30
	At least 3 years of experience in the field of Software Development	5	10
	Specific professional experience proved through participating in at least one similar project, for implementation of an integrated information System, in which he/she held a position of Technical Leader.	5	10
	Ability to speak, write and read English, Uzbek and/or Russian language is an advantage;	2,5	5
	University degree in areas such as computer sciences, engineering, and telecommunications or related;	2,5	5
3.7.	**Visual Designer**	12,5	25

		At least 3 years of experience in the field of Software Development	5	10
		Specific professional experience proved through participating in at least one similar project, for implementation of an integrated information System, in which he/she held a position of visual designer	2,5	5
		Ability to speak, write and read English, Uzbek and/or Russian language is an advantage;	2,5	5
		University degree in areas such as computer sciences, engineering, and telecommunications or related;	2,5	5
		Total Section 3	**100**	**200**
		SECTION 4. DEMONSTRATION OF ANY SUCCESSFULLY DEVELOPED AND DEPLOYED WEB APPLICATION		
4.1		The proposed software solution complies with technical architecture requirements.	40	80
4.2		The proposed software solution complies with functional requirements.	50	100
4.3		The demonstrated software corresponds to the main functional and technical requirements of the requested system	60	120
		Total Section 4	**150**	**300**
		TOTAL	**500**	**1000**

Annex 2
CHECK-LIST OF SUBMITTED DOCUMENTS

№	Required documents	Yes/No
1	Detailed description of the enterprise (experience, human resources, specialized management and technical capacities, etc.)	
2	Copy of registration documents	
3	Certificate confirming that the company has no arrears to the budget	
4	Latest Audited Financial Statement (Income Statement and Balance Sheet) including Auditor's Report for the past two years	
6	The portfolio of the company showing similar projects	
7	CVs of key personnel involved in the project	
8	Brief description of similar information solutions or ICT solutions;	
9	Detailed technical description of the proposed software solution, including hardware operational restrictions, estimation of activities and their duration;	
10	Other relevant documents.	
11	Detailed financial proposal (in a separate email/envelope);	
12	Signed Check-list of submitted documents (Annex 2).	

Note: Please consider that not providing the above documents will affect the company's evaluation and may lead to the rejection of the Bid.

Therefore, each applicant must study the list of required documents before making its proposals. Any such deletion or modification may lead to the rejection of the Bid.

Date:	Signature:
Name: Stamp:	Position: