**Terms of Reference (ToR)**

Cold Climate Sanitation Expert

**Background**

Sanitation in cold climate regions presents unique technical, operational, and environmental challenges that require specialized solutions to ensure sustainable wastewater management. Traditional sanitation systems often fail under extreme temperatures, permafrost conditions, and prolonged ice cover, leading to environmental contamination and public health risks. Adequate wastewater treatment in such conditions requires innovative, energy-efficient, and scalable models tailored to local climatic and infrastructural realities.

In response to these challenges, UNICEF seeks an expert to support developing resilient cold climate sanitation solutions in Ukraine, including case studies of best practices and scalable models such as containerized wastewater treatment systems (CWTS) and waste stabilization ponds (WSPs). The expert will support ongoing research and implementation efforts, ensuring that sanitation technologies are optimized for efficiency, affordability, and sustainability in extreme weather conditions. This role is critical in advancing evidence-based approaches to sanitation in cold climates, strengthening resilience in water and sanitation services, and integrating cold climate sanitation into broader environmental and public health strategies.

**Key Responsibilities**

The consultant will be responsible for providing technical, analytical, and strategic expertise in cold climate sanitation, including:

1. **Technical Research and Analysis**
   * Conduct a comprehensive review of existing sanitation solutions in cold climates, identifying strengths, challenges, and areas for improvement.
   * Develop case studies based on best practices, including CWTS and WSPs adapted for extreme weather conditions.
   * Assess energy efficiency, cost-effectiveness, and environmental impact of various sanitation technologies in cold climate regions.
2. **Development of Scalable Models for Cold Climate Sanitation**
   * Design scalable, cost-effective models for WSPs tailored to cold climates, ensuring they meet regulatory standards and operational feasibility.
   * Provide recommendations for design improvements in existing sanitation technologies, considering insulation, heating, and energy optimization.
   * Support the formulation of technical guidelines and best practices for implementing cold-adapted sanitation systems.
3. **Stakeholder Engagement and Capacity Building**
   * Collaborate with government agencies, utilities, and WASH sector stakeholders to align sanitation solutions with policy frameworks and local needs.
   * Develop and deliver training sessions, technical workshops, and knowledge-sharing materials for practitioners and decision-makers.
   * Contribute to the integration of climate resilience strategies into sanitation planning and infrastructure development.
4. **Policy and Regulatory Support**
   * Provide technical input on regulatory frameworks related to sanitation in extreme climates, ensuring compliance with international and national environmental standards.
   * Support the development of investment cases and policy recommendations to promote sustainable, climate-resilient sanitation infrastructure.
5. **Monitoring, Evaluation, and Knowledge Dissemination**
   * Establish performance indicators and monitoring frameworks to assess the long-term functionality of sanitation systems in cold climates.
   * Document findings in technical reports, policy briefs, and case study publications to support knowledge-sharing and advocacy.
   * Contribute to global WASH sector discussions on sanitation in cold climates by engaging in professional forums and conferences.

**Expected Deliverables**

1. **Technical Implementation Support**
   * Lead the implementation of cold climate sanitation projects in Ukraine based on comprehensive analysis of containerized wastewater treatment systems
   * Develop technical specifications and operational guidelines for selected sanitation technologies
   * Provide engineering oversight and quality assurance during implementation phases
2. **Technical Research and Assessment Report**
   * Comprehensive review of existing cold climate sanitation solutions with comparative analysis
   * Case studies documenting best practices in CWTS and WSPs adapted for extreme conditions
   * Energy efficiency and environmental impact assessments of implemented technologies
3. **Scalable Models and Design Guidelines**
   * Detailed specifications for cold-adapted WSP models meeting regulatory requirements
   * Technical recommendations for design improvements focused on insulation, heating, and energy optimization
   * Implementation roadmaps for different community scales and climatic conditions
4. **Capacity Building and Knowledge Transfer Materials**
   * Training curriculum and materials for practitioners and local stakeholders
   * Workshop facilitation guides and technical presentation packages
   * Knowledge-sharing resources on climate-resilient sanitation approaches
5. **Policy and Regulatory Framework**
   * Technical input on regulatory compliance for extreme climate sanitation
   * Investment case templates and policy recommendations
   * Monitoring and evaluation frameworks with performance indicators
6. **On-Demand Technical Consultations**
   * Expert advisory support addressing emerging challenges
   * Technical guidance for operational issues
   * Policy and strategic recommendations as needed throughout project implementation

**Languages**

The post holder will have at least CEFR level B1 in the following languages:

* English
* Ukrainian/Russian will be an asset
* Another UN language is an asset

**Duration and Duty Station**

* **Starting date and duration of assignment**: As soon as possible for 3 months (with potential 3 month extension).
* **Duty Station**: Remote

**Qualifications and Experience**

The ideal candidate should have:

**Education**

* Advanced university degree in Environmental Engineering, Public Health, Sanitation Engineering, or a related field.

**Professional Experience**

* Minimum 8 years of experience in sanitation, wastewater management, or WASH-related projects.
* Proven expertise in designing, implementing, and evaluating sanitation systems adapted to cold climate conditions.
* Experience working with WASH sector stakeholders, government agencies, and international development organizations.
* Strong knowledge of regulatory and policy frameworks for sanitation and wastewater treatment.
* Familiarity with energy-efficient and decentralized wastewater treatment technologies (e.g., CWTS, WSPs, constructed wetlands).

**Skills and Competencies**

* Strong technical research and analytical skills, with the ability to synthesize complex information into practical recommendations.
* Excellent stakeholder engagement and capacity-building abilities.
* Proven experience in technical writing, training development, and report preparation.
* Ability to work independently and collaboratively in a multidisciplinary environment.

**Reporting and Supervision**

The consultant will work under the supervision of the chief of WASH at the UNICEF Ukraine Country Office and will coordinate closely with relevant government institutions, WASH sector partners, and project stakeholders.