Guidelines:

- This Request Submission Form should be completed by the organisation requesting technical assistance from the Climate Technology Centre & Network (CTCN) in collaboration with the National Designated Entity (NDE) of the country in question
- The Form must be signed by the NDE. Please see updated contact list of NDEs here: http://unfccc.int/ttclear/support/national-designated-entity.html
- The Form can be submitted as a Word file containing a digital signature or as a signed and scanned PDF file in combination with an un-signed Word file
- For requests submitted by multiple countries, all the NDEs of the respective countries shall sign identical Forms before official submission to the CTCN
- NDEs have the opportunity to submit CTCN requests in collaboration with National Designated Authorities (NDAs) for the Green Climate Fund (GCF) if targeting the GCF Readiness Programme.

Requesting country or countries:	Tajikistan
Request title:	Enhancing weather and climate data management Innovation in Tajikistan through an AI- and Observation-Based High-Resolution Data Management Platform
NDE	Sunatullo Pirov, Deputy Director, Agency for Hydrometeorology of CEP under the Government of the Republic of Tajikistan, 13/1 B-Gafurov str, Dushanbe city, pirov.snt@gmail.com, 992-88-808-8811.
Request Applicant:	Sunatullo Pirov, Deputy Director, Agency for Hydrometeorology of CEP under the Government of the Republic of Tajikistan, 13/1 B-Gafurov str, Dushanbe city, pirov.snt@gmail.com, 992-88-808-8811.

Climate objective:

- ☒ Adaptation to climate change
- ☐ Mitigation of climate change
- ☐ Combination of adaptation and mitigation of climate change

Geographical scope:

- ☐ Community level
- ☒ Sub-national
- ☐ National
- ☐ Multi-country

If the request is at a sub-national or multi-country level, please describe specific geographical areas (provinces, states, countries, regions, etc.).

Problem statement related to climate change (up to one page):

This section should answer the question "what is the problem?" Please summarize the problem related to climate change and/or the negative impacts of climate change in the country that the request aims to address.

Data Gaps and Limited Use of AI & Satellite Analytics Are Undermining Climate-Informed Water-Management in Tajikistan

Tajikistan's energy and food security depend on water that is generated in its high-mountain cryosphere and delivered to downstream valleys where most people live. Climate change is accelerating glacier retreat, altering seasonal precipitation, and amplifying the "too-much / too-little water" paradox: spring floods and summer shortages.

Tajikistan has lost 30% of its glacier area since 1930, with projections of another 15-20% loss by 2050. [1]This issue is compounded by average temperatures that have increased by 0.7-1.9C in only the past decade. and more frequent +40C days. [2]Further, the region suffers from increasing water stress, receiving only 1,400 m³/person/year due to regional allocations, below the sufficiency threshold of 1,700 m³. [3] However, over 70% of natural disasters are caused by water-related risks, costing up to 1.4% of the GDP yearly. [4]

To manage increasing hydrological volatility, Tajikistan urgently needs fine-scale, near-real-time water data. Yet, national agencies still rely heavily on sparse surface point observations, lacking access to comprehensive, radar- and satellite-based precipitation maps that cover the entire country. This limits their ability to allocate water resources, manage reservoirs effectively, or protect communities from extreme weather events.

Despite recent efforts to expand the installation of automated weather stations, Tajikistan still has limited coverage, leaving mountainous and rural regions critically under-observed.[5] These data gaps strain the national Agency for Hydrometeorology's ability to deliver timely and accurate forecasts. Tajik hydromet, responsible for supporting data-driven scientific decision-making, continues to face chronic institutional limitations—such as budget constraints, infrastructure requiring advanced and innovative technologies, and low staff retention—that undermine its analytical capacity and erode stakeholder confidence, particularly in high-risk areas like the Pyanj River Basin.[6]

International partners like CARITAS Switzerland and MeteoSwiss have helped install low-cost weather stations and transfer early warning expertise. To effectively utilize the data collected from the more than 300 installed sites, a robust data quality management system will be essential. Moreover, these datasets could also serve as a valuable resource for validating satellite-based precipitation products. Without

[1] Tajhydro. (2024, April 22). *Glacier Melting in Tajikistan – A Tangible Crisis*. Retrieved from https://tajhydro.tj/2024/04/22/glacier-melting-in-tajikistan

[2] Government of the Republic of Tajikistan. (2024, November 29). *National Water Strategy of the Republic of Tajikistan for the Period up to 2040*. Approved by Decree №627. p.5

[3] ibid, p.2

[4] ibid, 8.

[5] MeteoSwiss. (2025). WWCS Tajikistan. Federal Office of Meteorology and Climatology. Retrieved from https://www.meteoswiss.admin.ch/about-us/research-and-cooperation/projects/en/2025/wwcs-tajikistan.html

[6] Asian Development Bank. (2018). Funding proposal FP075: Institutional Development of the State Agency for Hydrometeorology of Tajikistan. Green Climate Fund. https://www.greenclimate.fund/sites/default/files/document/funding-proposal-fp075-adb-tajikistan.pdf

targeted reform and modernization, the agency will remain unable to fulfil its public service obligations or contrivute effectively to disaster risk management and climate resilience in on of the county[7]

We have identified **four system gaps** that undermines resilience in the region:

1. **Missing eyes in the mountain:** Most weather stations lie far below glacier runoff zones.
2. **Under-used satellite observations**: Tajikistan lacks operational pipelines to ingest and apply satellite data (e.g., GPM, MSG/MTG).
3. **Lack of Capacity for AI-Driven weather and climate data management:** The absence of real-time, AI-enabled data monitoring systems, coupled with a lack of technical expertise and supporting infrastructure, hinders effective integration and application of these technologies
4. **Chronic underfunding**: Less than 1% of GDP is allocated to ecological resilience, limiting adaptation efforts.[8]

These information blind spots create **tangible risks**:

- **Climate analysis uncertainty:** limited-quality observations constrain reliable climate projections; hydropower, which provides over 90% of electricity,[9] faces instability from mismanaged wet/dry cycles; outdated irrigation calendars leave over 900 hectares of cropland vulnerable; and rapidly growing glacier lakes like Sarez threaten millions without continuous monitoring.
- **Governance coordination challenges:** Institutions responsible for water management rely on divergent and incomplete data for decision-making. As climate-related pressures intensify, coordination processes are becoming increasingly complex and more prone to conflict.
-

Data poverty is eroding Tajikistan's ability to protect lives, harvests, and power supplies in a warming climate. We aim to close the observation and analytics gaps with an AI-enabled, satellite-driven, high-resolution precipitation & glacier-monitoring platform

Past and on-going efforts to address the problem (up to half a page):

Tajikistan is not only proactive in recognizing its unique climate vulnerabilities, particularly those stemming from its mountainous geography and water dependency, but also in fostering regional collaboration for enhanced climate resilience across Central Asia. Its commitment is reflected through active participation in several strategic initiatives, like:

1. **Pilot Program for Climate Resilience (2009):**
   A government led-initiative that was launched to strengthen Tajikistan's climate adaptation capacity. Phase 2 of the project concentrated on modernizing hydromet services through improved forecasting, automated data collection, upgraded infrastructure, and institutional capacity building, laying a robust foundation for long-term climate resilience.
2. **Asian Development Bank and Green Climate Fund (2018):**
   These two institutions are collaborating in Tajikistan to modernize the national hydrometeorological agency (Hydromet), enhance extreme weather forecasting, and improve climate resilience, particularly in the Pyanj River Basin. Their joint efforts include infrastructure upgrades, institutional reforms, and the development of fee-based weather services, with a total project budget of USD 12.8 million approved in 2018

[7] Asian Development Bank. (2018). Funding proposal FP075: Institutional Development of the State Agency for Hydrometeorology of Tajikistan. Green Climate Fund. https://www.greenclimate.fund/sites/default/files/document/funding-proposal-fp075-adb-tajikistan.pdf

[8] In the danger zone: UN warns of growing drought risk in Tajikistan and Central Asia (2025, June 25). Retrieved from https://asiaplustj.info/en/news/tajikistan/society/20250625/in-the-danger-zone-un-warns-of-growing-drought-risk-in-tajikistan-and-central-asia

3. **CARITAS Weather, Water and Climate Services, WWCS (2021):**
   Caritas Switzerland began implementing Weather, Water and Climate Services (WWCS) as a core element of their strategy in 2021, as part of their 2021-2025 country strategy for Tajikistan. The initiative builds on their earlier work in promoting sustainable agriculture; reducing disaster risks; and restoring degraded landscapes. Through partnerships with local ministries and international organizations, they aim to make climate-informed decision-making accessible, inclusive, and effective, especially in rural communities.
4. **Glacier Risk Assessment and Water Forecasting (2025):**
   Collaborating with Turkmenistan, Tajikistan is leading a regional initiative to asses glacier-related risks and develop integrated water forecasting systems that will help secure long-term water and agricultural security. This initiative is part of the larger **CAREC Climate Change Action Plan (CCAP)**, under which Tajikistan is also co-leading the **Regional Risk Transfer Solution (2025)** with the Kyrgyz Republic, a solution aimed at strengthening financial resilience against climate and disaster risks.[10]

Specific technology[11] barriers (up to one page):

This section should answer the questions "what are the technology barriers that hinder national efforts described above" and "how will the CTCN technical assistance complement these efforts?" Building upon the problem statement and taking into consideration the existing efforts described above, please describe the specific technology barriers encountered by the requesting applicant to identify, assess or deploy climate technology(ies) in an effort to address the problem statement. The described barriers should be within the scope of the requested CTCN technical assistance (described in the section below).

Tajikistan's efforts to modernize its weather and climate data monitoring system using satellite and AI-enabled climate information are hindered by a set of deeply rooted technology-related barriers. While the demand for near-real-time, high-resolution hydrological data is growing rapidly in the face of glacier retreat and hydrological volatility, the country's digital infrastructure, data systems, and human capital are not yet positioned to deliver such capabilities. These barriers fall into five specific categories:

1.Inadequate Digital Infrastructure in High-Mountain and Rural Areas
Most of Tajikistan's glacier-fed waters originate above 3,000 meters, but those areas suffer from minimal or no internet connectivity, unreliable power supply, and extreme inaccessibility. This prevents real-time data collection and hinders the ability to validate or calibrate satellite-based observations.

2. Lack of National Data Storage and Processing Systems
Tajikistan does not currently operate a centralized hydrometeorological data platform that can ingest, store, and process multi-source data (ground, satellite, reanalysis). There is no operational API-based system that allows integration with Earth Observation (EO) platforms or AI-enabled analysis tools, and many datasets are not georeferenced or standardized for modelling use.

3. Limited Access to AI Toolkits and High-Performance Computing
While regional institutions may have some access to open-source AI libraries (e.g., TensorFlow, PyTorch), they lack local computing infrastructure and GPU-enabled servers needed for model training or image processing. Internet bandwidth is also a barrier: large satellite datasets (e.g., Meteosat or IMERG) are difficult to download, store, or analyze. Most data analytics tasks need to be outsourced or carried out with the support of external partners, resulting in delays and increased dependence on non-local systems.

[10] Asian Development Bank. (Nov. 2024).Central Asis Regional Cooperation Program, Climate Change Action Plan (2025-2027)

[11] *"**any equipment, techniques, practical knowledge and skills** needed for reducing greenhouse gas emissions and adapting to climate change" (Special Report on Technology Transfer, IPCC, 2000)*

4. Weak Institutional Access to Global EO and Climate Data
Although datasets from GPM, Sentinel, Meteosat, and other global sources are publicly available, there is no structured mechanism in Tajikistan to routinely access, pre-process, or translate these datasets into water-management metrics. EO literacy remains limited among hydrologists, and web-based climate data portals are still underutilized due to challenges such as limited language support, complex user interfaces, and a lack of locally relevant examples or case studies.

5. Shortage of Domain-Specific Human Capital
While basic meteorological and hydrological expertise exists, data science, remote sensing, machine learning, and climate modelling specialists are extremely limited in number. There is no permanent cross-sectoral unit or research hub focused on AI/EO integration for climate services. International projects (e.g., ADB, GIZ) often rely on external consultants, and knowledge is not retained in local institutions. Educational programs in climate informatics or environmental data engineering are not yet developed within Tajikistan's universities or technical institutes

Contribution to Programme of Work 2023-2027:

As per 3rd Programme of Work of the CTCN[12], please indicate the system transformation area, key enablers and cross-sectoral themes related to the request:

System transformation areas (mandatory)

- ☒ Water-Energy-Food Nexus
- ☐ Sustainable Mobility
- ☐ Energy Systems
- ☐ Buildings and Infrastructure
- ☐ Business and Industry

Key enablers (optional)

- ☒ National Systems of Innovation
- ☐ Digitalization

Cross-sectoral themes (optional)

- ☒ Gender
- ☒ Youth
- ☐ Indigenous Peoples

Sectors:

Please indicate the main sectors related to the request:

- ☐ Coastal zones
- ☒ Early Warning and Environmental
- ☐ Human Health
- ☐ Infrastructure and

[12] https://www.ctc-n.org/resources/ctcn-third-programme-work-2023-2027

	Assessment		Urban planning
☐ Marine and Fisheries	☒ Water	☒ Agriculture	☐ Carbon fixation
☐ Energy Efficiency	☐ Forestry	☐ Industry	☐ Renewable energy
☐ Transport	☐ Waste management		

Please add other relevant sectors:

Technical assistance requested (up to one page):

Founded on the problem statement, past/on-going efforts and technology barriers, please describe the requested technical assistance. The technical assistance should clearly contribute to mitigation or adaptation to climate change as described in the problem statement and contribute to overcome the specific technology barriers. Please explore the CTCN website and WIPO Green Technology Database for more information on climate technology options.

Within a clearly defined scope, the description of technical assistance should be structured into the following:

- Overall objective
- Anticipated groups of activities to be performed by the technical assistance
- Anticipated products to be delivered by the technical assistance.

Please note that the CTCN facilitates technical assistance and is not a project financing mechanism.

At the pilot stage, the scope is limited to the collection and AI-based quality control of temperature and humidity observations within the Dushanbe area only, serving as a proof-of-concept for potential national-level scale-up.

Outcome
AI validated approach to modernizing climate data management and AI-based quality management enhances the reliability and usability of climate observations and supports future national investments in climate information systems.

Output 1. Design of an Observation Data Management and Utilization Framework to Enhance Climate Data Usability
Activities:

- Analysis of the current status and limitations of data production, management, and use from a climate data utilization perspective
- Design of a national observation data management framework covering data collection, storage, sharing, and quality management
- Development of AI-ready, high-quality climate data standards that support AI-based analysis and automation
- Design of data utilization scenarios and approaches that integrate satellite and ground-based observations for climate analysis, early warning, and policy support

Output 2. Implementation of an AI-Based PoC for Quality Management of Ground-Observed Temperature and Humidity Data in Dushanbe region
Activities:

- Development of AI-based techniques for automatic detection of anomaly in temperature and humidity data
- Assessment of the feasibility of time-series analysis and model inputs through the application of AI-based data correction methods
- Evaluation of improvements in analytical accuracy, usability, and operational efficiency compared to existing data management approaches
- Verification of the technical feasibility, operational applicability, and scalability potential of AI-based data quality management methods

Output 3. Knowledge Transfer and Institutional Foundations (Operational and Standards Drafts) for Strengthening Climate Data Utilization Capacity
Activities:

- Training on concepts of observation data management modernization and climate data quality management
- Capacity-building training on integrated use and analysis of satellite and ground-based observation data
- Foundational training on AI-ready data management and basic AI concepts for temperature and humidity data quality management

Expected timeframe:

Please indicate the expected duration period for the requested technical assistance. Please note CTCN technical assistance usually has a duration of 15 months but can vary depending on the scope of activities.

15 months

Anticipated gender and other co-benefits from the technical assistance:

Please describe the activities with gender linkages as well as the anticipated gender and other co-benefits (e.g. biodiversity, economic, social, cultural, etc.) that are likely to be generated as a result of the technical assistance.

For more information you can find guidelines on the CTCN's website here:
https://www.ctc-n.org/technologies/ctcn-gender-mainstreaming-tool-response-plan-development

Further reading on gender can be found on the CTCN website here:
https://www.ctc-n.org/technology-sectors/gender

The technical assistance requested can generate immediate small-scale gender and other co-benefits. These benefits extend beyond the direct impact on climate resilience and sustainability, and will serve as a broader foundation for enhancing social equity, economic development, and empowerment for various groups within the population. Below are the anticipated gender-specific and other co-benefits that can arise from the project:

1.Gender-specific co-benefit

- **Women's Participation in Training and Mentorship:** The pilots will ensure active participation of female staff and students by reserving slots in training workshops and mentoring programs. A small-scale mentorship component, modeled after frameworks such as the UN's SheSpace initiative, will demonstrate how inclusive approaches can be embedded into climate and satellite data activities
- **Exposure to STEM Opportunities:** By engaging young women in practical applications of AI and Earth observation during the pilots, the project can spark interest in STEM careers and provide role models within the Agency for Hydrometeorology. These early steps can lay the groundwork for larger-scale initiatives in the future.
- **Job Creation and Skills Development:** Pilot-level training in AI, Earth observation, and data quality management will open pathways for women to access emerging job opportunities in climate data analysis and related technical fields. These early experiences can help bridge the gender gap in Tajikistan's STEM workforce.

2. Other Co-benefits

- **Practical Benefits for Farmers and Local Communities**: In pilot regions, improved precipitation monitoring and early warnings will support better crop planning, water use, and disaster preparedness. These targeted benefits will serve as proof-of-concept before broader rollout.
- **Institutional Strengthening and Governance:** The pilots will build local capacity in AI, Earth Observation, and integrated monitoring—particularly through the development of the Quality Management System (QMS)—so that Hydromet staff can sustain operations with minimal external support. By demonstrating how AI-driven systems improve data collection, validation, and analysis, the pilots also provide government agencies with stronger tools for resource allocation and climate risk planning, while ensuring accountability and attracting future investment in climate services.
- **Economic Diversification:** The pilots will introduce new applications of AI and satellite-based monitoring within Tajikistan, providing a first step toward diversifying the national economy into data and technology-driven sectors. Demonstrating feasibility at pilot level can encourage future growth in sustainable industries beyond traditional agriculture.

Conclusion

The technical assistance for AI adaptation in Tajikistan's climate change strategies promises substantial gender and social co-benefits. These include:

- Gender empowerment, particularly for women in rural areas, through better access to information, economic opportunities, and participation in decision-making.
- Economic growth by creating jobs, fostering entrepreneurship, and improving livelihoods.
- Public health improvements and disaster resilience due to enhanced AI-based early warning and climate forecasting systems.
- Environmental sustainability, such as more efficient resource management, better waste reduction, and support for climate-smart agricultural practices.
- Stronger governance through better data, predictive models, and climate risk management.

Anticipated follow-up activities after this technical assistance are completed:

Please describe the expected future use of the outputs and deliveries produced by this technical assistance, after the CTCN implementation is completed. For example, what organizations or stakeholders will use the outputs of the technical assistance after it is completed, for what purpose, at what scale and scope the outputs and deliveries will be applied, when and what will be the next steps undertaken, what options exist to scale up the results, what funding could be leveraged, etc.

To ensure continuity, accountability, and wider impact beyond the lifetime of this technical assistance,

we propose the following follow-up activities under the CTCN framework:

1. **Monitoring & Evaluation Framework**
   - The CTCN project manager and local stakeholders, Tajik Hydromet staff, will jointly design and implement a tailored M&E framework, focused on the Dushanbe-based temperature and humidity monitoring system.
   - Continuous monitoring using locally relevant performance metrics will track outcomes such as data quality improvements, AI-assisted workflow adoption, and staff capacity gains.
2. **Post-Project Reporting and Knowledge Sharing**
   - Prepare a final report and lessons-learned briefs and publish them through the CTCN Knowledge Portal to ensure open access and global visibility.
   - Share technical outputs (e.g., data governance frameworks, AI training materials, system design blueprints) with CTCN Network & Consortium Partners to support context-appropriate replication.
   - Contribute Tajikistan' Dushanbe pilot experience as a case study for CTCN regional fora, facilitating South–South knowledge exchange on early-stage AI deployment in climate data systems.
3. **Capacity Retention and Sustainability Assessments**
   - Conduct follow-up evaluations (6–12 months after completion) to assess workforce retention, institutional ownership and continued use of the AI-supported temperature and humidity datasets.
   - Organize "knowledge handover" and refresher workshops to ensure that pilot methodologies, QA/QC protocols, and governance practices remain embedded within TajikHydromet.
4. **International Cooperation and Continuous Learning**
   - Use CTCN platforms to connect Tajikistan with global partners for methodological exchange, comparative research, and co-learning, drawing on the Dushanbe pilot as a reference implementation.
   - Engage with CTCN communities of practice to access shared tools, training resources, and innovation pipelines that inform future system enhancement pathways.
5. **Long-Term Scaling Pathways**
   - Document scaling opportunities and upload them to the CTCN Knowledge Portal as part of Tajikistan's roadmap for climate-tech growth.
   - Position the national platform architecture developed through the pilot for potential integration with future CTCN-supported or donor-funded projects, enabling phased, evidence-based scale-up aligned with national priorities and available resources.

Key stakeholders:

Please list the stakeholders who will be involved in the implementation of the requested CTCN technical assistance and describe their role during the implementation (for example, government agencies and ministries, academic institutions and universities, private sector, community organizations, civil society, etc.).

Stakeholders	Role to support the implementation of the technical assistance
National Designated Entity Pirov Sunatullo	☐ Provide overall **oversight of the technical assistance**. ☐ Ensure **effective implementation** of project activities. ☐ Facilitate **active stakeholder participation** throughout the process. ☐ Align project activities with **national priorities and strategies**. ☐ Monitor progress and **coordinate between partners and**

	counterparts.
Request Applicant Pirov Sunatullo (Deputy Director, Agency for Hydrometeorology)	☐ Provide **representative climate, hydrological, and agricultural datasets** required for the pilot projects. ☐ Offer **feedback on functionality, usability, and operational relevance** of the developed systems to ensure they meet national needs. ☐ **Engage staff** in pilot activities to strengthen local capacity and ensure effective knowledge transfer. ☐ Act as the **primary counterpart** for coordination with technical partners and stakeholders throughout the project cycle.
National Ministry - Committee for Environmental Protection under the Government of the republic of Tajikistan - Ministry of Agriculture, Ministry of Industry and new technologies - Ministry of Energy and water resources, Committee for Emergency situations and civil defence under the Government of the republic of Tajikistan - Food Steering Committee under the Government of the republic of Tajikistan	☐ Provide **consolidated, sector-specific feedback** on climate-data applications to help refine system design and ensure alignment with national priorities. ☐ Contribute to **identifying user needs and operational gaps**, ensuring the system effectively supports sectoral decision-making. ☐ Participate in **validation and testing of system functionalities**, offering technical insights to improve usability and performance. ☐ Support **coordination between national stakeholders and technical partners** to facilitate smooth implementation. ☐ Ensure that the system development reflects **national policies, strategies, and operational contexts**.
Technology providers	☐ Act as the **technical solution provider**, responsible for delivering innovative, data-driven, and AI-enabled technologies to address climate-related challenges. ☐ Provide **capacity-building** through training sessions and workshops to enhance local technical expertise and ensure long-term system sustainability. ☐ Offer **technical support and maintenance** to ensure smooth operation and continuous improvement of the deployed systems. ☐ Collaborate closely with national stakeholders to ensure that solutions are **aligned with country priorities and operational needs**. ☐ Contribute to **knowledge transfer** and the creation of local operational capacity to enable long-term ownership.

Alignment with national priorities (up to 2000 characters including spaces):

Please describe how the technical assistance is consistent with national climate priorities such as: Nationally Determined Contribution, national development plans, poverty reduction plans, technology needs assessments (incl. whether this request refers to any technologies prioritized within Technology

Action Plans), Long-term Low Emission Development Strategies, National Adaptation Plans, GCF Country Programme, sectorial strategies and plans, etc.	
Reference document (please include date of document)	**Extract** (please include chapter, page number, etc.).
Nationally Determined Contribution (NDC)	Direct alignment and contribution to NDC implementation is required for all CTCN technical assistances. Please include a direct reference to the INDC/NDC document (chapter, page number, etc.). **Tajikistan's Nationally Determined Contributions (NDC)** **Publication Date**: **December 2020** (updated from the original 2015 submission) Tajikistan's NDC (Dec 2020) calls for *modernizing hydrometeorological services, improving data collection, early warning systems, and adopting advanced technologies* (Ch. 3 pp. 9–14; Ch. 4 pp. 15–18). The proposed AI-based solutions directly support these priorities by enhancing climate data management, predictive analytics, and real-time monitoring—strengthening institutional capacity and technology transfer in line with the NDC's adaptation and technology goals.
Technology Needs Assessment and Technology Action Plan	None.
National Adaptation Plans	**National Adaptation Strategy to Climate Change of the Republic of Tajikistan until 2030** **Approved by Resolution of the Government of the Republic of Tajikistan No. 482 of 2 October 2019** Tajikistan's **National Adaptation Strategy to Climate Change 2030** (2019) emphasizes science-based planning grounded in continuous climate data monitoring (**Ch.1, p.4**). It assigns the **Hydrometeorology Agency** a central role in climate-risk assessment and data provision (**p.43**), calls for glacier and hydrological monitoring systems (**p.47–49**), and urges creation of a **national climate information database and online portal** for data sharing (**p.52–53**). Reliable data underpin adaptation, financing, and M&E (**p.55–58**); AI-driven analytics can enhance these systems' accuracy, accessibility, and policy impact.
GCF Country Programme	**FP075: Institutional Development of the State Agency for Hydrometeorology of Tajikistan** **approved by the Board of the Green Climate Fund at B.19. (27 Mar. 2018)** The ADB–GCF project **"Institutional Development of the State Agency for Hydrometeorology of Tajikistan"** (FP075) addresses major data and forecasting gaps. It modernizes Hydromet's **monitoring systems (pp.8–9)**, builds a **centralized IT network and digital platform (pp.13–15)**, and installs **cloud-based flood early-warning systems (pp.16–17)**. Technical evaluation highlights **data integration and cloud computing (pp.34–35)**

	as key to sustainability, while economic analysis confirms the **high value of reliable climate data (pp.33–34)**. AI integration will optimize these systems, enhancing accuracy, early warning, and decision-making.
Long-term Low Emission Development Strategies	**Mitigation pathways for Tajikistan to achieve carbon neutrality by 2050** **Publication Date**: **September 2021** The report (UNDP 2021) stresses, in **Chapter 3 (pp. 27–34)**, that effective mitigation planning depends on national climate data, emission inventories, and monitoring systems. **Chapter 4 (pp. 36–95)** identifies data integration, energy-loss tracking, and sectoral modelling as key to policy design and cost analysis. Reliable hydrometeorological and emission datasets underpin Tajikistan's long-term low-emission pathways. Applying AI to these data systems can automate collection, improve forecasting accuracy, and enable dynamic scenario modelling—strengthening Tajikistan's carbon-neutrality strategy through real-time analytics and evidence-based policy decisions.
Add others here as relevant	

Development of the request (up to 2000 characters including spaces):

Please describe how the request was developed at the national level and the process used by the NDE to approve the request before submitting it (who initiated the process, who were the stakeholders involved and what were their roles?) and describe any consultations or other meetings that took place to develop and select this request, etc.

The development of the **CTCN Technical Assistance Request** for Tajikistan related to **AI technologies** for **climate change mitigation and adaptation** was initiated by the **Agency for Hydrometeorology** of the Committee for Environmental Protection under the Government of the Republic of Tajikistan. The process followed a structured approach, involving various stakeholders across government agencies and technical experts to ensure the request was comprehensive and aligned with national climate goals.

As part of this initiative, DI Lab Inc., a leading data analytics company in South Korea, provided insights into the advanced early warning system technologies utilizing satellite and AI. Through these discussions, Tajikistan was able to explore the potential applications of AI in climate adaptation and confirm the feasibility of its implementation.
Additionally, it was identified that Tajikistan falls within the observation range of South Korea's GK2A geostationary satellite. This finding opened the possibility of leveraging both geostationary (GK2A) and low Earth orbit (LEO) satellites to provide meteorological data for Tajikistan. This integration would enhance early warning systems for extreme weather events by utilizing real-time satellite-based climate information.

During our visit to Tajikistan this year, we conducted a comprehensive feasibility study focused on enhancing hydromet service delivery. Through stakeholder consultations and field assessments, we identified key components crucial for effective modernization. Through multiple meetings and discussions, both parties reached a consensus on the necessity of establishing an AI-powered early warning system using satellite technology in Tajikistan. This collaborative effort has played a crucial role in shaping the technical assistance request, ensuring that it is technically feasible and aligned with the country's climate resilience needs.

Background documents and other information relevant for the request:

- Please list all relevant documents that will help the CTCN analyse the context of the request and national priorities. Please note that all documents listed/provided should be mentioned in this request in the relevant section(s), and that their linkages with the request should be clearly indicated. For each document, please provide web-links (if available) or attach to the submission form. Please add any other relevant information as required.

Tajikistan faces mounting climate pressures, particularly within its water resource management and agricultural sectors. Frequent floods, landslides, and glacial retreat pose a serious threat to livelihoods and critical infrastructure. The national hydrometeorological service (TajikHydromet) remains constrained by outdated equipment, limited forecasting capabilities, and fragmented service delivery.

Technical Brief: Tajikistan Water Partnership & GWP

https://www.gwp.org/globalassets/global/toolbox/publications/technical-briefs/technical-brief-eng.pdf

Relevance to Request: Demonstrates the urgent need for modernized hydromet services and integrated water management approaches to build climate resilience.

Highlights:

- Advocates for basin-level coordination and risk reduction strategies.
- Cites key reforms: Water Code (2020) and draft National Water Strategy (2030).
- Reports Tajikistan's SDG 6.5.1 score as "medium-low" (46), indicating institutional and infrastructure challenges.

World Bank ICR (2023): Central Asia Hydromet Modernization Project (CAHMP)

https://documents1.worldbank.org/curated/en/099031324121020046/pdf/P1207881aba7b50c818181128709ba785f5.pdf

Relevance to Request: Serves as evidence of successful interventions and areas still requiring support.

Achievements:

- Rehabilitated over 100 meteorological and hydrological stations.
- Deployed high-speed computing and real-time data monitoring systems.
- Improved forecast accuracy from 66% (2011) to 84% (2023); river-flow forecasting improved to 80%.

Linkages to Request: Supports scaling and continuity of modernization efforts.

Green Climate Fund FP075: Institutional Development of Tajikhydromet

https://www.greenclimate.fund/sites/default/files/document/funding-proposal-fp075-adb-tajikistan.pdf

Relevance to Request: Addresses systemic institutional barriers and introduces a replicable model for modernization.

Major components:

- Component A:Campus modernization, including new facilities and core system upgrades

- Component B: Legal and organizational transformation to enable flexible staffing and entrepreneurial income
- Component C: Flood forecasting enhancement for the Pyanj River Basin (PRB) and awareness-building
- Component D: Marketing of fee-based weather products to increase Hydromet's financial sustainability

Alignment: The project aligns with Tajikistan's Nationally Determined Contribution (NDC)and the forthcoming National Climate Change Adaptation Strategy. It introduced a replicable model for hydromet modernization, with long-term benefits for disaster preparedness, agricultural productivity, and regional climate services.

AI directly contributes to the achievement of multiple **Sustainable Development Goals (SDGs)** to which Tajikistan is committed. In particular, **SDG 2 (Zero Hunger)**i s addressed through AI-powered precision agriculture, which improves productivity, reduces crop loss, and optimizes resource use. S**DG 6 (Clean Water and Sanitation)** benefits from AI-enhanced water management systems that increase irrigation efficiency and help monitor water quality in real time. Furthermore, S**DG 7 (Affordable and Clean Energy**) is supported through smart energy applications that improve the management and forecasting of renewable energy systems. Collectively, these contribute to **SDG 13 (Climate Action)** by increasing the country's capacity to manage climate risks and reduce vulnerability.

AI integration creates opportunities to strengthen technical expertise, enhance institutional systems, and encourage international knowledge exchange. By investing in training and systems development, Tajikistan can ensure long-term sustainability and local ownership of AI-based climate solutions.

Finally, equity and inclusion are central to the success of climate adaptation. AI tools can be tailored for rural contexts and deployed via accessible platforms such as SMS or mobile dashboards. Ensuring that women and marginalized groups are included in training and decision-making processes will not only improve outcomes but also promote gender-responsive climate resilience.

In summary, the proposed integration of AI technologies supports and advances Tajikistan's climate, development, and social equity priorities. It strengthens the technical foundation of the proposal and supports Tajikistan's ambition to build a climate-resilient and low-emission future through innovation.

OPTIONAL: Linkages to Green Climate Fund Readiness and Preparatory Support

The CTCN is collaborating with the GCF in order to facilitate access to environmentally sound technologies that address climate change and its effects, including through the provision of readiness and preparatory support delivered directly to countries through their GCF NDA. These actions are in line with the guidance of the GCF Board (Decision B.14/02) and the UNFCCC, particularly paragraphs 4 and 7 of 14/CP.22 and paragraph 4, 7 and 8 of 14/CP.24 that addresses Linkages between the Technology and the Financial Mechanisms[13].

The CTCN is therefore implementing some of its technical assistance using GCF readiness funds accessed via the country's NDA. Any application for GCF support, including the amount of support provided, is subject to the terms and conditions of the GCF and should be developed in conjunction with the NDA.

[13] Please see: https://unfccc.int/files/meetings/marrakech_nov_2016/application/pdf/auv_cop22_i8b_tm_fm.pdf

Please indicate whether this request has been identified as preliminarily eligible by the NDA to be considered for readiness support from the GCF.

☐ Initial engagement: The GCF NDA of the requesting country has been engaged in the design of this request and the NDA will be involved in the further process leading to an official agreement for accessing GCF readiness support.

☐ Advanced engagement (preferred): The GCF NDA of the requesting country has been directly involved in the design of this request and is a co-signer of this request, the signature indicating provisional agreement to use readiness national funds to support the implementation of the technical assistance.

NDA name:

Date:

Signature:

Monitoring and impact of the assistance:

By signing this request, I affirm that processes are in place in the country to monitor and evaluate the technical assistance provided by the CTCN. I understand that these processes will be explicitly identified in the CTCN Response Plan and that they will be used in the country to monitor the implementation of the technical assistance following standard CTCN procedures. This includes the active engagement as NDE together with the key project proponent / beneficiary in regular project steering meetings.

I understand that, after the completion of the requested assistance, I shall support CTCN efforts to measure the success and effects of the support provided, including its short, medium and long-term impacts in the country. This includes the completion of NDE feedback and post-implementation forms.

Signature:

NDE name:	Sunatullo Pirov
Date:	27/01/2026
Signature:	

THE COMPLETED FORM SHALL BE SENT TO THE CTCN@UNEP.ORG

The CTCN is available to answer all questions and provide guidance on the application process.