



PRE-CONCEPT FOR A REGIONAL PROJECT/PROGRAMME

PART I: PROJECT/PROGRAMME INFORMATION

Title of Project/Programme: Hydrological Status and Outlook system for integrated water resources management and climate resilience in Bangladesh and Nepal (HydroSOS- BaNe)

Countries: Bangladesh, Nepal ¹

Thematic Focal Area²: Disaster risk reduction and early warning systems

Type of Implementing Entity: Multilateral Implementing Entity

Implementing Entity: World Meteorological Organization

Executing Entities: Bangladesh Meteorological Department (BMD), Bangladesh Water Development Board (BWDB), Department of Hydrology and Meteorology of Nepal

Amount of Financing Requested: 12,090,000 (in U.S Dollars Equivalent)

Project Formulation Grant Request: Yes No

Amount of Requested financing for PFG: 20,000 (in U.S Dollars Equivalent)

Letters of Endorsement (LOE) signed for all countries: Yes No

NOTE: LOEs should be signed by the Designated Authority (DA). The signatory DA must be on file with the Adaptation Fund. To find the DA currently on file check this page: <https://www.adaptation-fund.org/apply-funding/designated-authorities>

Stage of Submission:

- This pre-concept has been submitted before
- This is the first submission ever of the pre-concept

In case of a resubmission, please indicate the last submission date: January 9 2023

¹ WMO continuously consulted India, Bhutan and People's Republic of China (PRC) for their participation as the executing entities for the proposed HydroSOS project. However, India, Bhutan and PRC have not submitted endorsement and commitment letters. So, the proposed project is submitted only for the two countries: Bangladesh, and Nepal. Once the project is approved and moves into implementation, National agencies of India, Bhutan and PRC will be invited as observers to develop HydroSOS system and after the completion of the project, it is expected that the HydroSOS EWS will be scaled up to cover the entire GBM region possibly through national investments or international funding mechanism

² Thematic areas are: Food security; Disaster risk reduction and early warning systems; Transboundary water management; Innovation in adaptation finance.

Project / Programme Background and Context

Bangladesh and Nepal cover a major portion of the Ganga Brahmaputra Meghna (GBM) River Basin. The GBM basin spread over an area of over 1.7 million sq. km and has a population of more than 500 million, making it one of the most populated river basins in the world. Both Bangladesh and Nepal face challenges stemming from its socio-political and ecological context leading to inadequate water resources management. Climate extremes specifically, floods and droughts are common phenomenon with enormous environmental, social and economic consequences. In spite of abundant natural resources, the number of people living under the poverty line and vulnerable to climate change events in these two countries are estimated to be around 10 million. The monsoon flooding during the last five years in the GBM basin, resulted in more than thousand deaths, millions of property damage and severe impact to environment. Around 80% of Bangladesh is floodplain, with major floods affecting millions of people every six years or so. Nepal faces a range of hazards including landslides, debris flow and flash floods and experience an increase in water availability during the monsoon but scarcity during winter and pre-monsoon season impacting its agriculture that is mostly monsoon dependent. Rainfall variation leads to drought, floods, landslides, putting much stress on food distribution. Glacial lakes of Nepal identified as Potentially Dangerous for Outburst causing Floods engendering human lives, adversely impacting agriculture, infrastructure, and reduction in water availability in the downstream areas. Studies conducted for the GBM region suggest that there will be significant variation in flow and quality of water over a medium to long term with strong impact on population, water for public use, demand for irrigation, hydropower, industry etc. The overall trend in the GBM region shows a growing anthropogenic development combined with climatic changes resulting in additional demands on water resources and triggering ecosystem degradation, erosion, salinization, water logging, displacements and migration. Climate change effects are linked to dry season, water shortages and droughts, which is threatening livelihoods, food security and resulting in widespread migration. The prevailing conditions make it imperative to build adequate capacity, technical knowledge and enable decision making on shared water resources and climate extremes at a regional, national and local levels. Based on recent assessment and participative consultations conducted by the WMO with the National stakeholders of the two countries², immediate need for alternating flood and water shortages monitoring and forecasting systems during the monsoon and dry seasons and associated water resources information are highlighted of a growing economy and population. Other main conclusions highlighted were to build upon the current context and on-going projects and initiatives to prepare the region for future socio-economic development and environmental changes, such as integration of disaster risk reduction in the national adaptation and management plans (National Adaptation Plans (NAPs) and National Adaptation Programme of Action (NAPA) identified under the National Determined Contribution's (NDC) for the GBM countries.³ A regional approach will result in greater co-benefits and cost effectiveness as compared to the national one because one set of resources will generate productive outcomes for two countries, which individual national projects would have achieved using more resources (human, time as well as material resources). It thus calls for innovative frameworks and policies, enhancement of synergy, complementarities and coordination at regional level to foster integrated flood and drought management including ecosystem based adaptations, availability of standardized interoperable Hydro-meteorological data, especially on real time basis, coordination of information channels and procedures for end-to-end early warning systems, and increase in knowledge availability with community members on social-economic and environmental risks and their participation in decision making and developing climate change adaptation strategies.

Project / Programme Objectives:

The proposed project objective is to increase the climate adaptive capacities and resilience of beneficiary communities to hydro-climatic risks. Furthermore, the project will develop local, national and regional adaptation strategies and implementation mechanisms based on integrated monitoring and management of water resources. Floods and drought being common feature in the two countries, the project envisages strengthening the capacities of National Meteorological and Hydrological Services (NMHSs) with a regional Hydro-Meteorological early warning system (providing short term and seasonal status) embedded into a long-term integrated water resource information system and concrete adaptation actions developed through a participatory design and executed in an integrated manner.

Project / Programme Components and Financing:

The following concrete outcomes are to be further developed in the concept note through additional national dialogues and based on already existing or planned activities.

| Project Components | Expected Outcomes | Expected Concrete Outputs | Amount (US\$) |
|--------------------|-------------------|---------------------------|---------------|
|--------------------|-------------------|---------------------------|---------------|

³ <https://www4.unfccc.int/sites/NDCStaging/Pages/All.aspx>

| | | | |
|--|---|---|-----------|
| Component 1: Risk-based preparedness and adaptation to the climate variabilities and water and environmental uncertainties | Outcome 1.1 Floods and drought risks informed decision-making at the regional, national and local levels | Output 1.1.1 Vulnerability and exposure assessment (including gender and sector-wise analyses) and risk maps are developed for the targeted countries | 1,000,000 |
| | | Output 1.1.2 Develop capacity and awareness at the local, national and regional levels to ensure risk informed decision-making | |
| | | Output 1.1.3 Long term risk management strategies identified and integrated into development plans (economic, social, environmental aspects) | |
| | Outcome 1.2 Preparedness and resilience to climate change promoted through innovative and community-based initiatives. | Output 1.2.1 Implementation of community-based floods and drought management strategies in the vulnerable sites and different ecosystems | 2,000,000 |
| | | Output 1.2.2 Strengthened awareness of vulnerable communities and agencies on hydro-meteorological risks through education programs including nature-based solutions and mainstreaming gender | |
| Component 2: Strengthening water resources management through access to hydro-meteorological information and augment regional /national capacity to monitor and assess Hydro-Meteorological hazards | Outcome 2.1 A web-based Hydrological Status and Outlook System for EWS is designed and developed together with the National services | Output 2.1.1 Improved hydrological status and outlook instruments through data standardization for EWS is designed and developed | 4,000,000 |
| | | Output 2.1.2 Existing products and tools are integrated and visualized in the regional HydroSOS for EWS | |
| | | Output 2.1.3 Establishment of Hydro-Climate Outlook Forums at the regional level | |
| | Outcome 2.2 Development of medium and long-term concrete adaptation measures in the prioritized areas and updates based on lessons learned and monitoring instruments | Output 2.2.1 EWS and concrete adaptation measures tested in selected vulnerable communities. | 2,000,000 |
| | | Output 2.2.2 Coordination and collaboration developed at the regional, national and local level | |
| | | Output 2.2.3 Decision-makers are informed with key water resources management parameters for current status and sub-seasonal and seasonal outlooks | |
| Component 3: Water and climate resilient regional cooperation arrangements together with National and regional stakeholders, and community involvement | Outcome 3.1 Improve information base and practices related to water resource management and climate change adaptation | Output 3.1.1 Best practices and experience from other region and river basins are made to ensure that existing national policies and practices are interoperable in GBM river basin cooperation framework | 600,000 |
| | | Output 3.1.2 Analysis and optimisation of benefits of regional water and climate adaptation action. | |
| | Outcome 3.2 National adaptation strategies (i.e. NAPs) are fully inclusive of water management issues, address community | Output 3.2.1 An inclusive process is developed to ensure that National adaptation strategies explicitly address water relevant instruments and strategies. Inclusive approaches are operational to include local communities. | 600,000 |

| | | | |
|---|--|--|-------------------|
| | concerns. Methodology and mechanism for leveraging and sharing benefits of optimising adaptation at regional level are in place. | Output 3.2.2 Regional mechanism for adaptation cooperation on HydroSOS established and operational. Periodic review and update of the mechanism is agreed on by riparian states. | |
| 8. Project/Programme Execution cost | | | 950,000 |
| 9. Total Project/Programme Cost | | | 11,150,000 |
| 10. Project/Programme Cycle Management Fee charged by the Implementing Entity (if applicable) | | | 940,000 |
| Amount of Financing Requested | | | 12,090,000 |

Project Duration: 4 years (48 months)

PART II: PROJECT / PROGRAMME JUSTIFICATION

There is a need for better, more effective and coherent regional, national and local strategies and decision-making frameworks to address water related climate resilience challenges in the GBM riparian countries. These challenges are being exacerbated by a changing climate, deterioration in socio-economic and environmental conditions and unplanned development. It is thus vital that the GBM basin is better understood through a regional project which provides opportunities to share experiences, and address knowledge gaps. Such a project will be useful to manage water resources, extreme events linked to climatic impact in a transboundary management framework and in an environment of mutual trust and confidence. The cost-effectiveness is assured through the implementation of concrete adaptation activities with community ownership and is the most sustainable means to achieve scalable long-term results at different levels. The endeavor is to consolidate gains from various ongoing/past projects from these two countries to link up with adaptation measures pertaining to disaster risks and water resource at a regional scale. The project partners propose to design and implement a large-scale, concrete and cooperative system allowing integration of relevant knowledge on quantitative and qualitative aspects of water resources and offer services and decision-making support to the end-users. A system-change and capacity development will be carried out through integration of different areas of expertise such as water, climate, weather, agriculture, disaster management etc. and fostering collaboration amongst global, national and local partners which traditionally operate in silos within their own domain. This will improve livelihood support and contribute to increased adaptive capacity and resilience to climate change related events. The development and implementation of a free, open-source, and sustainable Hydrological Status and Outlook System (HydroSOS) will be designed in a consultative manner and aim at augmenting operational capabilities of National Meteorological and Hydrological Services and the institutions in charge of water planning and management and disaster risk reduction. The aim of the HydroSOS-BaNe will be to develop an innovative system operating on a daily, weekly and monthly timescales capable of providing: 1) An indication of the current region-wide hydrological status (including: groundwater, river flow, soil moisture, cryosphere); 2) An appraisal of where this status is significantly different from 'normal' (for example, indicating drought and flood situations); 3) An assessment of where this is likely to get worse over coming months and season. HydroSOS will bring together existing tools and approaches to develop composite products of hydrological and meteorological status and outlook through the implementation of the WMO Hydrohub (enhancing hydrological monitoring and data exchange) and World Hydrological Observing System (WHOS)⁴ mandate of standardization of data and information management system. A detailed inventory of existing methodologies, equipment (hard and software), skills and operational procedures in Bangladesh and Nepal will be conducted to build on available tools and products.

The applicability and effectiveness of the proposed HydroSOS-BaNe system will be tested in various pilot sites selected by the participating countries to incorporate feedback and suggestions of end-users. Other project outcomes will include development of floods and drought risk maps using the local, national and global data and impact-based forecasting and warning services. At one level, the risk mapping will enable fill a knowledge gap about the vulnerability, exposure and impacts over various sectors. Further it will also improve and standardize data gathering and decision-making processes to understand vulnerability accumulation of specific areas and prominent risks for floods and drought events. Based on recent studies, floods can be predicted successfully with lead-time ranging from several days to even up to a few weeks by some of the countries. However, a regional approach will ensure information is shared between the respective agencies of the countries and is further developed for end-user to support timely decisions. Understanding related to a severe slow-setting drought is constrained due to lack of regional datasets and standardization in analytical methods and interconnectedness between different types of droughts namely meteorological, hydrological and agricultural. The HydroSOS-BaNe project will focus on integration of various types of

⁴ <https://public.wmo.int/en/our-mandate/water/whos>

droughts and provide support in drought monitoring and prediction from monthly to sub-seasonal to seasonal outlooks. It will aim to standardize processes followed across countries in the basin for production of hydrological status and outlooks and ensure region wide collection, dissemination of the information for climate change adaptation measures. The most vulnerable elements of the basin; human and environmental resources such as water, fish, minerals and agriculture etc. need long lasting, innovative, and coordinated measures to ensure sustainable development of the area.

The proposed project will contribute to UN Sustainable Development Goal (SDG) target 6.5 to implement integrated water resources management at all levels, including through transboundary cooperation. It also contributes to target 1.5 in building resilience through reduction in exposure and vulnerability for climate related extreme events; target 2.4 to ensure sustainable food production through climate adaptation to drought, flooding, other disasters; and target 11.5 making human settlements inclusive, safe, resilient and sustainable. At the national level, Water Resources Strategy (WRS) and Intended Nationally Determined Contributions (INDCs) and action plan (National Adaptation Plans or NAP and National Adaptation Plans for Action or NAPA) of each country will be taken into account to ensure that project outcomes are consistent and improves water resources management and in turn, reduce flood and drought disaster risks and impacts. Regional, national and local water management policies and action plans will be reviewed to ensure that knowledge and experience gained through the project components 1 and 2 feeds back to the national development policies and plans in the area of livelihood, natural resources management, ecosystem protection, disaster risk management, climate change adaptation and human rights in relation to migration and adaptation. A specific guideline for regional entities or centers will be prepared together with the involvement of the national stakeholders with an aim to build better coordination and collaboration between different competent agencies.

Regional and National level capacity building activities both in terms of development and use of a sustainable, improved, tailored and affordable HydroSOS Ban-Ne system will be given due importance for an integrated flood/drought/ and water resources management. Simultaneously nature-based solution will be promoted to build long-term collaboration, sustainability and adoption for various eco-friendly solutions⁵. Gender mainstreaming will form an important element of the project's outlook and it will be given adequate importance at the planning, policy and development of measures for managing climate extreme events. A preliminary joint national assessment and consultation studies⁶ were conducted in the targeted countries with the NMHSs and other concerned authorities during the year 2020 with an aim to better understand their current capabilities, needs and priorities for effective management of water resources and climate extremes in the GBM countries. Even though there were travel restrictions in these countries due to the covid-19 pandemic, the project team organized [vulnerable community visits](#) (with local level associations, women, youths, minor and vulnerable groups, at various sites of the basin to understand current needs and examine benefits of the project outputs and services), [regional virtual consultation meeting](#), [two day hybrid workshop](#) and [national consultation workshops](#) with the National stakeholders to present and finalize the project activities and collect missing and additional information such as [user requirements to investigate and discuss benefits and functionalities \(types of information, forms of warning etc.\)](#), selection and finalization of the sites for the pilot testing of the HydroSOS-BaNe products, inputs on social and environmental risks, role and responsibilities of the national agencies, etc. During the next phase of the project development, several face-to-face consultations are planned with the national and regional entities including the representatives and focal point of other projects and beneficiaries' communities to determine the good practices, lessons learned, and possible gaps.

The project will indirectly benefit hundreds of thousands of people living in the GBM countries through the proposed strategy of community-based flood and drought management and by enabling innovative local level climate change adaptation measures such as raising the level of houses, building of temporary structural measures, changing the agriculture/ horticulture cropping patterns etc. In addition, private sectors such as those in agriculture, aquaculture, hydropower will be one of the important stakeholders and benefit from the project outcomes. The studies for hazard and vulnerability mapping proposed under Component 1 of this project will help screen potential risks from a local community perspective (as per the Adaptation Fund's Environmental and Social Policy (ESP) and Gender Policy (GP)) that may arise during implementation. From an environmental viewpoint, the IUCN Red List of Ecosystems Categories and Criteria will be studied to better understand the status of ecosystems, applicable at local, national and global levels. A balanced ecosystem services will be promoted through nature-based solutions linking ecosystem management with livelihoods. With the information available at this stage, the project is expected to fall into medium risk category B because interventions such as information through risk maps and EWS could lead to movement of communities to a safer zone where they might need to identify new resources for survival.

The project will ensure that its products and tools build on existing resources, infrastructures and services available at the national and local level and thus avoid duplication. Some of the existing National level activities (Hydro-Meteo

⁵ [pdf-2021-9843-3-Nature-based Solutions in the GBM river basin.pdf \(worldwaterweek.org\)](#)

⁶ https://wmoom.sharepoint.com/:/s/Services/Er5M0Eve5KhCumNhufB00y0BKx_EEDIL67PmNVDRZ1fvQ?e=silGGK (not published)

monitoring, forecasting and warning services by the National Meteorological and Hydrological services of the targeted countries) will be considered and data and outputs will be integrated into the proposed HydroSOS system. Synergies and complementarities will be established with completed and on-going regional and national projects such as GEF-funded national and regional projects, WMO HYCOS-HKH, Regional flood outlook for the Ganges and Brahmaputra River basins developed by ICIMOD, South Asia Flash Flood Guidance System (SAFFGS), IUCN BRIDGE GBM etc. A preliminary list of national activities and projects are mentioned under Annex 2. A repository of technical reports, voices from the fields, training manuals and guidelines will be developed and made accessible to all. Innovative knowledge products and skills developed through the project will be communicated to respective stakeholders of the targeted countries, across the South-Asian countries and beyond. The medium of communicating these outputs will be the project website, social media channels, national and international workshops/seminars etc. Several experience sharing field visits with the neighboring countries will be organized for the National and local level stakeholders.

The provision of sufficient human and financial resources is an essential requirement for the sustainability of the new knowledge products and tools. Knowledge management tools and platform will be developed for sharing experience and storing project documents, reports etc. Long term maintenance of the tools and methodologies has been secured through a [letter of commitment](#) from the participating countries, possibly one of the national entities or the Joint River commission formed for Bangladesh and Nepal will become in charge of supporting regional coordination and operation of the developed HydroSOS-BaNe products and services for the targeted countries. It will also be ensured that the methodologies adopted, and human resources trained (from both the agencies and communities) remain a support for other actors and stakeholders in developing floods and drought risks maps, climate change scenarios, community-based initiatives and HydroSOS of their respective countries (and also in regions within and outside of the GBM basin) through national investments or international funding mechanism.

PART III: IMPLEMENTATION ARRANGEMENTS

WMO will be the implementing entity for the project providing overall management and specific technical support in the execution of the activities. Its international experience and presence through their WMO Regional Office for Asia, situates it ideally for coordinating with national authorities, especially NMHSs. The Technical Support Unit (TSU) of the Associated Programme on Flood Management (APFM) and the Integrated Drought Management Programme (IDMP) supported by a network of Support Base Partners comprising of NMHSs research centers, private engineering companies and international organizations will design and develop technical solutions with the executing partners, and they will have close links with the beneficiaries in the field. Other WMO teams (members of Standing Committee on Hydrology, Disaster Risk reduction and Agriculture) will provide support in reviewing the project results and programmes. The HydroSOS-BaNe team comprising of WMO hydrological coordination staff, UK Centre for Ecology & Hydrology(UK-CEH) and other contributing partners will be instrumental in providing technical guidance and implementation support to the national agencies. Other on-going initiatives of WMO especially the Global Framework for Climate Services (GFCS), Climate Risk and Early warning system (CREWS), Flash Flood Guidance System, HydroHub programme, Dynamic Water Assessment Tool (DWAT) will contribute to the development of tools, products and services delivery to the decision makers and also expand the results of the project to the neighboring regions.

At the National level, WMO will collaborate with NMHSs of the two targeted countries to lead the technical implementation and coordination of the project activities. For executing the project activities, the NMHSs of each country (through a project technical manager) will be the National focal point and will implement the activities at the National and local levels through local agencies, NGOs and private partners forming a network of technical support group. NMHSs will be in-charge of engaging and disseminating the project results towards the related Ministries in charge of Water Resources, Environment, Hydropower, Irrigation, Agriculture and Civil Defense, and to the regional organizations such as International Centre for Integrated Mountain Development (ICIMOD), Regional Integrated Multi-Hazard Early Warning System for Africa and Asia (RIMES) etc. working at the basin level. The National agencies will come up with regional intergovernmental associations or authorities (panel of meteorologists, hydrologists, and disaster risk management professionals from the operational organizations or services) to define the regional implementation plan and strategies for the long-term sustainability of the project outputs and outcomes. A project steering/advisory committee will be established with membership of National designated authority, agencies specialized in hydrology, meteorology, water resources, disaster management and of regional entities including representatives from major ongoing and planned projects to share exchange of experience, tools and methodologies. During the next phase of the project development, a detailed project implementation arrangement will be described with a clear description of the roles and responsibilities (organization chart showing how they report to each other) of the implementing entity and of executing entity or organizations/stakeholders involved in the project.


PART IV: ENDORSEMENT BY GOVERNMENTS AND CERTIFICATION BY THE IMPLEMENTING ENTITY

A. Record of endorsement on behalf of the government⁷

Provide the name and position of the government official and indicate date of endorsement for each country participating in the proposed project/programme. Add more lines as necessary. The endorsement letters should be attached as annexes to the project/programme proposal.

| | |
|---|-----------------------|
| Ms. Farhina Ahmed Secretary Ministry of Environment, Forest and Climate Change | Date: August 14 2022 |
| Mr. Yam Nath Pokharel Under Secretary (Technical) Climate Change Management Division Ministry of Forests and Environment | Date: January 09 2023 |

B. Implementing Entity certification

| | |
|--|---|
| I certify that this proposal has been prepared in accordance with guidelines provided by the Adaptation Fund Board, and prevailing National Development and Adaptation Plans and subject to the approval by the Adaptation Fund Board, <u>commit to implementing the project/programme in compliance with the Environmental and Social Policy of the Adaptation Fund</u> and on the understanding that the Implementing Entity will be fully (legally and financially) responsible for the implementation of this project/programme. | |
|  Moyenda Chaponda Implementing Entity Coordinator Project Management and Implementation Unit, WMO | |
| Date: February 07 2023 | Tel. and email: +41 22 730 8646 and mchaponda@wmo.int |
| Project Contact Person: Dr Hwirin Kim | |
| Tel. And Email: +41 22 730 8358 and hkim@wmo.int | |

⁷Each Party shall designate and communicate to the secretariat the authority that will endorse on behalf of the national government the projects and programmes proposed by the implementing entities.

সচিব
পরিবেশ, বন ও জলবায়ু পরিবর্তন মন্ত্রণালয়
গণপ্রজাতন্ত্রী বাংলাদেশ সরকার
বাংলাদেশ সচিবালয়, ঢাকা-১০০০



Secretary
Ministry of Environment, Forest and
Climate Change
Govt. of the People's Republic of Bangladesh
Bangladesh Secretariat, Dhaka-1000

Letter of Endorsement on behalf of the Government of Bangladesh

Record No- 22.00.0000.078.99.011.17- 25

Date: 19 August 2022

To: The Adaptation Fund Board
c/o Adaptation Fund Board Secretariat
Email: Secretariat@Adaptation-Fund.org
Fax: 202 522 3240/5

Subject: Endorsement for Hydrological Status and Outlook system for integrated water resources management and climate resilience in the Ganga Brahmaputra Meghna Basin (HydroSOS-GBM)

In my capacity as designated authority for the Adaptation Fund in Bangladesh, I confirm that the above regional grant proposal is in accordance with the government's national priorities in implementing adaptation activities to reduce adverse impacts of, and risks, posed by climate change in the Bangladesh.

Accordingly, I am pleased to endorse the above grant proposal with support from the Adaptation Fund. If approved, the project will be implemented by the World Meteorological Organization (WMO) and executed by the Bangladesh Meteorological Department (BMD), Bangladesh Water Development Board (BWDB), National Center for Hydrology and Meteorology (NCHM)-Bhutan, Central Water Commission (CWC) and India Meteorological Department (IMD), Department of Hydrology and Meteorology of Nepal).

Sincerely,

Dr. Farhina Ahmed
Secretary

Ministry of Environment, Forest and Climate Change
and
Designated authority for the Adaptation Fund in Bangladesh



Government of Nepal
Ministry of Forests and Environment



P.O.Box No.3987
Singha Durbar, Kathmandu

Ref.No. 10

Date:- July 31, 2022

To: The Adaptation Fund Board
c/o Adaptation Fund Board Secretariat
Email: Secretariat@Adaptation-Fund.org
Fax: 202 522 3240/5

Subject: Endorsement of the pre-concept note "Hydrological status and outlook system for integrated water resources management and climate resilience in the Ganga Brahmaputra Meghna Basin (HydroSOS-GBM)".

In my capacity as designated authority for the Adaptation Fund, I confirm that the above mentioned pre-concept note is in accordance with the Government of Nepal's national and regional priorities in implementing adaptation activities to reduce adverse impacts of, and risks, posed by climate change in Nepal.

Accordingly, I am pleased to endorse the pre-concept note with support from the Adaptation Fund-Regional Projects (2+ countries, USD 14 million). If approved, the project will be implemented by the World Meteorological Organization (WMO) and executed by the relevant National Meteorological and Hydrological Services in Bangladesh, Bhutan, India, and Nepal in close coordination with the climate change focal ministry in these countries.

Thank you very much for your support and cooperation.

Best regards

Arun Prakash Bhatta (PhD)
Designated Authority, Adaptation Fund
Climate Change Management Division
Ministry of Forests and Environment
Singhadurbar, Kathmandu, NEPAL.

Tel: +977 1 4211567

Web: <https://www.mofe.gov.np/>



Project Formulation Grant (PFG)

Submission Date: 09 January 2023

Adaptation Fund Project ID:

Country/ies: Bangladesh and Nepal

Title of Project/Programme: Hydrological Status and Outlook system for integrated water resources management and climate resilience in Bangladesh and Nepal (HydroSOS-BaNe)

Type of IE (NIE/MIE): MIE

Implementing Entity: World Meteorological Organization

Executing Entity/ies: National Meteorological and Hydrological Services of the targeted two countries (Bangladesh Meteorological Department (BMD), Bangladesh Water Development Board (BWDB), and Department of Hydrology and Meteorology (DHM) of Nepal)

A. Project Preparation Timeframe

| | |
|------------------------|-----------------------|
| Start date of PFG | 27 March 2023 |
| Completion date of PFG | 06 August 2023 |


B. Proposed Project Preparation Activities (\$)

Describe the PFG activities and justifications:

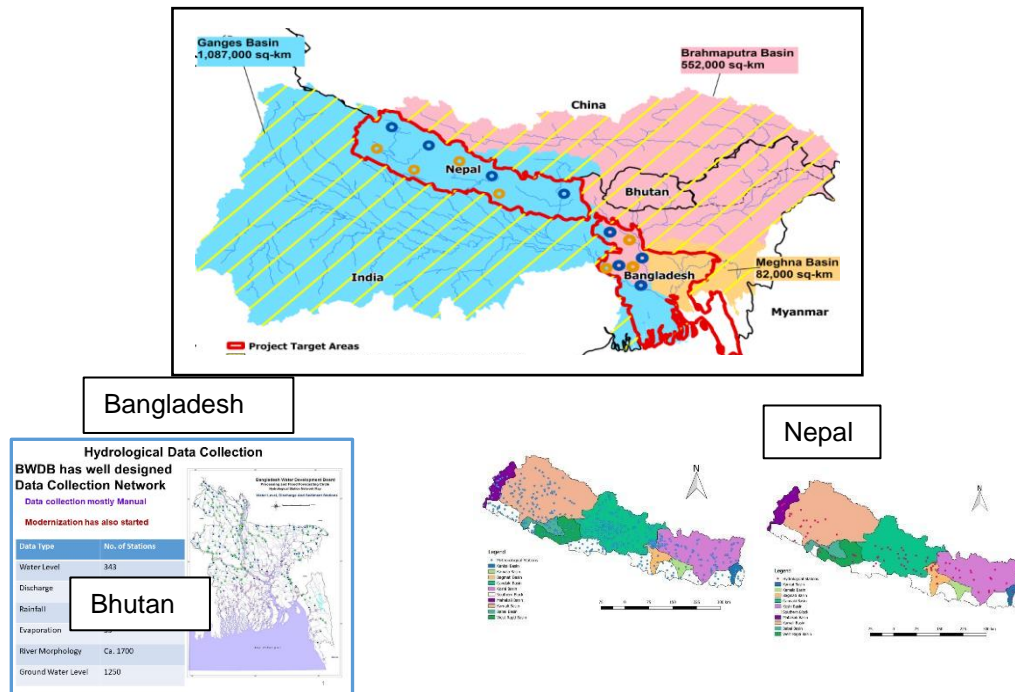
| List of Proposed Project Preparation Activities | Output of the PFG Activities | USD Amount |
|---|--|---------------|
| Hire a consultant to contribute to the development of the concept note by: <ul style="list-style-type: none"> · Performing a need assessment and developing operational solutions proposal for the HydroSOS pilot sites · Identify country specific activities needed for developing HydroSOS system | Obtain full description of problems to be solved, available data and historical events, define needs and priorities and propose operational activities needed for developing HydroSOS system | 5,000 |
| Organizing and participating to the regional Workshop organized by WMO and National Meteorological and Hydrological Services (NMHSs) to define tasks distribution and pilot areas | Meet the national and regional partners and stakeholders to validate the draft concept note and discuss detailed implementation arrangements, pilot testing areas, and finalize the above | 15,000 |
| Total Project Formulation Grant | | 20,000 |

C. Implementing Entity

This request has been prepared in accordance with the Adaptation Fund Board's procedures and meets the Adaptation Fund's criteria for project identification and formulation

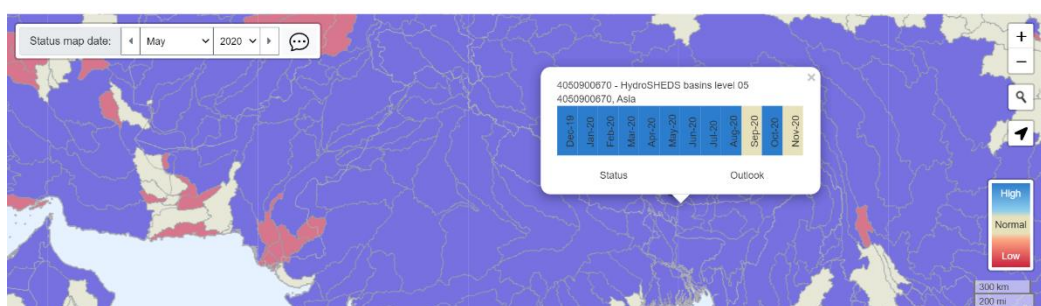
| Implementing Entity Coordinator, IE Name | Signature | Date (Month, day, year) | Project Contact Person | Telephone | Email Address |
|--|---|-------------------------|------------------------|-----------------|---------------|
| Moyenda Chaponda, Project Officer, World Meteorological Organization |  | January 09 2023 | Dr Hwirin Kim | +41 22 730 8358 | hkim@wmo.int |

Annex 1: The targeted project region (area covered under the red boundary) with the potential pilot testing sites of the HydroSOS system and community-based initiatives. The test sites will be finalized in the next phase of the project preparation phase:



Available Hydrological and Meteorological stations or associated existing products in Bangladesh and Nepal to be used for developing the HydroSOS system

HydroSOS Global demonstrator products as a demonstration of end products:
<https://eip.ceh.ac.uk/hydrology/HydroSOS/portal/>



Annex 2:

2.1 Some of the important reference materials consulted:

- 1) WMO National consultation and assessment reports of Bangladesh, Bhutan, India and Nepal. 2019-2020 (Unpublished)
- 2) Priya, Satya, William Young, Thomas Hopson, and Ankit Avasthi. 2017. Flood Risk Assessment and Forecasting for the Ganges Brahmaputra-Meghna River Basins. Washington, DC: World Bank.
- 3) Mélanie Becker et al. 2020. Water level changes, subsidence, and sea level rise in the Ganges–Brahmaputra -Meghna delta, Proceedings of the National Academy of Sciences Jan, 117 (4) 1867-1876;

- 4) P F Uhe et al, 2019, Enhanced flood risk with 1.5°C global warming in the Ganges–Brahmaputra–Meghna basin
- 5) University of Southampton, 2017, The Ganges Brahmaputra Meghna Delta: Understanding the Present State of Climate Change, Adaptation and Migration, (DECCMA) project (IDRC 107642) under the Collaborative Adaptation Research Initiative in Africa and Asia (CARIIA) programme
- 6) FAO, 2011, Transboundary River Basin Overview – Ganges-Brahmaputra-Meghna
- 7) Masood M et al, 2015, Persistence Characteristics of Floods and Droughts of the Ganges- Brahmaputra-Meghna Basins Using Flood Duration Curve and Drought Duration Curve
- 8) Robert J Nicholls et al, 2020, Deltas in the Anthropocene- Ganges-Brahmaputra-Meghna Delta, Bangladesh and India: A Transnational Mega-Delta
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2.2 List of projects/initiatives to be screened during the next phase of project development for developing synergies or complementarities

- 1) GEF funded projects in Bangladesh and Nepal
 - GEFID 10207 Building climate resilient livelihoods in vulnerable landscapes in Bangladesh (BCRL)
 - GEFID 10727 Managing Watersheds for Enhanced Resilience of Communities to Climate Change in Nepal (MaWRIN)
 - GEFID 6989 Developing Climate Resilient Livelihoods in the Vulnerable Watershed in Nepal
 - GEFID 4551 Community Based Flood and Glacial Lake Outburst Risk Reduction
- 2) RMSI Private Ltd., India, developed a calibrated flood risk assessment for the Ganges River basin and created an online flood risk atlas under the leadership of the World Bank team.
- 3) NCAR provides operational river forecasts for 87 locations across the Ganges-Brahmaputra-Meghna basins. The red dots show the forecasting sites (which coincide with river-gauge sites). The flood forecasts are available online: <http://indiawbg.rap.ucar.edu/display/>
- 4) Building River Dialogue and Governance for civil society organizations in the Ganges-Brahmaputra-Meghna river basins (BRIDGE GBM) <https://www.iucn.org/regions/asia/our-work/regional-projects/bridge-ganges-brahmaputra-meghna-river-basins-bridge-gbm>
- 5) South Asia Flash Flood Guidance System (SAFFGS)
- 6) Regional flood outlook for the Ganges and Brahmaputra river basins developed by ICIMOD <https://lib.icimod.org/record/34366>
- 6) South Asia Water Initiative (SAWI) - <https://www.worldbank.org/en/programs/sawi>.
- 7) South Asia hydromet forum - <https://thedocs.worldbank.org/en/doc/659031589812163011-0310022020/original/SAHFIIfinalreport.pdf>
- 8) Climate Adaptation and Resilience for South Asia (CARE) project - <https://projects.worldbank.org/en/projects-operations/project-detail/P171054>
- 9) Reducing Climate Change-induced Risks and Vulnerabilities from Glacial Lake Outbursts in the Punakha-Wangdi and Chamkhar Valleys <https://www.thegef.org/project/reducing-climate-change-induced-risks-and-vulnerabilities-glacial-lake-outbursts-punakha>
- 10) EU-SAR DRM program - <https://www.gfdrr.org/sites/default/files/publication/program-profile-eu-south-asia-capacity-building.pdf>
- 11) Regional Flood Information System in the Hindu Kush Himalayan Region under Hindu Kush Himalayan-HYCOS (HKH-HYCOS) project <https://www.icimod.org/initiative/hycos/>
- 12) WMO Hydrological Observing System (WHOS) <https://public.wmo.int/en/our-mandate/water/whos>