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PROPOSAL FOR CAMBODIA, LAO PDR, VIET NAM, THAILAND

ADAPTATION FUND BOARD SECRETARIAT TECHNICAL REVIEW OF PROJECT/PROGRAMME PROPOSAL

PROJECT/PROGRAMME CATEGORY: Pre-Concept for a Regional Project

Comments from Adaptation Fund technical review	Response from the ECR Mekong IE (WMO) and EEs
No. Essential information needed to justify the funding request, is lacking. The scope of the project is so broad that the diversity and complexity of the problems the proposal aims to address is not presented or reflected in the proposed approach. **CR 1:** Please provide the necessary information on the problem as well as the proposed remedy, as required, at the different levels.	Response to CR1: Climate change variability is already having an impact in the Mekong Basin and is likely to intensify in the future. According to the Mekong River Commissions (MRCs) research, a wide range of potential changes are projected to occur over the next 20 to 50 years. Temperatures are projected to increase across the basin and across seasons. By 2060 the average annual basin-wide increase could be between 0.4˚C and 3.3˚C depending on the trajectory of global greenhouse gas emissions. Average change in rainfall by 2060 under a dry climate scenario is projected to fall by 16%, and under a wet climate scenario, to increase by 17%. The objective of the ECR-MEKONG project is to assist the targeted Mekong Basin countries in the implementation of an integrated river basin flood and drought risk management approach in order to improve their existing capacity to manage associated vulnerabilities and risk at regional, national and local levels and to enhance resilience of vulnerable communities in the Mekong River Basin to climate-induced events. The countries will benefit from a basin-wide transboundary multi-hazard risk management framework based on : concrete adaptation measures applied at all levels, improved climate risk knowledge and information; improved national and transboundary cooperation arrangements and policy framework for long term investment and sustainable development. The project ECR Mekong aims to enable different actors and stakeholders at regional, national and local levels to manage climate, weather and water-related risks more effectively. Through MRC (MRC), a recent detailed assessment was conducted in the Mekong Countries and the report support the preparation of the Mekong Adaptation Strategy and Action Plan (MASAP) in conjunction with a regional review of policy for climate change and adaptation in the LMB. The proposed project will align with the MASAP strategy of MRC1. This strategy recognizes that the current water crisis in the Mekong River basin and its tributaries are inextricably linked to climate change and requires systemic changes. This project plans to drive that change using an integrated climate and water approach to deal with increasing exposure to weather and water related risks. **The project will ensure to identify existing capabilities (human, infrastructures, IT) through other on-going projects and initiatives at local, national, and regional levels and will build upon the ongoing**

[1] https://www.mrcmekong.org/assets/Uploads/Summary-of-basin-wide-impact-assessments.pdf

	efforts (use of tools, skills, and infrastructures) instead of duplication of efforts. A change through updated systems, approaches and mindset will be carried out by bringing together different disciplines in the water, climate and disaster management sectors and fostering collaboration amongst global, national and local partners which traditionally have been working separately. This will be done by breaking institutional barriers among sectors and organizations and establishing a model of cooperation that will enable different actors to achieve common goals. The broader aim is to forge new relationships that will deliver strategic results at local, national and regional levels in future, and beyond this project. **Regional level approaches:** Within the Lower Mekong Basin, there is a lack of climate change related information system especially multi-hazard early warning system covering the main river and its tributaries. Based on preliminary information, sharing of data and information from local, national to regional levels have been a challenge especially on operational hydrology. The measurements and transmission of data and information at various locations are not available and this information is critical to accurate forecasting and warning on floods and drought. The project will consider the integrated management of floods and drought through EWS, and risk based informed decision making. This will be a unique transboundary approaches where hydrological aspects will be considered for the entire Mekong Basin (for example at any given time one area of the Basin could be experiencing drought and another area experiencing a flooding situation) and then related information will be downscaled to national levels for climate change adaptation and disaster risk reduction approaches. **National level approaches:** In the Mekong River basin countries, the predicted negative impacts of climate change are leading to more severe and frequent pattern of drought and flood events. Both floods and drought could be aggravated in terms of frequency, predictability and severity leading to loss of lives and livelihoods, damage to property and environmental degradation. The project will allow national stakeholders to adopt mix of existing structural (dams, reservoirs etc) and non-structural measures (EWS, risk maps, knowledge and awareness, flood proofing, land use planning etc.) for improved climate change adaptation and disaster risk reduction. **Local level approaches:** Climate change variabilities have impacted communities on their lives, livelihood, food security, and natural resources. It is observed that the community are not receiving timely advisories from the national agencies for adaptation and risk reduction measures to the climate change events. At local level, community will develop self-help capabilities and adaptation measures (early warning system, risk knowledge, local level plans for emergency situation, raising of house level due to flood marking, changing crop patterns etc.) **A more detailed theory of change (ToC) is provided below in Annex 1.** National partners, including Governments, Research Organizations, Private Sectors, etc. in each country will set their own roles and responsibilities around these focus areas, with risk informed decision making will be delegated as close to communities as possible. This will allow for maximum flexibility and impact depending on the available

	capacities in the country. The ToC will be refined by the country teams during the next project preparation phase. **References** **https://www.mrcmekong.org/our-work/topics/climate-change/** **https://www.mrcmekong.org/our-work/topics/flood-and-drought/** **https://www.mrcmekong.org/assets/Uploads/Summary-of-basin-wide-impact-assessments.pdf** **https://www.thailandadaptation.net/pdf/pdf3/19.pdf** **https://www.ipcc.ch/apps/njlite/ar5wg2/njlite_download2.php?id=9637** **https://journals.ametsoc.org/view/journals/hydr/19/5/jhm-d-17-0195_1.xml**
No. The pre-concept note is a broad mix of issues and topics, some with a clear climate change link, others with only a marginal or no connection at all. 1. The target area of the proposal is not clearly defined and misaligned with the envisaged objective. The absence from the proposal of PR China (and, to a lesser extent, Myanmar) as a participating country is a major gap as a key source of flood-determining flow and flow control through hydropower management is thereby not included. Furthermore, apart from Cambodia and Lao PDR, only relatively small parts of the territories of Thailand and Viet Nam are located in the Mekong river basin. It is unclear to what extent and how these two countries will use and develop national and nation-wide structures based on these limited requirements. 2. The target communities are poorly identified. The project title refers to “Mekong river communities”, while elsewhere they are referred to as “riparian communities” or yet as “vulnerable communities in the Participating Countries”. The	**CR2:** The proposed project will cover the entire four countries of the Mekong River Basin to support with affordable, tailored, and sustainable climate adaptation and disaster risk reduction approaches such as: development of flood and drought risk maps for current and future climate for informed risk based decision making, Multi hazard early warning system, community based flood and drought management including localized adaptation measures such as flood water level marking for raising the level of houses or future flood proofing house construction, water resources management techniques with minimal impact on social, economic and environmental services. Below is the project targeted area and possible support to the stakeholders and beneficiaries: **List of stakeholders and beneficiaries** The direct beneficiaries of the new tools and system within the targeted countries and regional levels will include: 1. National Meteorological and Hydrological Services (NMHS) (some 500 persons from the countries), who will be contributing to the development of the tools, providing improved or new services but also gaining in capacities and means of actions. 2. Emergency, Civil protection authorities and Disaster Management Services (estimated 500 to 1000 persons from the targeted countries), who will be integrating new risk maps/warning into their operating procedures and crisis management.

flood and drought risks directly related to Mekong river flows and rainfall extend far beyond its direct riparian area. 3. The main objective of the project is described as being achieved "by implementing climate-smart decision-making networks". The proposal does not explain how these decision-making networks will be relevant in decision making across all the sectors involved in the management of drought and flood disaster risks. 4. There seems to be a major disconnect between the information that is needed and relevant for flood and drought disaster risk management (i.e. mostly *weather* forecasts) and the envisaged "climate services production and delivery". At the community level, for the mentioned sector of agriculture, weather forecasts are relevant, as decisions at a temporal scale where 'climate services' are relevant are typically not taken at the level of those communities. 5. There is a conceptual bias in the term 'flood' as used in the proposal. It is only used in the sense of being a catastrophic or disastrous event, one that should be avoided or minimised through a disaster preparedness approach. The recurrent flooding associated with the natural hydrological cycle of the Mekong River and its vital importance to globally unique biodiversity, ecosystem processes, ecosystem services and livelihoods, while documented and demonstrated ad nauseam, is entirely absent from the proposal. The proposal makes some references to hydropower development as a factor affecting flooding but ignores the impact of e.g. irrigation	3. Other National authorities of the countries and related departments (estimated total 200 persons) such as Health, Water, Irrigation and Agriculture. 4. Social Institutions such as schools, hospitals, fire stations etc. (Estimated to several thousands of people), who will be able to prepare or improve their emergency plans; 5. Non-governmental organizations (NGO's), International Non-governmental organizations (INGO's) (estimated to be several hundreds), who will either directly use the new information to improve their resilience capacity and adaptation or transfer to their partners. 6. Community-based organizations (CBO), farmer and fishermen associations, in particular women groups etc. (estimated to be thousands of persons over the basin) in the Mekong River Basin who will be using the new tools and methodologies to decrease their vulnerability to extreme events; 7. Managers of industrial sites (estimated to several thousands of people over the basin), and private companies (dam's operators) who will be able to draw emergency plans and build more resilient infrastructures; 8. Individual Community members of urban and rural areas especially youths who are more familiar with Information Technologies (potentially the whole population of the Mekong River Basin, but in the first stage, estimated 5-10 %, or approximately up to 1 million persons) who will, get timely warning messages and possibly contribute to disseminating and crowdsourcing of information for early actions.  **Figure 1: Maps of targeted areas of the Mekong River Basin** Key affected stakeholders are mainly two kinds in the Mekong region: 1) People working in the agricultural and fishing sector (farmers, pastoralists, fishermen) that accounts for 40% of the basin's economy output. More than two third of the total people living in the basin are largely dependent on agriculture[2], which is mainly rain-fed, poorly mechanized and consists of small family farms that are particularly vulnerable to climate change impacts, especially risks of drought and floods. This vulnerability is caused by high dependence on rain-fed agriculture but also the low levels of data and information, in addition to the prevalence of poverty and the relatively low capacity of the governments and communities to adapt. The projected increase in temperature and rainfall will result (and some impacts are already visible) in crop failure and loss of livelihoods for farmers that practice rain-fed cropping (majority of them in the basin). Research studies show there will be short and intense monsoon period in future and then longer dry season where shortage of water will impact the livelihoods, economic activities such as hydro-power generation, water availability etc. for example, in the Cambodia part of the basin, local activities (agriculture, livestock farming and fishing) are completely dependent of the floods due to the extreme poverty of local communities. However, rainfall have been irregular which directly impact local economic activities. Farmers cannot stock cereals which hinder financial and food security stability. They often choose crop diversification and exodus to cities as adaptation strategies.

[2] https://cuts-international.org/HRC/pdf/PB-8-07.pdf

development and loss of wetlands and floodplain vegetation, dynamics and other features such as connectivity. 6. Similarly, the proposal ignores the livelihoods and ways of life of millions of households in the Mekong River basin who have adapted to naturally occurring floods and droughts and, in a number of cases, have developed over several thousands of years ways to cope, exploit and often prosper with these natural hydrological cycles. 7. The project objective includes "better (…) water resources management encompassing hydropower generation." The development of both mainstream and tributaries hydropower infrastructure in the Mekong River basin of the past three decades has clearly shown the inability of the countries and companies involved to take into consideration factors in their hydropower operations that are not directly in support of their own profitability. Clearly, considering their impact on river flows, they are of vital importance in flood and drought disaster risks management. However, the proposal does not demonstrate how it will achieve such engagement with the hydropower sector. Attempts at their engagement have consistently failed, despite the existence of bespoke international agreements and institutions established for that exact purpose (e.g. MRC). **CR 2:** Please clarify the link between the project objectives, the project components and the proposed allocation of financing, taking into consideration the above remarks.	2) Poor people living in areas at risk in cities: Due to the lack of land-use planning and alternatives, people affected by poverty mostly live in areas at risk such as flood plain near the urban areas, riverbanks, valley floors and slopes, particularly vulnerable to floods and landslides. Based on the collected floods and droughts in Mekong River basin in recent 20 years, the losses, causes and effects of flood and drought disasters are analyzed[3]. The main conclusions are drawn as follows: (1) Flood-caused fatalities in the Mekong River Basin were most serious, 825, in 2000, followed by 2001 (489), 2011 (396), 2013 (247) and 1996 (173). (2) Flood imposes significant impact on agriculture. 2000 saw the biggest agricultural impact of floods, approximately 2.50 million hm², followed by 2011, about 500,000 hm². (3) Flood incurs serious economic loss in countries in the basin. Cambodia ranks top by 1.4 billion USD, followed by Viet Nam by 980 million USD and Lao PDR by 590 million USD. Thailand ranks bottom by 310 million USD in 1996–2014. As floods are predicted to become more severe and frequent with climate change, more people will be at risk in the cities or urban areas of the Mekong. The project will promote the concept of transboundary implementation of the Integrated Flood and Drought Management strategies (supported by WMO and GWP- Associated Programme on Flood Management (APFM) and Integrated Drought Management Programme(IDMP) through non-structural and structural measures which has the objective to maximize the net benefit from the flood plan (supporting their existing strategies to cope, exploit and often prosper with the natural hydrological cycles) and at the same time reduces the socio-economic and environmental impacts. The "integrated" does not refer to the two hydrological extremes (i.e. integrating drought AND flood management) but rather, as explained in relevant literature http://www.floodmanagement.info/publications/concept_paper_e.pdf and http://www.idmp.info/documents/IDMP_Concept_Note.pdf to the integration of aspects not only related to the technical side of these events (i.e. engineering or hydrological solutions) but also aspects related to the socio-economic, environmental and institutional implications that floods and drought entail. The project will support in adequately managing of water resources in the Mekong river basin region mainly through hydro-meteorological information for various stakeholders such as hydro power dam operators, river basin authorities, MRC etc. for timely decision making on water availability in river stream mainly its status (current flow whether it is normal situation, above normal or below normal), forecasts (0-7 days for floods and hydro-meteo drought events), sub-seasonal to seasonal outlook (how the situation is going to change in coming months accessing also the meteorological parameters) which will improve the efficient use or release of water. This will avoid storage of access amount of water which can eventually lead to dam break or spillage. In Lao

[3] https://www.researchgate.net/publication/342535200_Summary_of_Flood_and_Drought_in_Mekong_River_Basin

CR 3: Please clarify the components to demonstrate how they will realistically result in outcomes that contribute to achieving the project objectives.	PDR, during 2018 there was a dam outbreak situation leading to loss of lives, damage to property and infrastructure and displacement of population[4]. Following the development of the hydrological status and outlook system, the dam operators, MRC and national hydro-meteorological agencies could jointly monitor the situation at the Mekong River basin and make risk informed decision-making for reducing the impacts to population and river stream dependent livelihoods. The proposed ECR-Mekong project is addressing this major gap of transforming these scattered national capacities, for hazard forecasting and early warning, into a common structure and an extension of successful solutions to cover larger territories as both the hydro-meteorological events are not spatially limited and go beyond the countries border. The project objectives and project components have been aligned based on the above presented approach. Component 1 Risk preparedness and adaptation through user-centred and integrated Early Warning Systems for drought and floods, including: - *Develop capacity and established frameworks at the local, national and regional levels to ensure risk informed decision-making.* - *Future scenario and impacts on the socio-economic and environmental.* - *Enhanced understanding of existing hydromet warnings at the national level, through increased collaboration between NMHSs and DRM authorities to harmonise multi-risk information and warnings.* - *Integration of existing information and data to strengthen flood and drought forecasting instruments and Early Warning Systems (EWS) and coordination at the transboundary level to reduce disaster risks in vulnerable communities.* - *A web-based Hydrological Status and Outlook System for EWS is designed and developed together with the National services along with impact-based flood forecasting.* Component 2: Established Locally led adaptation and disaster risk reduction strategies to counter the adverse impact of drought and floods. - *Community based flood and drought management in order to develop capacities and increase resilience of communities in selected vulnerable areas where flooding poses a prominent risk* - *Develop preparedness and response measures implemented through the National forecasts and warning services.* - *Demonstration of the added value of the E2E EWS Alarm through a series of pilot testing during monsoon and dry seasons* - *Develop medium and long-term locally led adaptation measures for vulnerable communities* Component 3: Water, Weather and Climate resilient regional and national cooperation arrangements together with stakeholders including community involvement

[4] https://www.ohchr.org/en/press-releases/2022/07/lao-dam-disaster-un-experts-decry-lack-progress-survivors-four-years#:~:text=A%20torrent%20of%20water%2C%20mud,left%20homeless%20by%20the%20disaster.

	- *Strengthened capacities of actors and decision-makers at national and transboundary level on long term risk management policies plan and strategies* - *Helping in participatory management of water and natural resources in MRC and support to Hydrological Climate Outlook Forum* - *Regional mechanism for adaptation cooperation on HydroSOS established and operational. Periodic review and update of the mechanism is agreed on by riparian states* - *National adaptation strategies (NAPs) are fully inclusive of water management issues, address community concerns. Methodology and mechanism for leveraging and sharing benefits of optimising adaptation at regional level are in place* - *A collaborative process is developed to ensure those instruments and strategies are accepted by the local organization and communities and adapted to the local context* The component 3 will be on governance to ensure the experience and good practices gained from the proposed project leads to review and update of national policies and plans (NAP, NAPA, Nationally Determined Contributions and disaster risk reduction strategies) eventually leading to long term investments for strengthening climate change adaptation at regional, national and local levels. Each component will deliver outcomes and associated outputs which are inter-linked or dependent on the information and outputs from the previous outputs or activities. References: https://unfccc.int/sites/default/files/200311_start_adaptation_mekong.pdf https://en.wikipedia.org/wiki/2018_Laos_dam_collapse https://www.mrcmekong.org/news-and-events/news/extent-of-flooding-and-water-level-rise-from-dam-break-in-southern-laos/
No. Despite its very broad scope, it can be concluded that the proposal would contribute primarily to disaster risk reduction and early warning systems. The potential for the project to support concrete adaptation actions is low, as the allocation of funding to activities that could be considered concrete adaptation, or that are likely imminently leading to such adaptation, is very limited, involving only an unspecified number of pilot cases and sites.	**CAR1:** A central output of the project is the development of an End-to-End Early Warning System covering the various areas at risk of floods and drought (including landslides). The system will allow to produce and disseminate warnings according to pre-defined levels of risks, using colour coding and icons for the different types of hazards, similarly to the warning systems largely installed over a large number of countries and transboundary watersheds (see for example the MeteoAlarm platform that is gathering information from European countries https://www.meteoalarm.eu/). These multi-hazard warning systems provide already information to the end-users on various types of extreme events, from meteorological (wind, temperature, precipitations and heavy rainfall for example) and hydrological (soil moisture, high and low water-levels) nature, but also from geological (landslide) or health related (heat wave) origin. However, it has to be noted that the methods allowing to produce warnings will differ depending on the characteristics of the hazard (flood or drought). This is due to the fact that, besides being both hydrological extremes, the two phenomena differ a lot in terms of manifestation: floods are usually rapid events, caused by intense precipitation, limited in time and affecting a localized area; whereas drought are a slow induced event,

The added value of the regional approach is not demonstrated (please also see comment 1 under point 3 above). For rainfall forecasting, regional impacts in terms of flood and drought risk materialise in a lagged manner through the hydrology of the river, which is extensively monitored and for which robust flood forecasting has already existed for several years (please see e.g. https://portal.mrcmekong.org/monitoring/flood-forecasting). The description of how the project would provide new and innovative solutions for climate change adaptation is vague and contains very few new and no innovative elements. Numerous attempts to "solve potential conflicts in water use between agriculture, energy, and water management using multipurpose infrastructures" have been made in the past, many through MRC, and have mostly failed. The section on cost-effectiveness provides no information on how the proposed project would be a cost-effective way to achieving the project objectives. The proposal contains no gender considerations. Sustainability of the project is said to be "guaranteed" by the national meteorological institutions "in their roles of government agencies supported by public funding with officially mandated duties." The proposal contains no relevant information in support of the claim of sustainability of the project outcomes. **CAR 1:** Please provide the required information justifying the proposed project.	and might have a much-distributed impact both in area and time. As such, the data needed and the methodology to forecast the two phenomena varies considerably and depends on different availability of suitable data (meteorological and hydrological historical data series, forecasts and climate predictions). Climate change events have impacted communities with loss of lives, livelihood, food security, and natural resources. It is observed that the community are not receiving timely advisories from the national agencies for adaptation and risk reduction strategies to the climate change events. Through timely warnings and advisories from the national hydro-meteorological agencies, vulnerable communities will develop self-help capabilities and adaptation measures (early warning system for informing other member of communities, type of risks and its associated impacts, local level plans for emergency situation, raising of house level due to flood marking, changing crop patterns etc.). These locally led adaptation measures will be critical for adapting to the climate change and continuing their lives ensuring the risks are minimal. Previously if the community was impacted by floods or drought, there were migration within the countries mainly to urban areas where similar risks exist or they have to struggle to identify livelihood and fight for resources to survive. The existing early warning system (including https://portal.mrcmekong.org/monitoring/flood-forecasting) are mainly providing forecasts for flood events for the next days (usually for 0-5 days). However the ECR-Mekong is proposing a system (integrating information and products from other completed and on-going projects or initiatives) which will provide hydro-meteorological information for various stakeholders such as hydro power dam operators, river basin authorities, MRC etc. for timely decision making on water availability in river stream mainly its status (current flow whether it is normal situation, above normal (high flow) or low (below normal)), forecasts (0-7 days for floods and hydro-meteo drought events), sub-seasonal to seasonal outlook (how the situation is going to change in coming months accessing also the meteorological and climatological parameters) which will improve the efficient use or release of water to communities. The basin scale approach is a suitable way to identify and implement cost-effective measures as Mekong countries have similar challenges related to climate change events (floods and drought) that will be addressed during this project. 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 Mekong Basin 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 Mekong basin is better understood through a regional project which provides opportunities to share experiences, good practices 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. Also, a regional approach will ensure monitoring and warning information is shared between the respective agencies of the Mekong countries and is further developed for end-user to support timely decisions. Understanding related to a rapid on-set of flooding and severe slow-setting drought are constrained due to lack of regional and national datasets and standardization in analytical methods and interconnectedness between different types of droughts namely meteorological, hydrological and agricultural where regional level data and information (from upstream to downstream countries) will be critical for successful development and operationalization of EWS. The

	proposed project's activities under each Component will promote improved coordination between regional and national institutions responsible for transboundary water management, disaster risk reduction and climate change adaptation for the Mekong region. By involving the four-countries, previous knowledge and funding, as well as current projects, can be considered to ensure minimum overlap and transfer of methodologies from one area to the other. The cost effectiveness analysis of the proposed project with alternative methods have been updated ensuring sustainability of the proposed solutions. The below proposed cost effectiveness approaches includes potential cost value under the column' Alternatives to the proposed approach and cost'. In consultation with the national and local stakeholders it was agreed that the climate change adaptation (CCA) measures (through EWS, community-based activities, risk maps for understanding potential impacts) to floods and drought hazards is more cost-effective than the baseline of disaster response and rehabilitation. Early Warning Systems provide more than a tenfold return on investment. Just 24 hours' notice of an impending hazardous event can cut the ensuing damage by 30 per cent. The Global Commission on Adaptation found that spending just US$800 million on such systems in developing countries would avoid losses of $3 to 16 billion per year. (reference: https://www.un.org/africarenewal/magazine/april-2023/fast-tracking-global-early-warnings-systems#:~:text=Early%20Warning%20Systems%20provide%20more,damage%20by%2030%20per%20cent.) Hence, it was felt that there is an urgent need to implement non-structural measures for managing floods and drought such as EWS, risk maps, knowledge and awareness, improved livelihood through sub-seasonal and seasonal outlook of weather and water availability, etc. to improve preparedness and resilience of target communities. Alternative to the proposed approach, the costliest measure (approximately 100-150 times more cost as compared to the proposed project) would be resettlement of vulnerable communities, which would also involve unacceptable amounts of risk in terms of social and economic disruption to the communities. Investing in community infrastructure reconstruction or retrofitting as an alternate solution is not only highly expensive (at least 50-100 times more expensive) and but time consuming too for example carrying out retrofitting in downstream areas where not just houses even water resources infrastructures require to be covered for drought. In addition, post-retrofitting community members will still be vulnerable to the worst floods and drought events. Another expensive set of measures in terms of economic costs would be targeted protection structures, such as drainage construction work or protective dams/reservoir, which have been previously adopted and still chances of getting affected by floods is very high. Given the relative advantages of CCA and DRR measures, the project has selected the three least-expensive interventions through a) EWS b) knowledge and c) capacity building measures, which together will generate significant benefits such as increased safety and economic activities as opposed to significant investment in structural (hard measures).

	Relevant changes have been made to the updated pre-concept note and it is shared for review. In the fully developed concept note and proposal, the project partners will present a detailed and quantitative analysis of cost effectiveness of the selected measures compared to alternative options that could have been established to address the issues. The project development team has carried out initial assessment in consultation with stakeholders (national agencies staff and community representatives) to identify if the proposed project will lead to any equity and women empowerment and this was not identified at the initial screening of the proposed project activities. On the contrary, the proposed project will improve the gender equity and women empowerment through the WMO developed tool: Training Manual for mainstreaming gender in End-to-End Early Warning system for flood forecasting and integrated flood management through a participatory design approach. This will help in increasing the participation across gender divide and that of other vulnerable groups in flood and drought management activities and decision-making processes. Further the activities related to the development of risk maps and an integrated early warning system will take place in an inclusive and participatory manner ensuring vulnerability related data are dis-aggregated by sex and in tailoring warning services to fill the needs of the population especially women, children, elderly etc. Women representatives will be involved in the design, organization and implementation of the activities such as in training workshops, meetings, update or review of policies and plans etc. It is expected to empower them with knowledge, skills and tools for disaster preparedness and resilience. However, the ECR-Mekong project team will conduct EIA and SIA studies planned in the next phase of project concept note development to carry out a detailed screenings of all the 15 Adaptation Fund environmental and social principles as well as gender policies. In case of any risks identified, necessary mitigation or management measures will be provided in the environmental and social risk management plan. The project team has added necessary changes, and more information will be provided in the next project concept note document which will be submitted to the Adaptation Fund in the next submission cycle. The project will build capacities of NMHSs, disaster management, communities, NGOs etc. on mainstreaming gender into end-to-end early warning systems for flood forecasting and integrated flood management mainly to incorporate gender-sensitive needs, strategies, and actions through a participatory design approach. WMO in collaboration of Disaster Management and CBOs, will conduct training and capacity development activities on gender mainstreaming into different phases of flood and drought management (data collection, modelling and forecasting, early warning information dissemination, decision-support and response to warning). Long-term maintenance of the tools and methodologies have been agreed with the national and regional stakeholders. The official commitment from MRC has been received for their participation as the regional executing entity and supporting the development and implementation of the ECR-Mekong project. A commitment letter from the NMHSs agencies of the four countries will be provided during the next submission of the project

	concept note. The texts under the pre- concept note have been added with the proposed commitment letter from the NMHSs of the four countries which will be added in the concept note. These commitments and support of the national agencies will ensure the continuous flow of data and information for production, use and maintenance of HydroSOS EWS products and tools, which will also remain operational even after the completion of the project and thus securing long-term sustainability. In the next development phase of the project, roles and responsibilities of other relevant agencies at regional level (ICIMOD, ADPC, RIMES etc.) and national levels (disaster management, water resources, research institute or academia, environmental agency, NGOs etc.) will be identified for different proposed activities (such as support to data collection for risk maps and its use, community-based flood and drought management, capacity development on nature-based solutions and gender mainstreaming, synergies with other projects, etc.). and support letter will be gathered to secure their availability and participation during and after the project phase. Reference: https://public.wmo.int/en/our-mandate/what-we-do/application-services/hydrosos
Unclear. The proposal includes eight organisations as named Executing Entities, four in each participating country, and four located outside the project region. In addition, unspecified "relevant national institutions" will execute activities at community level in each country. The role of MRC as regional partner is unclear. **CR 4:** Please clarify (i) the role of each executing entity in executing the proposed components/outputs, as well as (ii) the process through which a smooth coordination among the myriad of EEs will be ensured. None of the participating countries has an accredited NIE. The IE will be involved in the execution of some activities. The proposal should comply with relevant AF guidelines related to implementing entities providing execution services.	**CR4:** The IE and EEs have discussed the importance of involving regional entity during the design and implementation of the project activities, especially at the regional levels. This will allow ownership, maintenance, operationalization, and scalability of project outputs and outcomes generated at the national and regional levels. MRC have been supporting the four project countries in improving their monitoring and forecasting capabilities for floods and drought. The IE (WMO) has received the agreement from MRC as a regional entity to join the ECR-Mekong project development and implementation as an executing partner, supporting the regional coordination and implementation of the activities at the regional level. MRC as an intergovernmental agency formed by the Mekong countries to provide support in operational services such as management of climate change events, institutional capacity development programme, coordination among upstream and downstream countries and implementation of regional strategy on water resources management and disaster risk reduction in the Mekong River basin. MRC will ensure data are shared (list of hydro-meteorological stations in the Mekong countries are provided under Annex 2) from national agencies to continue the operation of the HydroSOS system and d) under component 3, support in the review, update or development of transboundary policies, plans and guidelines on managing floods and drought events in the changing climate. The review and update of the policies, plans and guidelines will be carried out based on experiences and lesson learned during the development of HydroSOS system with impact-based forecast and implementation of the pilot testing phase to test the applicability and effectiveness of the early warning services from regional, national and at local levels. The participation of MRC will be instrumental in ensuring long term sustainability of development tools, capacities and scaling up of the project results in future to other non-participating countries of the Mekong River basin or in Southeast Asia.

CAR 2: Please clarify the role of the IE in the execution of the project, and correct the administrative costs accordingly as needed, in line with relevant AF guidelines.	A specific letter of cooperation or support will be signed for the ECR-MEKONG project and submitted to the Adaptation Fund during the project concept note stage highlighting detailed roles and responsibilities of MRC. The number of executing entities initially proposed has been revised in the updated pre-concept note. Presently MRC and NMHSs of the four countries are part of the executing entities together with WMO. Other partners will join as the technical implementation partners once the project will move into the implementation considering their expertise and required need in the implementation of the project activities at local, national and regional levels. Yes, the NMHSs are not accredited as the Adaptation Fund NIE. However their involvement is important at the national level due to their national mandate in operational meteorological and hydrological services and has available expertise and necessary data required for the development of the HydroSOS system and other tools needed for effectively management of the climate change events. The IE (WMO) serving also an EE will apply 1.5% of the execution fee in order to provide support in the execution of activities under various components of the proposed project. The IE(WMO) will not directly implement any activities in the countries but mainly provide guidance and support through the WMO technical partners (especially from WMO Associated Programme on Flood Management (APFM) and Integrated Drought Management Programme (IDMP)) having relevant expertise related to flood and drought management especially for the development of risk maps, HydroSOS products and tools, etc. The IE jointly with EEs will select technical implementation partners to support the national agencies with various activities ensuring the following 1) Organizations have experience of working in the project countries or region 2) Organizations have expertise in the various areas of project activities. They have competency to manage or oversee the execution of the project/programme including ability to manage sub-recipients and to support project activities implementation, building synergies with other on-going projects or initiatives (as provided under Annex 3) and deliver jointly with the regional and national stakeholders. Having an understanding of and capacity to implement technical activities of the project and their implications, the partners will provide solutions that are free and open source and design tools following participatory approach which will be sustainable and without leading to social, environmental and gender related risks. The draft institutional arrangement for the ECR-Mekong project is provided under Annex 4 and will be refined in the next project development phase aligning with the mandate and expertise of various agencies. WMO being a United Nations specialized agency has several advantages such as VAT exemption during the procurement of goods and services, expertise and availability of technical tools and products, etc. which will be instrumental in the execution of the project activities (as with the National agencies carrying out procurement of goods, some VAT charges and other admin and services related fees needs to be provided). For this, WMO as EE can lead the procurement process related to the establishment of the HydroSOS EWS (in case of purchase of server, IT equipment's, installation of few hydrological or meteorological stations or maintenance services ensuring necessary real-time hydrological and meteorological data for development of the HydroSOS

<table>
<tr><td></td><td>EWS is available). For above mentioned justification, WMO will directly be involved in the procurement of goods and services and provide technical partners experts to support the national agencies to develop early warning system for climate change adaptation and disaster risk reduction measures.
The detailed budget for IE and EE fees parted by each executing partners and activities will be updated (ensuring WMO as IE will follow the AF guidelines on budgeting for the project) during the concept note and proposal development stage.</td></tr>
<tr><td>Unclear.
The total funding requested does not correspond to the sum of the project activities and the administrative costs.

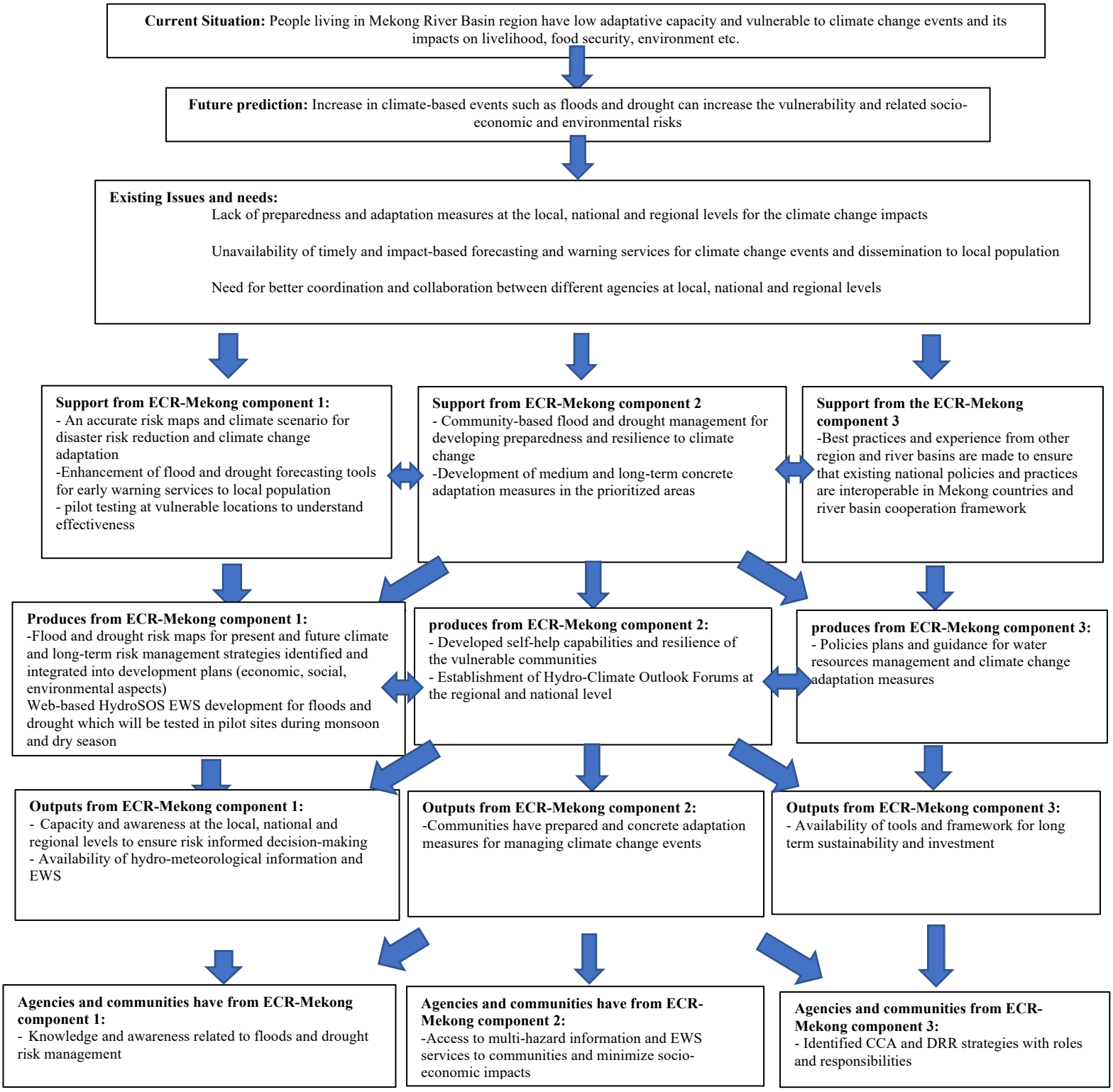
CAR 3: Please correct the amounts of funding requested.

At 8.5 per cent, the Implementing Entity Management Fee is at or below 10% of the project/programme cost, as are at 8.7 per cent the Project Execution Costs.</td><td>CAR3: The amount of funding requested have been corrected in the revised pre-concept note reflecting the AF guidelines on budgeting for the project ensuring the implementing fee is at or below 10% of the total project cost.

<table><tr><td>Total programme/project costs</td><td>10,350,000</td></tr><tr><td>Project/Programme Execution cost (9.5% of total components cost)</td><td>$ 983,250</td></tr><tr><td>Total Project/Programme Cost</td><td>$11,333,250</td></tr><tr><td>Project/Programme Cycle Management Fee charged by the Implementing Entity (if applicable) (10% of the Total Project/Programme Cost)</td><td>$ 1,133,325</td></tr><tr><td>Amount of Financing Requested</td><td>$ 12,466,575</td></tr></table>
The detailed split of budget for each IE and EEs will be provided during the submission of the full project proposal which will be submitted during early 2025 for review and endorsement by the Adaptation Fund Secretariat, PPRC and Board Members.</td></tr>
</table>

Annex 1: Detailed Theory of Change

Theory of Change framework for the ECR-Mekong project submitted to the Adaptation Fund



Future outcomes from the proposed project
Developed community resilience to climate change with adaptable strategies, actions and governance in the Mekong River Basin, possibility to scale the results to other South-East Asian countries

Annex 2: The preliminary list of stations in the Mekong River Basin which will be used for calibration, development of EWS and verification of hydro-meteorological events

Annex 3: Draft list of projects or initiatives for developing synergies and complementarities with the proposed ECR-Mekong project

	Title	Details	Period	Institutions Involved
Disaster Risk Reduction				
1	Piloting Flood Management Planning Tool at the Sangkat Level Phnom Penh	- The aim of the project is to build the city's capacity to predict, manage, and mitigate the impact from floods at the local/commune level	2021 - 2022	GFDRR
2	Cambodia Southeast Asia Disaster Risk Management Project: Component 1 and 2	- Component 1: Resilient rural corridors. Resilient rural roads rehabilitation and maintenance (Activities include road safety training and disaster risk management, preparedness planning, and awareness raising for communities adjacent to rural roads.) - Component 2: Financial planning for disaster resilience (This involves provision of technical assistance to strengthen MEF's capacity for financial planning for disaster resilience.	2017 - 2023	World Bank, MRD, and MEF
3	Strengthening Cooperation on Disaster Risk Management within the Association of Southeast Asian Nations	- The KSTA aims to support the Association of Southeast Asian Nations (ASEAN) Secretariat and member states implement the ASEAN Agreement on Disaster Management and Emergency Response (AADMER) Work Programme 2021-2025 by supporting increased cooperation and enhancing capacity on disaster risk management (DRM).	2021 - 2023	ADB
4	Building Disaster-Resilient Infrastructure through Enhanced Knowledge	- The TA aims to strengthen action-oriented disaster risk management (DRM) knowledge for disaster-resilient infrastructure in developing member countries (DMCs).	2020 - 2022	ADB
5	Lao PDR Southeast Asia Disaster Risk Management Project	- The objective of the Southeast Asia Disaster Risk Management Project for Laos is to reduce the impacts of flooding in Muang Xay and enhance the Government's capacity to provide hydro-meteorological services and disaster response.	2017 - 2024	The World Bank
Early Warning System				
1	Installation of the Automated Weather Observation System for Forecasting and Warning of Natural Disaster in Cambodia	Key activities include: - Investigating the meteorological status and relevant infrastructure conditions, including weather stations in Cambodia - Installation of 27 Automatic Weather Stations (AWSs) and power system at the weather stations - Development of a data receiving system at MOWRAM in Phnom Penh, a data analysis and display system to support weather forecasting.	2019 - 2022	KMA and KMI
2	Support of the GEO-KOMPSAT-2A Receiving and Analysis System in Cambodia	Key activities include: - Investigating the meteorological status and relevant infrastructure for meteorological satellite utilization in Cambodia	2020 - 2023	KMA and KMI

	Title	Details	Period	Institutions Involved
		- Selection of a service provider for the installation of GEO-KOMPSAT-2A (GK2A) receiving and analysis system. GK2A[5] is expected to provide nationwide meteorological information with high-resolution satellite images and high-speed data transfer.		
3	Cambodia Agricultural Sector Diversification Project (Component 3: Improvement of agricultural information systems and quality control management)	- The component has a sub-component on Agricultural Information System which will be developed to improve the use of soil/agro-ecological maps, agricultural early warning systems, food production and agricultural statistics/census data, etc. New technologies in ICT will be promoted to ensure broadcast dissemination and best use of available data and information for public and private sector stakeholder's planning and decision-making.	2019 - 2025	MAFF, MEF, MRD, MOWRAM, and The World Bank
4	EWS1294	- The EWS1294 is a life-saving system that provides accurate and timely flood information to national and provincial authorities and allows them to easily and quickly disseminate reliable warning messages to at-risk communities regarding climatic or societal hazards. The system is operational in Cambodia and is being developed in Laos.	2013 - 2024	ECHO, SDC, MFA, UNDP, WFP, BHA, PIN
5	Flash Flood Guidance System with Global Coverage (FFGS)	- FFGS is necessary to provide operational forecasters and disaster management agencies with real-time informational guidance products pertaining to the threat of small-scale flash flooding.	On-going	WMO
6	Enhanced Severe Weather Response utilizing an Integrated Typhoon Monitoring and Forecasting Platform in Lao PDR	- The objectives of the project are to enhance response capacity to typhoon hazards, reduce economic damage, and improve safety of people in Lao PDR by monitoring and forecasting typhoons with Typhoon Operation System (TOS) and GEO-KOMPSAT-2A (GK2A) receiving and analysis system. GK2A[6] is Korea's second geostationary meteorological satellite launched in 2018.	2020 - 2023	KMA
7	Strengthening Agro-climatic Monitoring and Information System (SAMIS)	- The project aims to strengthen agro-climatic monitoring, analysis, communication, use of data and information, and knowledge management and dissemination for agriculture and food security, as well as boosting the institutional and technical capacities involved in the services.	2018 – 2022 with expansion in the pipeline	LDCF, GEF, GCF, FAO, DMH, MONRE, DALaM, MAF
8	Reinforcing the capacities of meteorological and hydrological services and enhancing the early warning systems	- The project aims to enhance the capacities of national and regional stakeholders/institutions to provide hydromet, early action and response services to ensure that vulnerable populations in Cambodia and Lao PDR are reached through effective and inclusive risk-informed early warning services.	2021 - 2025	WMO, WB and UNDRR

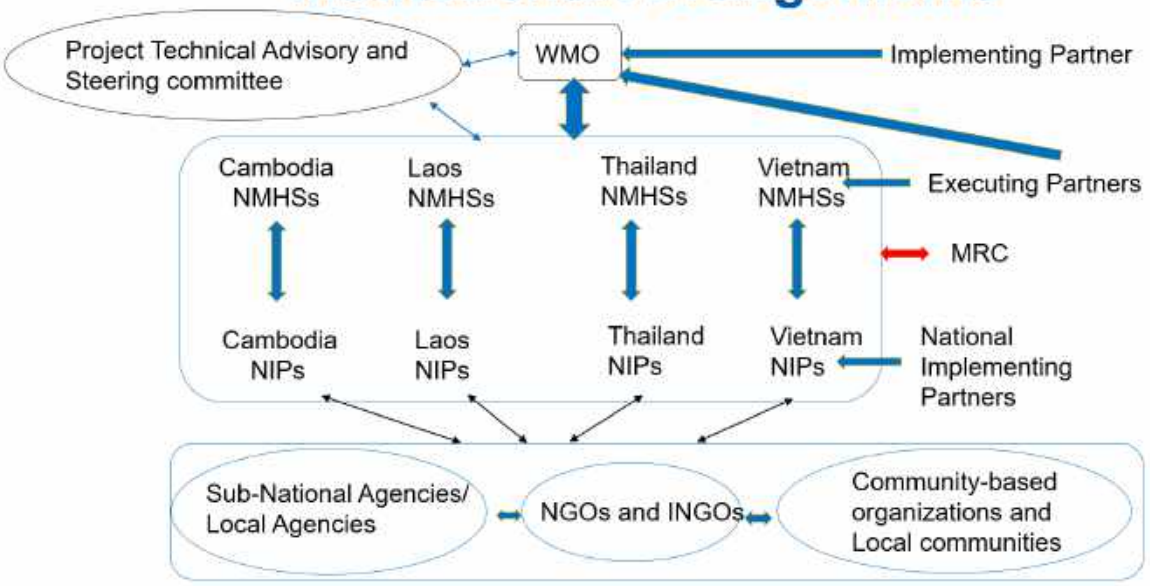
	Title	Details	Period	Institutions Involved
	in Cambodia and Lao People's Democratic Republic (PDR) (CREWS Cambodia and Lao PDR)			
Integrated Water Resource Management				
1	Irrigated Agriculture Improvement Project	- The project aims to enhance the efficiency and climate resilience of irrigation systems and to improve the water resource management in Cambodia.	2019-2025	MOWRAM with ADB support
2	Water Resources Management and Agroecological Transition for Cambodia (WAT4CAM)	- The program consists of 4 components: (1) Rehabilitation and completion of irrigation and drainage infrastructures; (2) Improvement of irrigation management; (3) Support water resources monitoring and management. This component will provide specific modelling studies, capacity building to MOWRAM on IWRM processes, river basins planning and management, spatial hydrology and climatic services; (4) Support innovative farming practices and support to rice value chain.	2019 - 2023	MOWRAM, MAFF, MEF with support from Agence Francaise de European Union
3	Uplands Irrigation and Water Resources Management Sector Project	- The project aimed to help the RGC increase agricultural production, modernizing, and climate-proofing selected irrigation systems in Kampong Thom and Battambang provinces. Subprojects were undertaken to (i) enhance efficiency and climate resilience of irrigation systems, and (ii) improve water resource	2016 - 2022	MOWRAM and ADB
4	Mekong Integrated Water Resources Management Project	- The program development objective is to establish key examples of integrated water resource management practices in the LMB at the regional, national, and sub-national levels, thus contributing to more sustainable river basin development in the Lower Mekong	2012 - On-going	The World Bank
5	Additional Financing for Mekong Integrated Water Resources	- The development objective of the First Phase of Mekong Integrated Water Resources Management Project of Lao People's Democratic Republic is to improve water resource and fisheries management in selected areas of the Lower Mekong Basin.	2017 - On-going	The World Bank
6	Groundwater resources in the Greater Mekong Subregion: Collaborative management to increase resilience (Cambodia, Lao People's Democratic Republic, Thailand, Viet Nam)	- The project aims to benefit around 1.5 million people indirectly, it also targets to create a groundwater community of practice (CoP) of around 20 experts, equipped with the skills to ensure technical and management capabilities. Additionally, it will support the regulatory framework to manage resources and expand new groundwater-based resilience strategies and practical interventions by proposing either primary or secondary legislations in the targeted countries.	2022 - 2026	United Nations Educational, Scientific and Cultural Organization
Climate Change Adaptation				

	Title	Details	Period	Institutions Involved
1	Identifying Climate Adaptation Investment Priorities (Subproject 4)	- The knowledge and support technical assistance (TA) cluster on Supporting the Implementation of ADB's Climate Change Operational Framework 2017-2030 (CCOF2030) was approved by the President on 7 December 2018 with an amount of $4.55 million. The TA cluster is aligned with the Asian Development Bank's (ADB) Strategy 2030 Operational Priority 3 on tackling climate change, building climate and disaster resilience, and enhancing environmental sustainability.	2022 - 2024	ADB
2	Climate Change Adaptation through Protective Small-scale Infrastructure Interventions in Coastal Settlements of Cambodia	- The main objective of the project is to enhance climate change adaptation and resilience of the most vulnerable coastal human settlements of Cambodia through concrete climate change adaptation actions, particularly in areas where ecotourism has the potential to sustain such interventions. To achieve this objective, the project focuses its actions on highly vulnerable settlements in Kep Province and Prey Nob District of Preah Sihanouk Province.	2021 - 2025	UN Habitat and Adaptation Fund
3	DE-RISK Southeast Asia	- The DE-RISK project will develop climate risk management systems, best practices and insurance products that will shield smallholder farmers and businesses engaged in producing coffee, sugar, rice, cassava, rubber, dairy, and grazing across the agricultural value chain in key Southeast Asian countries from physical and financial disaster associated with climate change.	2018 - 2022	WMO
4	Greater Mekong Subregion Climate Change and Environmental Sustainability Program	- The TA is aligned with the following impact: environment sustainability and climate-compatibility of economic growth and propensity in the GMS improved, as stated in GMS Core Environment Program Strategic Framework and Action Plan. The TA will have the following outcome: climate resilience, green growth, and environmental quality in the GMS enhanced.	2019 - 2025	ADB
5	Building capacity in Lao PDR to understand, anticipate and adapt to climate change impacts	- Five southern provinces of Laos PDR, namely: Savannakhet, Salavanh, Attapeu, Champasak, and Sekong, all face increased drought risk due to climate change. The project promotes strengthening capacity in the implementation areas to comprehend, predict, and adapt to growing climate risks and consequences, particularly on drought. Utilizing impact-based predictions to provide anticipatory actions prior to an extreme weather event will enable this effort to affect a national paradigm change.	Concept Note submitted	GCF, WFP
Cross-cutting				
1	Enhancing Integrated Water Management and Climate Resilience in Vulnerable Urban	- Output 1. Inclusive assessment of water-related climate risks completed in the priority river Basins.	2021 - 2025	UNDP

	Title	Details	Period	Institutions Involved
	Areas of the Mekong River Basin	- Output 2. Enabling environment for gender-responsive climate risk-informed integrated water resources management developed.		
2	Mekong EbA South: Enhancing Climate Resilience in the Greater Mekong Sub-region through Ecosystem-based Adaptation in the Context of South-South Cooperation (Thailand, Viet Nam)	- The overall objective of the proposed project is to strengthen awareness and action of governments and communities in the GMS to adapt to climate change using ecosystem-based adaptation (EbA).	2021 - 2024	UNEP
3	Feasibility Study on Water Supply Measure and Flood Mitigation for the Prek Neal River Basin, Svay Rieng Province, Cambodia	- The project's objective is to make a basic plan for flood mitigation and water supply and carry out a feasibility study in Svay Rieng area.	2021 - 2023	KOICA
4	Building resilience of urban populations with ecosystem-based solutions in Lao PDR	- The project aims to test an alternative approach to flood control in urban Laos, moving away from a traditional focus on grey infrastructure, such as dams and concrete drainage systems. It will implement ecosystem-based adaptation in urban areas. One of the first examples of this adaptation approach in developing countries, it could serve as a model for other nations facing similar climate challenges.	2019 - 2025	GCF
5	Integrated Water Resource Management and Ecosystem-based Adaptation (EbA) in the Xe Bang Hieng River Basin and Luang Prabang City	- Promote integrated management of sites in the Mekong River Basin for increased climate resilience of Savannakhet Province and Luang Prabang communities vulnerable to floods and droughts, which are expected to worsen under future scenarios.	2022	GEF
6	Building climate and disaster resilience capacities of vulnerable small towns in Lao PDR	- The objective of this project is to build climate resilience in small towns along the east-west economic corridor in the central region of Lao PDR. This will be achieved through the provision of climate resilient water infrastructure and the mainstreaming of climate change into urban planning.	2020 - 2024	Adaptation Fund

Annex 4: The institutional arrangements for the ECR-Mekong is presented below and will be refined based on discussion with the national agencies of the targeted four countries and regional entity (MRC).

Institutional Arrangements



ADAPTATION FUND

PRE-CONCEPT FOR A REGIONAL PROJECT/PROGRAMME

PART I: PROJECT/PROGRAMME INFORMATION

Title of Project/Programme:	Enhancing Climate (Change) Adaptation and Resilience of Mekong River Communities through Strengthening of Weather, Water and Climate Services (ECR-MEKONG)
Countries:	Cambodia, Lao People's Democratic Republic (PDR), Viet Nam, and Thailand
Thematic Focal Area[1]:	Disaster risk reduction and early warning systems
Type of Implementing Entity:	Multilateral Implementing Entity (MIE)
Implementing Entity:	World Meteorological Organization (WMO)
Executing Entities:	Mekong River Commission (MRC). In Cambodia: Department of Meteorology (DOM) and Department of Hydrology and River Works (DHRW), Ministry of Water Resources and Meteorology (MOWRAM). In Lao PDR: Department of Meteorology and Hydrology (DMH), Ministry of Natural Resources and Environment (MoNRE). In Thailand: Thai Meteorological Department (TMD), Ministry of Digital Economy and Society (MDES). In Viet Nam: Viet Nam Meteorological and Hydrological Administration (VNMHA), Ministry of Environment (MONRE).
Amount of Financing Requested:	12,466,575 (in U.S Dollars Equivalent)

Project / Programme Background and Context:

The frequency and severity of drought and floods in Southeast Asia are increasing and are expected to continue to increase over the next decades (IPCC Sixth Assessment Report). The least developed and developing countries in the region, such as Cambodia, Lao PDR, Thailand, and Viet Nam (hereinafter referred to as the Participating Countries) are particularly vulnerable to the adverse effects of climate change, such as more severe and frequent droughts and floods. Based on WMO assessments conducted during 2019-2022, stakeholders from all four countries indicated that floods, droughts, and severe weather events are the most common hazards affecting them. Moreover, in the past three decades, droughts and floods have affected more than 100 million people in these countries (Asian Development Bank; WMO 2021). In addition, the Nationally Determined Contributions (NDCs) submitted to the United Nations Framework Convention on Climate Change (UNFCCC) by the Participating Countries indicate the need to strengthen drought and flood early warning systems (EWSs), especially improving warning services, and risk-informed decision making for the agriculture, energy and water sectors.

The Mekong is a transboundary river that runs through the Participating Countries. The river flow is fundamental for the communities residing near the Mekong River and its tributaries as their livelihood mostly depends on agriculture (including crops, livestock, and inland fisheries). Agriculture it is the primary source of employment in Lao PDR (61%), Viet Nam (41%), Cambodia (27%), Thailand (32%)and 29% in Vietnam. As such, timely warning and risk informed decision making on agriculture and water management will offer major opportunities to improve proactive disaster risk management strategies and increase economic productivity. In the last ten years, the lower Mekong River countries faced around 100 reported meteorological and hydrological hazardous events leading to the deaths of more than 1000 people and affecting socio-economic activities of more than 24 million (EM-DAT/CRED). In Lao PDR, during 2018, there was a dam outbreak situation leading to loss of lives, damage to property and infrastructure and displacement of population[2].The impact of drought on vulnerable communities in the Participating Countries has been demonstrated using the disastrous consequences of the 2015-16 El Niño phenomenon. Based on a desk review, the impacts in Participating Countries were: Cambodia – an estimated 2.5 million people were affected by drought; Thailand – the total rice production fell to 27 million tonnes, the lowest since 2000-2001; Viet Nam – it was the worst drought in the past 90 years, affecting 52 out of 63 provinces, with 1.1 million people experiencing food insecurity and more than 2 million facing damaged or lost their livelihoods.

Figure 1: Targeted Participating Countries of the Mekong Basin where EWS and risk profiles will be developed, including tentative vulnerable pilot locations where locally led adaptation and risk reduction measures will be implemented.

Following the discussions with stakeholders from various sectors in the Participating Countries, it was identified that accurate and actionable knowledge about meteorological and hydrological parameters (precipitation, temperature, soil moisture, water levels etc), their spatial and temporal distribution, and impact-based forecasts on various time scales from days to months (sub-seasonal to seasonal) are considered vital for the sustainable social and economic development of the lower Mekong River countries and for long-term development planning purposes. Therefore, this project will examine (enhance) data collection, monitoring and forecasting; co-production of affordable, sustainable and tailored warning services and advisories; their dissemination through effective communication channels (technological and traditional mode of communication); and participatory engagement of stakeholders to increase uptake of climate change variabilities advisories and associated actions. As a result, all of these improvements will provide stakeholders in the agriculture, energy, and water sectors, in cross-sectoral disaster risk management and in local communities with weather-, water- and climate-related information for saving lives and livelihoods, adapting to climate change, and creating social, economic and environmental benefits.

While the impact of climate change is difficult to forecast, below are climate change projections for the Mekong River Basin for the next 20 to 30 years[3], based on a downscaled global climate model:

- Basin-wide temperature increase of 0.79°C leading to annual rainfall increase of 200 mm (13.5% increase).
- Increase in dry-season rainfall in northern catchments and decrease in southern catchments.
- Total annual runoff increase of 21% with increase in flooding in all parts of the basin, with the greatest impact on downstream catchments of the Mekong River.

Climate change is expected to affect natural ecosystems and agriculture throughout the Mekong River Basin. This will make it increasingly difficult to meet the demand for natural resources from the growing population. Analysing the current situation in the Participating Countries and evaluating technical and technological capacities of National Meteorological and Hydrological Services (NMHSs) and other competent authorities, it is observed that there is inadequate hydro-meteorological observation networks, insufficient weather, water and climate databases, unavailability of impact-based forecasts and warnings, lack of or inadequate/outdated

[1] Thematic areas are: Food security; Disaster risk reduction and Early Warning Systems (EWS); Transboundary water management; Innovation in adaptation finance.
[2] https://www.ohchr.org/en/press-releases/2022/07/lao-dam-disaster-un-experts-decry-lack-progress-survivors-four-years#:~:text=A%20torrent%20of%20water%2C%20mud,left%20homeless%20by%20the%20disaster.
[3] https://www.mrcmekong.org/about/mekong-basin/climate/

climate change (adaptation) and disaster risk management plans and policies, and lack of infrastructures and technical capacity to generate climate and weather information tailored to specific needs of key economic sectors and communities have been identified as the priorities to improve climate (change) adaptation. Implementing climate (change) adaptation and related strategies and improving the management of water resources are recognized by the lower Mekong River Basin countries as major challenges. This project proposal responds to addressing these needs through WMO-led coordination of partnership and cooperation among the NMHSs in the Participating Countries, and through jointly providing technical support to strengthen their day-to-day work and services. MRC is an inter-governmental organization established in 1995 that serves as a regional platform for water diplomacy and a knowledge hub of water resources management for the sustainable development of the region. It is committed to successfully implement the Basin Development Strategy for the Mekong River Basin 2021–2030 & MRC Strategic Plan 2021–2025 through an integrated basin-wide forecasting and warning system, management of water resource, etc., thus ensuring social, economic and environmental improvements that will lead to better living standards for all the Mekong River Basin countries and peoples. The proposed project will involve other national agencies (such as those responsible for disaster management, environmental protection, water resources, etc.), academia, international and national non-governmental organizations (NGOs), etc. to provide support in co-design and development of outcomes related to EWS, risk mapping, community-based flood and drought management including locally led adaptation strategies. It will be developing synergies and complementarities with other on-going and completed projects to efficiently strengthen EWS and integrated water resources management, leading to increased preparedness and resilience to climate- and climate change-related hazard events.

Project / Programme Objectives:
The ECR-Mekong project is aligned with the Adaptation Fund objective to "reduce vulnerability and increase adaptive capacity of communities to respond to the impacts of climate change at local, national and regional level". It will also support the United Nations (UN) Early Warnings for All initiative (EW4All), which is co-led by the World Meteorological Organization (WMO) and the 2022 UN Office for Disaster Risk Reduction (UNDRR) and implemented in partnership with other international partners to cover everyone on Earth with EWS by the end of 2027. Cambodia and Lao PDR are two of the initial 30 priority countries receiving targeted support under the EW4All initiative. In this regard, Cambodia and Lao PDR are also supported through the Systematic Observation Financing Facility (SOFF) initiative (a UN Multi-Partner Trust Fund co-created by UNDP, UNEP and WMO) and the Climate Risk and Early Warning Systems (CREWS) initiative (a multi-donor Financial Intermediary Fund hosted by the World Bank). The Adaptation Fund is a member of the SOFF Advisory Board. SOFF's goal is to support countries to improve their meteorological observations in compliance with the internationally agreed WMO Global Basic Observation Network (GBON), and which in turn will support Global Producing Centres for Long-Range Forecasts (GPC-LRFs, such as the European Centre for Medium-Range Weather Forecasts (ECMWF) in developing high-quality meteorological and hydrological monitoring and forecasting products. Both SOFF and CREWS have been identified as key financing vehicles for the implementation of the EW4All initiative. The overall objective of the project is to reduce vulnerability and exposure from climate hydro-meteorological hazards, therefore, strengthening the adaptation and resilience of communities in the Participating Countries to climate variability and change. 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 Participating countries, the project envisages strengthening the capacities of National Meteorological and Hydrological Services (NMHSs) with a regional integrated Hydro-Meteorological early warning system (providing short term status and seasonal outlook) embedded into a long-term integrated water resource information system and concrete locally led adaptation actions developed through a participatory design.

Based on WMO preliminary assessments/consultations with NMHSs and MRC, existing capacity, needs to strengthen the EWS has been identified, including guidance on weather-, water- and climate-related services enhancing climate change adaptation and disaster risk reduction strategies at regional, national and local levels. National and regional capacity development is required for forecasting of weather, and water events, enhancing sector-specific advisories, increasing collaboration among agencies in disseminating warnings and emergency response, developing self-help capabilities of the communities prone to hydro-meteorological hazards to better adapt, respond and develop resilience. MRC and the WMO-designated South-East Asia Regional Climate Centre (SEA-RCC) network (in demonstration phase) are mandated to share of weather, water and climate data across the countries. The proposed ECR-Mekong project will address the major gap of transforming scattered national capacities, for hazard forecasting and early warning, into a common structure and an extension of successful solutions to cover larger territories as hydro-meteorological events are not spatially limited and go beyond the countries border.

Project/ Programme Components	Expected Outcomes	Expected Outputs	Countries	Amount (US$)
1. Preparedness and adaptation through user-centred and integrated national early warning systems (EWS) for drought and floods	Outcome 1.1 Risk informed decision making at regional, national and local levels for disaster risk reduction and climate change adaptation	Output 1.1.1 Strengthen observation networks and social-structural databases, drought and flood risk maps for current and future predicted climate are developed/updated	Cambodia Lao PDR Thailand Viet Nam	3,150,000
		Output 1.1.2 Develop capacity and established frameworks at the local, national, and regional levels to ensure risk informed decision-making to various stakeholders		
		Output 1.1.3 Long-term risk management strategies are identified and integrated into development plans (economic, social, environmental aspects)		
	Outcome 1.2: Operational web-based multi-hazard EWSs (interfaces) are established/strengthened to support warning services at (regional) national, provincial, and local levels.	Output 1.2.1 Hydrological and meteorological status and outlook products within the EWSs are developed and operationally used by the NMHSs	Cambodia Lao PDR Thailand Viet Nam	2,700,000
		Output 1.2.2 EWSs and concrete adaptation measures are tested in selected vulnerable communities during the monsoon and dry seasons.		
2. Established Locally led adaptation and disaster risk reduction strategies to counter the adverse impact of drought and floods	Outcome 2.1 Preparedness and resilience to climate change is increased/promoted through innovative and community-based initiatives.	Output 2.1.1 Implementation of community-based floods and drought management strategies in the vulnerable sites and different ecosystems	Cambodia Lao PDR Thailand Viet Nam	2,700,000
		Output 2.1.2 Enhanced local stakeholders and communities' capacities to adapt to climate change by understanding and proactively applying warning information or advisories tailored to their needs for risk management and adaptation policies and plans, including national Adaptation Plans (NAPs), NAPA, and Nationally Determined Contributions (NDCs).		
	Outcome 2.2: Strengthened awareness of vulnerable communities and agencies on hydro-meteorological risks through education programmes.	Output 2.2.1 Enhanced knowledge and awareness of stakeholders on nature-based solutions and mainstreaming gender for managing climate-related hazard events.	Cambodia Lao PDR Thailand Viet Nam	
		Output 2.2.2: Strengthened capacity of stakeholders to improve management of climate change adaptation and disaster risk reduction measures including innovative learnings and experience sharing		

Project/ Programme Components	Expected Outcomes	Expected Outputs	Countries	Amount (US$)
3. Water, Weather and Climate resilient regional and national cooperation arrangements together with stakeholders including community involvement	Outcome 3.1 regional cooperation mechanisms (Regional Hydrological and Climate Outlook Forums (RHCOFs,)) among the NMHSs and stakeholders are strengthened and have updated policies, plans and guidelines	Output 3.1.1 Updated regional and national plans / policies on climate change adaptation and disaster risk reduction/management and sustained capacity building through regional transboundary strategic alliances and partnerships coordinated by the Mekong River Commission (MRC)	Cambodia Lao PDR Thailand Viet Nam	1,800,000
		Output 3.1.2 Established regional technical working groups with the NMHSs, agriculture, energy, water sectors and disaster management agencies including the South-East Asia RCC Network and other partners to analyse and develop regional and national water and climate change adaptation and disaster risk reduction policies, plans and actions.		
	Outcome 3.2 Strengthened governance strategies on water resources management and services at transboundary, national and local levels	Output 3.2.1 Governance strategies are reviewed and improved for water resources management and services including linkages between transboundary, national and local levels		
5. Project/Programme Execution cost (9.5% of total components cost)				983,250
6. Total Project/Programme Cost				11,333,250
7. Project/Programme Cycle Management Fee charged by the Implementing Entity (if applicable) (10% of the Total Project/Programme Cost)				1,133,325
Amount of Financing Requested				12,466,575

Project Duration: 5 years (2024 – 2028)

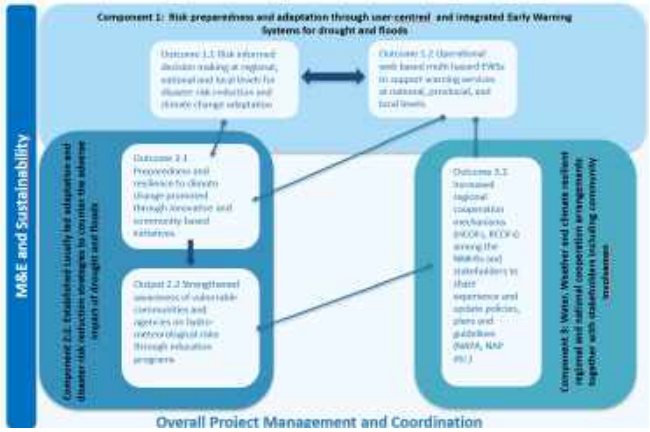


Figure 2: Linkages between components, outcomes and outputs of the project

Interconnections between the three project components are shown in this diagram. At this pre-concept stage, the proposed activities in the Participating Countries are indicative and broadly described.

The proposed project through Components 1 and 2 will implement activities to address the climate change-influenced climate variabilities and events mainly through the EWS and related services production and delivery to various stakeholders. The full value chain of observation, monitoring, forecasting and warning services will be demonstrated in pilot sites that the Participating Countries will identify. Evidence-based socio-economic benefits of resilience and adaptation measures such as user-centred EWSs will be quantified at communities' level.

Component 3 will be on governance/cooperation to ensure the experience and good practices gained from the proposed project leads to review and update of national policies and plans (NAPs, NAPA, NDCs and disaster risk reduction strategies) eventually leading to long-term investments for strengthening climate change adaptation at regional, national and local levels.

PART II: PROJECT / PROGRAMME JUSTIFICATION

Project Justification for regional approach, cost effectiveness, innovative, sustainability, socio-economic benefits etc.

The project is advancing a multi-sectoral (agriculture, energy, and water utility) disaster risk reduction approach to minimize the vulnerability and exposure of the Mekong communities and to increase their adaptive capacity to climate change, variability and extremes. Given high vulnerability of local communities in the Participating Countries to the impact of droughts and floods and the need to prepare for and build resilience to these hazards, the project will focus on enhancing EWSs for droughts and floods and on effective management of water resources through improved availability of and access to weather, water and climate products tailored to specific needs of sectors and communities. Specific interactions and support for local stakeholders would include the following: the Cambodian Farmer Federation Association of Agricultural Producers (CFAP); Atlantic Commodities Vietnam (ACOM) in Vietnam; National Agriculture and Forestry Research Institute, Ministry of Finance in Lao PDR; and Department of Agriculture in Thailand. Based on preliminary consultations, the following gaps and needs to improve resilience to climate change and related natural hazards were identified:

- Lack of technical capacity to generate and disseminate weather, water and climate information and early warnings.
- Lack of capacity to use weather, water and climate information for proactive and risk-informed decision-making.
- Lack of national capacity to produce relevant climate extremes information and integrated early warning system and exchange information among the countries.
- Lack of institutional capacity for cross-sectoral and cross-national coordination and co-production of information.

To address the identified needs, the proposed project will implement activities through 3 project components and associated outcomes and outputs as follows: Component 1 Risk preparedness and adaptation through user-centred and integrated EWS for drought and floods, Component 2: Established locally-led adaptation and disaster risk reduction strategies to counter the adverse impacts of drought and floods, and Component 3: Water-, weather- and climate-resilient regional and national cooperation arrangements together with stakeholders including community involvement.

A central output of the project is the development of an End-to-End Early Warning System covering the various areas at risk of floods and droughts (including flash floods and landslides). The system will allow to produce and disseminate warnings according to pre-defined levels of risks, using colour coding and icons for the different types of hazards, similarly to the EWS largely established in a large number of countries and transboundary watersheds. The existing EWSs (including https://portal.mrcmekong.org/monitoring/flood-forecasting) are mainly providing monitoring, forecasts and warnings for riverine flood and flash flood events within the next days (usually for 0-5 days) and agrometeorological droughts. However, the ECR-Mekong project is proposing a system (integrating information and products from other completed and on-going projects or initiatives) which will provide hydro-meteorological information for various stakeholders such as hydropower dam operators, river basin authorities, MRC, irrigation, etc. for timely decision-making on water availability in river stream mainly its status (current flow whether it is normal situation, above normal (high flow) or low (below normal)), forecasts (0-7 days for floods and

hydro-meteorological drought events), and sub-seasonal to seasonal outlooks (how the situation is going to change in coming months accessing also the meteorological and climatological parameters) which will improve the efficient use or release of water to communities. The basin scale approach is a suitable way to identify and implement cost-effective measures, as Mekong countries have similar challenges related to climate-related events (floods and droughts) that will be addressed by this project. There is a need for better, i.e. more effective and coherent regional, national and local strategies and decision-making frameworks to address water-related climate resilience challenges in the Mekong Basin 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 Mekong Basin is better understood through a regional project which provides opportunities to share experiences, good practices and address knowledge gaps. Such a project will be useful to manage water resources, extreme events linked to climate change in a transboundary management framework and in an environment of mutual trust and confidence. Also, a regional approach will ensure monitoring and warning information is shared between the respective agencies of the Mekong countries and is further developed for end-user to support timely decisions. A regional approach also provides scope for data sharing on a real time basis and facilitating disaster preparedness and response and execution of risk reduction measures. By involving the four-countries, previous knowledge and funding, as well as current projects, can be considered to ensure minimum overlap and transfer of methodologies from one area to the other.

EWS can provide more than a tenfold return on investment. Just 24 hours' notice of an impending hazardous event can cut the ensuing damage by 30 per cent. The Global Commission on Adaptation (GCA) found that spending just US$800 million on such systems in developing countries would avoid losses of US$3 to 16 billion per year[4]. In consultation with the national and local stakeholders it was agreed that the climate change adaptation measures (through EWS, community-based activities, risk maps for understanding potential impacts) to flood and drought hazards is more cost-effective than the baseline of disaster response and rehabilitation. The cost-effectiveness analysis of the proposed project with alternative methods have been studied ensuring cost effectiveness, impact to social, economic and environments, sustainability of the solutions. Alternative to the proposed project approach, the costliest measure (approximately 100-150 times more cost as compared to the proposed project) would be resettlement of vulnerable communities, which would also involve unacceptable amounts of risk in terms of social and economic disruption to the communities.

WMO surveys its Member countries and territories via the Country Profile Database (CPDB), and results from the most recent survey indicated that Mekong countries provide flood and drought warning services mainly based on global or regional products. Only Thailand has a national drought monitoring system and policy. Moreover, there is a lack of local riverine flood monitoring and impact-based forecasting and warning services. The identified gaps of inadequate national observations networks and insufficient databases will be addressed through WMO flagship initiatives Space-based Weather and Climate Extreme Monitoring (SWCEM) and SOFF. The project will collaborate with disaster management authorities providing them with early warnings for droughts and floods which will assist them in responding to emergency and revising and implementing their national climate change adaptation and disaster risk reduction and management strategies. An important part of flood and drought risk management plans are to link the hazard monitoring and risk knowledge to community-led preparedness and response actions on the ground. Local communities will be engaged in the co-production of the early warnings of droughts and floods, which will improve their preparedness, response capability and resilience. It is well-known that the Participating Countries share common climate drivers (IPCC AR6 WG1) and it is important to ensure consistency in the way the regional information is optimised (national data/information and knowledge from each country are shared) and integrated (at regional levels integrated to develop regional products) and shared with national and sub-national stakeholders for weather, water and climate services.

Expected innovative deliverables through this project include: : The floods and drought risk maps, integrating environmental indicators to the impact on human and properties approaches, will be open-source and thus facilitate mainstreaming of results into other initiatives relating to floods and drought management or generally development processes (raising of houses, cropping patterns, water resources management etc.) in the target countries. An integrated and state-of-the-art approach to flood and drought early warning systems is an immediate priority for the Mekong region where timely and relevant information are lacking for impending hydro-meteorological hazards. In these countries during a flooding situation in one part, there can be a drought in another part of the country. An integrated approach to floods and drought monitoring and early warning systems will support national forecasters to observe and generate useful early warning services to the stakeholders. Improved availability of and access to weather and water data, satellite observations, and global and regional hydro-meteorological model outputs, for use to save lives and improve decision making by agriculture, water management, and energy sectors. The project will bring together policymakers and decision makers to review, develop and refine existing policies on water management and disaster risk management following experiences and lesson learned from the outcomes under components 1 and 2. This will allow developing regional/transboundary water management, disaster risk reduction and climate change adaptation strategies, plans and guidelines instead of country-specific ones. This will be particularly important to solve on-going or potential conflicts in water use between agriculture, energy, and water management using multipurpose infrastructures.

There are different capabilities in the Participating Countries and therefore the main gaps are a lack of standardized hydro-meteorological data and information across the region and a lack of sharing such data, which would help the development of regional products for improved decision making. Viet Nam and Thailand are a bit more advanced and special attention would be given to Cambodia, and Lao PDR and the project should be able to facilitate the exchange of skills between these countries. Also, drought and flood early warnings will be disseminated to at-risk communities through a user-centred integrated EWS. This would be co-produced with stakeholders in partnership with project partners such as the MRC who have the mandate to issue forecasts and advisories at regional levels. Flood and drought hazards are usually treated separately, and this project will develop and promote common and integrated adaptation and risk reduction measures at regional, national and local level to tackle these hazards in a common framework.

The cost-effectiveness analysis includes various short-term benefits such as prevention and minimisation of losses from hydro-meteorological hazards, availability and access to impact-based EWSs. In the medium-term, climate change adaptation and disaster risk management planning will be augmented through development of risk maps, sub-seasonal to season water resources information for irrigation facilities, climate-resilient cropping, renewable energy generation and development of local economy etc and through local initiatives, creation of new social institutions, tailored system for adaptation to climate change events. In the long-term perspective, there will be optimal use of water resources leading to prevention and mitigation of flood and droughts, ecological restoration, and formulation and implementation of policies for making communities adapt to climate change and natural hazards. Alternatives to the proposed measures, such as resettlement of vulnerable communities, involve much higher costs, but with limited benefits and detrimental environmental consequences. Alternative solutions are often to construct dams and reservoirs or reconstruct or retrofit the vulnerable community which will approximately cost US$150-300 million. Given the relative costs and benefits of possible climate change adaptation and disaster risk reduction measures, the project has selected the three least-expensive interventions through EWSs, risk maps and knowledge/capacity building measures at all levels, to generate significant benefits in the form of increased safety and economic activities as opposed to significant investment in structural measures. During the concept note preparation, the project partners will present a detailed and quantitative analysis of cost effectiveness of the selected measures as compared to alternative options.

The Project will be consistent with international, national and regional sustainable development, climate change adaptation and disaster risk management strategies, among them:

- *Cambodia*: Cambodia Climate Change Strategic Plan (2014-2023), the Agricultural Development Plan, the Climate Change Strategic Plan for Water Recourses and Meteorology, NDC
- *Lao PDR*: The National Strategy on Climate Change, NAPA
- *Thailand*: Thailand Climate Change Master Plan 2015-2050, 13th National Economic and Social Development Plan (NESDP) 2023-2027, NDC

[4] https://www.un.org/africarenewal/magazine/april-2023/fast-tracking-global-early-warnings-systems#:~:text=Early%20Warning%20Systems%20provide%20more,damage%20by%2030%20per%20cent.

- *Viet Nam*: The Climate Change Action Plan for Agriculture and Rural Development, the National Adaptation Programme for Climate Change, the National Climate Change Strategy
- *Regional*: Mekong River Commission Basin Development Strategy (2021-2030) and Mekong River Commission Strategic Plan 2021-2025, and the Lancang-Mekong Environmental Cooperation Strategic Framework (2019-2023), ASEAN Regional Plan of Action for Adaptation to Drought (ARPA-AD), and others
- The proposed project will contribute to the UN Sustainable Development Goal (SDG) 6, namely its target 6.5 to implement integrated water resources management at all levels, including through transboundary cooperation. It also contributes to SDG 1, namely its target 1.5 in building resilience through reduction in exposure and vulnerability for climate related extreme events; SDG 2, namely its target 2.4 to ensure sustainable food production through climate adaptation to drought, flooding, and other disasters; and SDG 11, namely its target 11.5 making human settlements inclusive, safe, resilient and sustainable; as well as the Sendai Framework for Disaster Risk Reduction 2015-2030.

A learning and knowledge management component to capture and disseminate lessons learned will be provided by WMO Regional and National Climate (Outlook) Forums (RCOFs/NCOFs) which are a platform for regular interactions between climate specialists and users in a regional/national context. Lessons learnt from knowledge management in this project will facilitate the dissemination of best practices. This learning and knowledge management component will target three different levels: 1) learning among the NMHSs (specialist level); 2) learning among local governments and communities (local level), and 3) learning and collaboration over shared resources (the Mekong River, as being the major and significant river in the region that would be affected by climate change) mainly among specialists from all Participating Countries and regional/international organisations. Knowledge management tools and platforms will be developed for sharing experience and storing project documents, reports etc. and also a dedicated website for the project with a community of practice (online forum, in different language if possible) will be designed for sharing experience and supporting stakeholders.

This pre-concept note was developed based on the needs highlighted by national institutions, and inputs from WMO, Global Water Partnership (GWP), Food and Agricultural Organisation of the UN (FAO), RMIT University SPACE Centre, and Australian Bureau of Meteorology (BoM), following national consultations with the NMHSs of Cambodia, Lao PDR, Thailand, and Viet Nam and during WMO regular constituent or expert group meetings organised in WMO Region II (Asia). The first national consultations were undertaken in November 2019 at the ASEAN Regional Climate Outlook Forum (ASEANCOF) and then virtually during the COVID-19 pandemic. Other organisations such as the UN Development Programme (UNDP), World Food Programme WFP, Asian Disaster Preparedness Center (ADPC), and the World Bank (WB) were consulted during the implementation of the WMO CREWS project in Cambodia and Lao PDR. MRC was consulted as one of the main stakeholders of the project. In addition, the discussions among five countries (China, Lao PDR, Cambodia, Thailand, and Viet Nam) facilitated by the Lancang-Mekong Water Resources Cooperation Centre (LMWRCC) in 2018 and 2019 have shown that climate variability and change make the urgency of climate information services over the upper and lower Mekong River basin even more prominent, thus requiring transboundary cooperation of all riparian countries starting by data and information exchange on climate information as the basis of integrated river basin planning in the region. Recent community consultations were carried out in Cambodia during August 2022 (check Annex 3 below) where issues and needs were provided (such as riverine floods in the downstream agriculture areas are generating negative impacts). There is a need to develop local capacities to manage the agricultural production between the floods to ensure food security and adequate income. A new mode of early warning communication is required for increasing self-help capabilities and for taking preparedness and response measures. Internet connectivity is available with mobile phones and similarly local radio network can be useful for communication and dissemination. Activities related to water and soil conservation are required to improve agricultural production and improve food security, Detailed consultations with further communities are planned in the next preparation phase, together with the national and regional stakeholders, to finalise the list of activities and pilot sites for testing the current and future EWSs, prepare the EIA and SIA studies, determine the roles and responsibilities of the national and regional agencies, etc.

The participating NMHSs are sustainable institutions within their national governments who have mandates for monitoring, forecasting and delivering advisory and warning services to stakeholders which have been a challenge until now or carried out with limitation. The project sustainability will be guaranteed by Cambodia's DOM and DHRW, Lao PDR's DMH, Thailand's TMD, and Viet Nam's VNMHA in their roles as government agencies supported by public funding who will ensure adequate resources (human, infrastructure, capacities) are available not only during but also after the project period. The national agencies and regional entity (MRC) will ensure availability of standardized interoperable hydro-meteorological data, especially on real-time basis, coordination of information channels and procedures for end-to-end EWSs, and increase in knowledge availability with community members on social-economic and environmental risks and their participation in decision making and the development of climate change adaptation and disaster risk management strategies and will lead to long-term sustainability of developed products, services and knowledge, which will be shared continuously between technical professionals of different agencies and at local level among population groups. The commitment from the national agencies has been secured, reflected in their participation to the project as executing partners. The official commitment from MRC has been received for their participation as the regional executing entity and supporting the development and implementation of the ECR-Mekong project. An effective, sustainable and tailored flood and drought EWS (will ensure participation and access of the most vulnerable groups including those with disability, women, senior citizens and children) through the project will help in taking adaptive measures such as raising of houses from past flooding levels, farm practices, crop selection/adoption, harvest timing etc. It will build resilience into livelihoods and contribute to local economy. The project will promote nature-based solutions for adaptation and help maintain an ecological balance for the entire basin by ensuring systematic measures to mitigate land degradation and soil desertification are implemented.

Investments in risk reduction and preventive adaptation measures based on authoritative water, weather and climate information spanning the historical recurrence and the future new trends should result in economic benefits for local communities and the entire targeted Project Countries given the potential avoided costs associated with lack of preparedness or use of structural measures (dams, reservoirs, dykes etc resulting in environmental and social impacts). A comprehensive description of social and environmental benefits will be provided in the final proposal, after due assessments (EIA and SIA including screening of the 15 environmental, social, and gender principles of the Adaptation Fund) and consultations are carried out with the respective authorities and communities. Consultations will be undertaken on aiding vulnerable and marginalized populations and with regards to gender (women's, youth, elderly, internal displaced populations etc.) consideration will be provided in the consultation planned during the project concept and proposal preparation phase. The project will indirectly benefit hundreds of thousands of people living in the Mekong River Basin countries through the proposed strategy of community-based flood and drought management and by enabling local level climate change adaptation and disaster risk reduction measures. 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 hazard and vulnerability mapping proposed under Component 1 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 International Union for the Conservation of Nature (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-approach will be promoted through natural and 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 EWSs could lead to movement of communities to a safer zone where they might need to identify new resources (livelihoods, house, adoption to new culture etc.) for survival.
The project will not duplicate the efforts of other initiatives or funding sources. Instead, the proposed project will identify synergies and complementarities with ongoing and planned initiatives (check Annex 1 on : the AF project in Lao PDR, CREWS projects in South-East Asia, and De-Risk Southeast Asia, FAO's GCF PEARL and SAMIS, UN Environment Programme (UNEP)/Mekong Ecosystem-based Adaptation (EbA) South, UN-Habitat projects in Viet Nam and Cambodia to ensure coherence with the proposed regional programs and ensure use of existing resources (human, tools, infrastructures etc.) available to build upon it. Thus, the project will seek engagement with the regional and national institutions in the region to identify good practices, gaps and needs so that common efforts could be delivered jointly with the stakeholders. There are no regional projects that bring Mekong River countries together to address the common climate-induced events and their impacts and that apply integrated approaches for drought and flood EWSs and for locally led adaptation and disaster risk reduction. The project will develop a regional web-based system building on the current MRC web-based system that will be set up to address the national needs, with

MRC having the regional mandate and taking on roles and responsibilities in managing the system and its long-term sustainability as the regional Implementing Partner.

PART III: IMPLEMENTATION ARRANGEMENTS

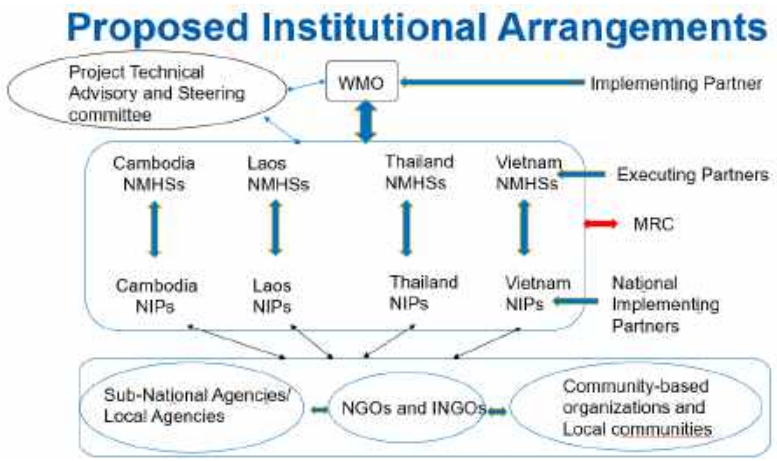
WMO will be the implementing entity for this project. WMO will indirectly implement this project through the NMHSs as national executing partners, regional executing partners (mainly MRC) and other technical organisations (e.g. partners of the WMO/GWP Associated Programme on Flood Management (APFM) and Integrated Flood and Drought Management (IDMP)) to execute project activities delivering affordable, sustainable, tailored water, weather and climate monitoring, forecasting and warning related products and services. The NMHSs of the Participating Countries will play the key role in developing partnerships for the project's implementation by taking the lead on national consultations and co-production of various products or services related to management of climate change events. The WMO GPC-LRF hosted by the Australian BoM will provide global, regional, and national climate information and support the NMHSs in the project implementation. Other WMO GPC-LRFs and partners will assist the NMHSs with enhancing EWSs, promoting the development and provision of reliable, consistent, and high-quality data and products for drought and flood monitoring and prediction (available to end-users assisting them with decision-making in resilient food production, hydropower generation, and water management). APFM and IDMP partners together with the RMIT University SPACE Centre, drawing on its expertise in space-based observations and application of geographic information systems (GIS), will develop tailored methodologies for risk assessments and produce web-based information tools for multi-layered GIS mapping of drought and flood risk combined with relevant exposure and vulnerability information at regional, national, sub-national and community level. FAO, GWP, ADPC, the Regional Integrated Multi-Hazard Early Warning System for Africa and Asia (RIMES), NMHSs and other relevant national institutions (Ministries of Agriculture and Water Management) would be hired for implementing specific activities at the national and local/community level, based on their extensive experience in (i) assisting communities to make agriculture more productive and sustainable, (ii) enabling inclusive and efficient agricultural and food systems, and (iii) increasing the preparedness and resilience of livelihoods to threats and crises. Other projects implemented by MRC, ADPC, UNDP, WFP, UNDRR, WB, FAO, UNEP, WMO, etc. have been preliminary screened (Annex 1) for developing synergies and complementarities and avoiding duplication of efforts. A detailed review of on-going projects or initiatives will be conducted during the concept preparation phase.

A project steering committee and an advisory committee/group will be established with membership of national designated authority/agencies specialised in hydrology, meteorology, climatology, water resources, as disaster management as well as relevant regional entities. An initial institutional /implementing arrangement can be found in Annex 2, with a description of the roles and responsibilities (organization chart showing how they report to each other) of the implementing and executing entities and stakeholders involved in the project. During the next phase of the project development, it will be refined with additional stakeholders from global, regional, national and local levels. A Project Management unit (PMU) will be established with the WMO, regional and national entities staff working directly with the National Working groups (formed with the representatives of various agencies) to ensure the planning and timely execution of the project activities.

Annex 1: List of projects or initiatives for developing synergies or complementarities with the proposed ECR Mekong project.

ECR-Mekong draft list of projects or initiatives for developing synergies and complementarities with the proposed ECR.docx

Annex 2: Proposed Institutional Arrangements of the ECR-Mekong which will be updated in the next preparation phase with the national and regional entities and detailed role and responsibilities will be provided.



Annex 3: Community consultation report provided with some initial needs or justifications for the proposed project.

Community consultation report - Cambodia- 19 August 2022 KM.pdf

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

A. Record of endorsement on behalf of the government *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.*

Tin Ponlok Secretary of State Ministry of Environment Cambodia	Date: 22 June 2023
Syamphone Sengchandala Director General Department of Climate Change Ministry of Natural Resources and Environment	Date: 23 December 2022

Lao PDR	
Jatuporn Buruspat Permanent Secretary, Ministry of Natural Resources and Environment Thailand	Date: 11 August 2022
Dr Tran Hong Ha Minister of Natural Resources and Environment Viet Nam	Date: 30 July 2022

B. Implementing Entity Certification *Provide the name and signature of the Implementing Entity Coordinator and the date of signature. Provide also the project/programme contact person's name, telephone number and email address*

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 (*Cambodia*: National Climate Change Adaptation Plan; *Laos*: The National Strategy on Climate Change, the National Adaptation Program of Action; *Thailand*: Thailand Climate Change Master Plan 2015-2050; *Viet Nam*: The Climate Change Action Plan for Agriculture and Rural Development, the National Adaptation Programme for Climate Change, the National Climate Change Strategy), and subject to the approval by the Adaptation Fund Board, commit to implementing the project/programme in compliance with the Environmental and Social Policy of the Adaptation Fund 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 Member Services and Development Department	
Date: 22 December 2023	Tel. and email: +41 22 730 8646, mchaponda@wmo.int
Project Contact Person: Ben Churchil	Tel. and email: bchurchill@wmo.int

KINGDOM OF CAMBODIA
Nation Religion King

Ministry of Environment
Nº :1445 MoE

Phnom Penh, 22 June 2023

To: The Adaptation Fund Board Secretariat
c/o Global Environment Facility Secretariat
1818H Street, NW, MSN P-4-400
Washington DC, United States of America.
Email: Secretariat@Adaptation-Fund.org
Fax: +1 202 522 3240/5

Subject: Endorsement for "Enhancing Climate Resilience of Mekong River Communities Through Strengthening Climate Service (ECR-MEKONG)"

Dear Sir/Madam,

In my capacity as designated authority for the Adaptation Fund in Cambodia, I confirm that the above regional project proposal is in accordance with my government's national and regional priorities, especially with the specific commitments to the Cambodia Climate Change Strategic Plan (2014-2023), the Mekong Climate Change Adaptation Strategy and Action Plan (MASAP), and Cambodia's Updated Nationally Determined Contribution (Updated NDC) in implementing adaptation activities to reduce adverse impacts of, and risks, posed by climate change in the Mekong River basin.

Accordingly, I am pleased to endorse the preparation of the above project proposal with support from the Adaptation Fund. If approved, the project will be implemented by the Word Meteorological Organization (WMO) and executed by the National Meteorological and Hydrological Services of the Ministry of Water Resources and Meteorology, Cambodia.

I sincerely hope that this proposal will be considered favorably by the Adaptation Fund.

Sincerely Yours,

Tin Ponlok
Secretary of State

KINGDOM OF CAMBODIA
Nation Religion King

Ministry of Environment
Nº : 1046 MoE

Phnom Penh, 22 June 2023

Mr. Henry Gonzalez
Executive Director a.i.
Green Climate Fund Secretariat
G-Tower 175 Art Center-daero
Yeonsu-gu, Incheon 22004
Republic of Korea

Subject: Funding proposal for the GCF by the United Nations Development Programme regarding Early Warnings for All (EW4All) initiative

Dear Mr. Gonzalez,

We refer to the programme titled Early Warnings for All (EW4All) as included in the idea note submitted by the United Nations Development Programme to us on 2 June 2023.

The undersigned is the duly authorized representative of the Ministry of Environment, the National Designated Authority of the Royal Government of Cambodia.

Pursuant to GCF decision B.08/10, the content of which we acknowledge to have reviewed, we hereby communicate our no-objection to the programme as included in the funding proposal.

By communicating our no-objection, it is implied that:

(a) The government of Cambodia has no-objection to the programme as included in the funding proposal;

(b) The programme as included in the funding proposal is in conformity with the national priorities, strategies and plans of Cambodia;

(c) In accordance with the GCF's environmental and social safeguards, the programme as included in the funding proposal is in conformity with relevant national laws and regulations.

We also confirm that our national process for ascertaining no-objection to the programme as included in the funding proposal has been duly followed.

We also confirm that our no-objection applies to all projects or activities to be implemented within the scope of the programme.

We acknowledge that this letter will be made publicly available on the GCF website.

Sincerely yours,

Say Samal
Chair of the National Council for Sustainable Development,
Minister of Environment

Lao People's Democratic Republic
Peace Independence Democracy Unity Prosperity

Ministry of Natural Resources and Environment
Department of Climate Change

No: 1065 -/DCC
Vientiane Capital, Date: 23. December 2022

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

Subject: **Endorsement for "Enhancing Climate Resilience of Mekong River Communities Through Strengthening Climate Services"**

In my capacity as the designated authority for the Adaptation Fund in Lao PDR, I confirm that the above regional project proposal is in accordance with the government's national and regional priorities in implementing adaptation activities to reduce the adverse impact of, and risk, posed by climate change in the Mekong River basin.

Accordingly, I am pleased to endorse the above project/programme proposal with support from the Adaptation Fund. If approved, the project will be implemented by WMO and executed by the National Meteorological Service in Lao PDR.

Sincerely,

Syamphone Sengchandala

Director General,
Department of Climate Change,
Ministry of Natural Resources and Environment.
Designated Authority for Lao PDR

SOCIALIST REPUBLIC OF VIET NAM

MINISTRY OF NATURAL RESOURCES AND ENVIRONMENT

Ha Noi, 17 March 2023
Ref. No: /MONRE-2023

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

Endorsement for the revised Pre-Concept Proposal of "Enhancing Climate Resilience of Mekong River Communities through Strengthening Climate Services" project

After addressing all comments based on the Adaptation Fund's review of the Pre-Concept Proposal of "Enhancing Climate Resilience of Mekong River Communities through Strengthening Climate Services" project submitted in 2022, the World Meteorological Organization (WMO) and the Ministry of Natural Resources and Environment of Viet Nam are ready to submit the revised Pre-Concept Proposal.

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

Accordingly, I am pleased to endorse the above-mentioned project proposal with support from the Adaptation Fund. If approved, the project will be implemented by the World Meteorological Organization (WMO) and executed by Viet Nam Meteorological and Hydrological Administration, Ministry of Natural Resources and Environment of Viet Nam and national partners.

Yours Sincerely,

Tran Hong Ha
Minister of Natural Resources and Environment
Socialist Republic of Viet Nam.

Address: 10 Ton That Thuyet street, South Tu Liem district, Ha Noi, Viet Nam
Tel: +84 24 37956868, Fax: +84 24 38359221, Email: icd-monre@monre.gov.vn, Website: http://www.monre.gov.vn

No 1006.4/ 1893

Ministry of Natural Resources
and Environment
92 Soi Phahol Yothin 7,
Phahol Yothin Road, Phaya Thai,
Bangkok 10400 Thailand
Tel./Fax +66 2 265 6692

19 July B.E. 2566 (2023)

Sir/Madam,

Subject: Endorsement for Enhancing Climate Resilience of Mekong River Communities through Strengthening Climate Services (ECR-MEKONG)

In my capacity, as designated authority for the Adaptation Fund in the Kingdom of Thailand, I confirm that the above regional pre-concept note is in accordance with the government's national and sub-regional priorities in implementing adaptation activities to strengthen the capacity on climate information and services for relevant agencies, increase collaboration network within Thailand and among Mekong river countries, and support Thailand's National Adaptation Plan implementation on water management sector, and agriculture and food security sector.

Accordingly, I am pleased to endorse the above pre-concept note dated 26 May 2023 for your consideration. If approved, the project will be implemented by World Meteorological Organization and executed by Thai Meteorological Department.

Yours sincerely,

Jatuporn Buruspat

(Mr. Jatuporn Buruspat)
Permanent Secretary
Ministry Natural Resources and Environment

Adaptation Fund Board Secretariat
c/o Global Environment Facility
1818 H Street NW, Washington DC 20433, USA
Email: secretariat@adaptation-fund.org