CREWS Project Presentation Note to the Steering Committee

Project Title	**Strengthening Risk informed planning, Hydro-Meteorological and Early Warning Services in Malawi**	
Document Reference	CREWS/CProj/14/Malawi	
Geographic coverage	*Malawi*	
Timeframe	4 years	
Total CREWS Contribution	US$ 3 Million	
Lead Implementing Partner	The World Bank	
	a. Execution	US$ 1,400,000
	b. Fees	US$ 140,000
	c. Total	US$ 1,540,000
Additional Implementing Partners	World Meteorological Organization-WMO (in conjunction with Malawi Red Cross and IFRC)	
	a. Execution	US$ 1,292,035
	b. Fees	US$ 167,965
	c. Total	US$ 1,460,000
Project Recipient/ Beneficiary	Department of Climate Change and Meteorological Services (DCCMS), Department of Water Resources (DWR), Department of Disaster Management Affairs (DoDMA) and District Councils	
Additional Operational Partners	Red Cross (IFRC, Red Cross Climate Center and National Societies)	
Main objective(s)	To strengthen the national capacity related to weather forecasting, hydrological services, early warning early action services and financial preparedness of the government of Malawi.	
Initial state of play - project rationale	a. Vulnerability, exposure to risks, disasters impact (on people and economy)	Malawi is exposed to a variety of natural hazards, with floods, strong winds and droughts being the most frequent and most impactful. Its economy is predominantly agrarian, with about 85 percent of its population living in rural areas and the majority engaged in smallholder rain-fed subsistence farming, making the country particularly vulnerable to weather related events. Droughts exacerbate chronic food insecurity while floods and strong winds destroy crops and other public and private assets. According to the red cross, displaced people, women, children and the elderly are disproportionately at risk of climate change impacts, due to their limited access to information, technology and financial resources. Some climate impacts on different groups of people noted by IFRC in an assessment in Malawi include Elderly

		people (heat and climate disaster risk); children (food security, undernutrition and sexual and reproductive health rights (SRHR); female-headed households (food security and undernutrition); women (SRHR and undernutrition). While those with disabilities often the most vulnerable when confronted by climate emergencies. Although only 16.4 percent of Malawi's population live in urban areas, urban population is expected to almost triple, from 2.2 million in 2015 to 6.3 million by 2040. Urbanization is concentrated in four major cities—Blantyre, Lilongwe, Mzuzu, and Zomba—where growth is mostly informal and unregulated, largely because of lack of adequate and affordable housing for the urban poor, lack of enforcement capacity urban settlements, and weaknesses in land use planning and building codes. This fast and largely unplanned urban growth is creating new risk as all of Malawi's major cities are exposed to floods. Disaster risk and disaster losses in the country are on the rise. Climate change, together with environmental degradation and uncontrolled urban growth are increasing both the severity and frequency of hazards, and vulnerability in the country. In 2015, the country experienced its worst floods in 50 years, followed by a drought in 2016 due to the strongest El Niño event in 35 years. These successive events resulted in annual estimated losses of US$500 million across all sectors (*Government of Malawi, WBG, United Nations, and European Union, Malawi Drought 2015-2016: Post Disaster Needs Assessment-PDNA, 2016*). Three years later, in 2019, the country was struck by Tropical Cyclone Idai with physical damage to the country's capital stock totaling US$220 million (*Government of Malawi, WBG and United Nations, Malawi 2019 Floods: Post Disaster Needs Assessment-PDNA, 2019*). Again, three years later at the end of January 2022, Malawi was impacted by Tropical Cyclone ANA resulting in significant damages affecting over 995,000 people with 190,000 displaced families in 19 districts and two cities.
	b. Status of the EWS, DRM institutions and NHMSs, actors / players present	Malawi routinely participates in the Southern Africa Regional Climate Outlook Forum (SARCOF), and therefore contributes to, and benefits from, season-ahead information concerning tercile probabilities (above-normal, normal or below-normal) of seasonal rainfall. However, Malawi's reporting to WMO indicates that the country does not have a national-level Multi-Hazard Early Warning System in place. Currently, the **Department of Climate Change and Meteorological Services** runs a COSMO model at 7-km resolution and is limited in terms of (i) Internet access to ingest global model outputs as boundary conditions; (ii) using observations to calibrate and enhance limited area model outputs and (iii) developing applications beyond the basic observation and forecasting.

		The hydrometeorological modelling capacity of the **Water Resources Department** concentrates mainly in the Shire basin where it runs a custom-built semiautomatic model called ODSS to provide water level forecasts and flood early warnings. Other basins in the country are mostly unequipped. The Department of Disaster Management Affairs as the head of the Disaster Risk Management System of Malawi and the District Councils through the District Civil Protection Committees, are main institutional members of the DRM system in charge of early warning dissemination and disaster response. The capacity at the district level for these tasks is limited and varies amongst districts. Very few understand the full scope of their responsibilities and how best to fulfill them and very few have emergency preparedness and response protocols and standard operating procedures which if tuned with their capacities would guide them to how best attend their responsibilities with the available resources. With the support of developing partners such as the World Bank and UNDP, the country is advancing in having real time monitoring networks and higher resolution weather and flood forecasts, but limitations in resources and technical capacity restrict the number and quality of weather products and the timely and adequate dissemination amongst final users, resulting in poor access by decision makers and rural communities to timely and accurate climate and weather forecasts and early warnings. Weather forecasts and early warnings are mainly produced in English and Chichewa, not in the local dialects, and broadcast through main communication channels, thus failing to reach many communities and decision makers. **Red Cross Red Crescent Movement (RCRC): The Red Cross Red Crescent Movement** is composed of the International Federation of Red Cross and Red Crescent Societies (IFRC), Red Cross National Societies and Reference centers such as the Climate Centre and Livelihood Centers among others. The Red Cross Red Crescent Climate Centre provides ongoing support to the IFRC and national societies including the one in Malawi to enhance their capacity in climate smart programming, Anticipatory Action, Forecast based Finance (FbF) and Early Action Protocols (EAP). The IFRC as the secretariat supports local Red Cross Red Crescent action in more than 192 countries globally. The IFRC in partnership with the relevant National Societies and supported by the Climate Centre, are well-placed to support elements of CREWS-financed activities described in this proposal. In particular, the IFRC and National Societies have a key role to play in ensuring a people centered approach to early warning and early action.

		More specific areas of potential partnership include: (i) advancing dissemination and uptake of early warnings and in the design of early warning products and early action plans to compliment CREWS initiatives; (ii) Supporting Simulation exercise on key components of Early Warning Early Action with national entities and local communities; (iii) Supporting the NMHSs in communicating People Centered Early Warning Early actions and related climate risks to the last mile.
	c. Projects and programs dealing with EWS and hydromet under implementation or preparation	Malawi benefited from the first GCF support for climate information and early warning systems, namely Scaling up the use of Modernized Climate information and Early Warning Systems in Malawi, which will continue running until 2023. In addition, a NORAD-funded Adaptation Programme in Africa (APA) project implemented by WMO and partners have set-up Radio hubs as well as Radio programs to disseminate climate and weather forecasts and agro-bulletins to farmers. This has proven to be effective in the districts where the APA has focused. Malawi Red Cross Society (MRCS) with funding from WMO implemented the Global Framework for climate services (GFCS) which had overall goal of contributing to the increased resilience of vulnerable populations to the impacts of weather and climate related risks through enhanced provision of climate services. The project assisted to build Resilience in Disaster Risk Reduction, Food Security and Health through Climate Services. In addition, the project contributed to higher order, long-term impacts, such as progress in the participating countries toward Sustainable Development Goals 2, 3, and 13[1] as well as the Sendai Framework for Disaster Risk Reduction MRCS in partnership with Department of Disaster Management Affairs (DoDMA) and UNDP, through the M-CLIMES project is implementing a comprehensive community-based flood preparedness program which aims at complementing national level early warning systems. This is a follow up to the installation of automated flood/hydrological monitoring and telemetry/early warning systems at 21 locations across the 8 districts under the Community Based Early Warning Systems. The project aims at bringing people of same community together to enable them to collectively address flood risk by assessment of the risks; development of flood risk maps, development of a flood response and evacuation plan; establishment and capacity building of teams at the community level through trainings/orientation, community sensitization, monitoring risks, management of the system, dissemination of flood warnings and simulation drills in order to enhance community-based flood preparedness and response. The Malawi Department of Climate Change and Meteorological Services (DCCMS) is involved in a case-study on climate

1 (SDG) 2: End hunger, achieve food security, SDG 3 Ensure healthy lives and promote well-being for all at all ages (project specific, Lower incidence of climate sensitive communicable diseases e.g. malaria, cholera), SDG13 Take urgent action to combat climate change and its impacts

		information for food security in the context of the WMO-led and EU-funded FOCUS-Africa project. FOCUS-Africa aims to deliver tailored climate services to increase resilience and adaptation in the Southern African Development Community (SADC) region in four key sectors: agriculture and food security, water, energy and infrastructure. The goal of the food security case study is to develop climate services for the agricultural sector and tailor them to the local farmers' needs. This will be done by analyzing state-of-the-art climate projections and decadal forecasts; verification and optimization (calibration, downscaling, multi modeling) of seasonal forecasts; and updating existing agrometeorological tools and models with the latest climate forecast information and local data. These updates will improve the detection and assessment of droughts and other weather extremes, enhance management of post-harvest processes, address crop climate vulnerability, support adaptation measures and ultimately demonstrate a fit-for purpose objective seasonal forecasting model for the agriculture sector. FOCUS-Africa also includes a case study focused on hydropower for the Shire River, with EDF as the primary user, which involves researching the predictability of Lake Malawi levels on seasonal timescales and the development of a seasonal forecast climate service in partnership with DCCMS. At the same time, the World Bank funded Malawi Resilience and Disaster Risk Management Project (MRDRMP, P171877) is investing in strengthening i) the capacity of the Meteorological and Hydrological Services in Malawi to produce forecasts and early warnings; ii) the Disaster Risk Management institutional framework in their preparedness and response capacity; iii) risk assessment for Districts and city councils to support decision making; and iv) reconstruction of infrastructure after Tropical Cyclone Idai in support of flood/drought management. Under this project, the Department of Climate Change and Meteorological Services (DCCMS) is updating its IT equipment, standardizing the communications in its monitoring network, updating its modelling capacity, updating its forecaster workstation, enhancing its capacity to operate in local languages and consulting the users and receiving feedback. The Department of Water (DWR) resources and the National Water Resources Authority (NWRA) are updating the flood risk assessment and flood risk management plan for the Shire River basin, augmenting the hydrological network and enhancing both the setup and capabilities of the Operational Decision Support System (ODSS, a system that continuously runs a hydrological model of the Shire River providing early warnings and information to control the Kamuzu Barrage to manage water levels downstream and at Lake Malawi to reduce flood risk). The City of Blantyre is producing a high-resolution flood risk assessment to guide land use planning and develop a flood risk management plan. The Department of Disaster Management Affairs (DoDMA) is building a National Disaster management Center/Emergency Operations Center and putting in place an multi-year institutional strengthening plan and financing strategy for all the agencies responsible for disaster management, including a coordinated dissemination strategy amongst all

		government agencies and the media to improve the timeliness and consistency of early warnings, guide risk informed decision making, investing in risk reduction and avoiding the creation of new risk.
	d. Describe the multiplier /leveraging potential of the CREWS investments	CREWS investments will be implemented in parallel with World Bank funded Malawi Resilience and Disaster Risk Management Project (MRDRMP, P171877). The CREWS Malawi project will significantly add value to the investment outcomes of MRDRMP, GFCS and similar projects achieved so far by providing a critical support for the Government to expand and replicate successful MRDRMP developments of EWS in regions other than MRDRMP targeted areas building on good practices and lessons learnt. Building on modernized monitoring systems and modeling capacity supported by ongoing projects, the CREWS Malawi project will support the development of tailor-made climate services, co-produced advisories and community centered early Warning and Early Action messages, strengthening of dissemination and the capacity of users to understand and use of such information services for decision making. IFRC/RCC and MRCS can further support expansion of EWS reach through the network of volunteers and existing communication and action mechanisms The project will also build on MRCS, ECHO funded project "Increased disaster resilience through early action in Malawi ("iDREAM")" The project which is aimed at contributing to increased resilience of vulnerable communities in Malawi in disaster prone areas to anticipate, withstand, adapt and quickly recover from stresses and shocks. The project will run from 1st July 2021 to 30th June 2023. The CREWS Malawi is expected to leverage about a total of US$ 10M.
	e. Describe measures to ensure coherence with existing initiatives	CREWS Implementing Partners are responsible for most of the international funding DRM invested in Malawi, with their knowledge used during CREWS design to ensure complementary with existing initiatives. In addition, the project will be presented in the Malawi international development aid agencies DRM committee to ensure coherence and avoid duplication with initiatives from other development partners. The project will also seek to complement efforts towards the government led policy instruments such as DRM policy, climate change policy and the Malawi Vision 2063 and standard operating procedures for a people centered early warning early action.
Project design	a. Project components and activities	**Component 1: Strengthening the production and Co-production of climate services and early warning services** **Sub-component 1.1. Strengthening the provision of climate services** with activities such as: i) supporting the semi-automation of daily routine NMS tasks; ii) Enhancing National Climate Services (ENACTS) sector applications and map rooms at the national level, as well as in selected districts; iii) Roll-out

		National Climate Outlook Forums (NCOFs – building upon experience since 2019 through APA project); iv) Setup Climate Services Toolkit (CST) and Climate Watch Advisory System (CWS) with a multi-hazard and multi-sectorial approaches; v) Strengthen the user interface platform for systematic user consultation and feedback about NMHS products and services for continuous improvement; and vii) monitoring the implementation of the National Framework for Climate Services (NFCS). **Sub-component 1.2. Strengthening of a drought monitoring and early warning system.** It will be based on local hydrometeorological data and complemented with freely available satellite imagery about vegetation health, surface temperature, soil moisture, etc. This will involve a historical validation process to calibrate the Composite Drought Index developed by the US National Drought Mitigation Center to implement a semiautomatic, easy to run, drought monitor. System will be calibrated with local data and participation of the users and will be operated by DCCMS. A soil moisture monitoring network will be designed. The project will also facilitate dissemination of drought Early Warning and alerts in the affected communities in collaboration with MRCS. Coproduction aspects will build on experiences and lessons from the GFCS APA in Malawi. Users of the priority socio economic sectors (farmers, fishing communities, communities exposed to floods and droughts and the institutional members of the DRM System, including the media) will be convened at the onset of the project and annually during project implementation in at least four different locations each time, to gather inputs and feedback on climate services and early warning products. Structured workshops per sector will assess amongst other issues, the frequency, content, clarity of the messages and effectiveness of the dissemination channels of each of the climate services and early warning products systematically issued by DCCMS and explore any gendered nuances. Workshop preparation will be informed by a previous analysis of the information gathered by the user interface platform for systematic user consultation and feedback that will be implemented by the Project. Clarity of vocabulary and translation to the four main local languages in Malawi will also be assessed (DCCMS is currently commissioning the development of a translation app to facilitate, and semi automate translation to local languages that also needs to be continuously improved with the feedback of the users). **Sub-component 1.3. Enhancement of Flood early warning system in the Shire basin.** Technical support, expert review and inputs into the current setup of the ODSS, following recent cyclone experiences (TS Ana); support to the enhancement of

		its 2D hydrological modelling, visual outputs capabilities and interaction with the users; technical considerations into the expansion of ODSS to other catchments outside the Shire basin. This sub-component also supports translation and dissemination of anticipatory actions and other early warning messages facilitated by MRCS as well as training to maximize the benefits and utilization by key users. Furthermore, the project shall promote development of contingency plans at different levels; identification of evacuation routes and centres including provision of capacity building initiatives. **Component 2. Strengthening early warning dissemination, preparedness and response** **Sub-component 2.1: Strengthening early warning dissemination and preparedness/response capacity in the country**. through i) the formulation/update of emergency preparedness and response protocols and standard operating procedures at District and local authority level, building upon the MHEWS protocols established by IFRC under the NORAD Adaptation Programme and in light of the new/updated forecasts and early warnings; and ii) formulation/update of a National Forecast and Warning dissemination strategy that drives the coordination amongst government agencies (DWR, MoAG, DoDMA, DCCMS) and the media, to reduce fragmentation, and communication gaps at national, district and community level, expanding and building on the Radio hubs and Radio programs developed in Malawi through the APA project of WMO. This sub-component would be supported by the MRCS through the IFRC and supported by Red Cross and Red Crescent Climate Centre (RCRCCC), to assist in formulation and implementation of early action plans and Standard Operating Procedures (SOPs), ensuring effective dissemination down to the community level. The actions undertaken here will be implemented taking consideration of gender and social inclusion (for example of the elderly) according to IFRC's knowledge and experience on Protection, Gender and Inclusion. **Sub-component 2.2: Strengthening urban flood risk information and management in the country** by: i) undertaking flood risk assessments for the cities of Zomba and Mzuzu, (the remaining two out of the four major urban centers of the country without a detailed flood risk assessment) to enhance impact based early warning and preparedness, ii) formulation of flood risk management strategies for these cities, and iii) support the consolidation of the urban disaster management institutional framework. MRCS will be involved to support

		review of flood risk outcomes and early action based on the risk assessment findings **Sub-component 2.3: Operationalization of the Risk Financing Strategy.** The Malawi Ministry of Finance has adopted a National Risk Financing Strategy to improve the financial capacity of the country to respond timely to disasters and reduce dependency from international humanitarian cooperation. Timely response reduces the potential full impact of disasters since unattended affectations tend to aggravate with time. The main elements of the Strategy are the creation and funding of a Disaster Risk Management Fund (to keep public resources for immediate response and to fund risk reduction investments), and the adoption of other risk financing instruments such as insurance and pre-negotiated disaster response loans. This sub-component will i) Support inputs into the design and establishment of the Disaster Risk Management Fund, ii) Technical inputs to support decision making on adoption of Risk Financing Instruments, and iii) Exchange, awareness and training of Risk Financing amongst Decision Makers. Ministry of Finance and DoDMA will receive support to work on strengthening the legal standing of these instruments, transparent governance and decision making, cost benefit analysis and feasibility studies. **Component 3: Capacity Building** Capacity development for NMHS staff and users on basic systems (observations, monitoring, modelling, prediction), research, development and delivery of services, and application of services, including ENACTS; and exploring opportunities for sustainable financing of DCCMS (through public, private and projects resources). In addition to the NMHS staff, the main targeted users will include, communities at risk of floods and droughts, farmers, fishermen and water user associations that manage water supply or irrigation systems that depend on surface water. The project will also support capacity building by MRCS for staff, stakeholders and volunteers on interpretation of advisories, dissemination of EW messages as well equipping of EW teams and simulation exercises amongst key EWS stakeholders. All the activities will emphasize gender mainstreaming and social inclusion including needs of persons with disabilities. Hydrometeorological products and services as well as their dissemination systems will be developed in a gender sensitive and socially inclusive manner. Gender, protection, social inclusion and accountability experts at WMO, WB and IFRC/MRCS will provide

		technical support, including review of documents, processes, products and services.
	b. Work plan	See attachment 2

Organization and operating procedures	a. Institutional framework	The project will be implemented by the World Bank (lead) and WMO, in conjunction with the Malawi Red Cross, in close coordination with DCCMS, DWR and DoDMA. A Project Steering Committee (PSC) will be established with representatives from the four Implementing Partners, DoDMA, DCCMS, DWR and RCRC (encompassing IFRC, MRCS and RCRCCC) and in order to supervise and support implementation as well as ensure participation and permanent coherence with government and international cooperation policies and initiatives. The PSC will be consulted during the preparation of the implementation plans and budgets and will meet at least bi-annually to follow on project progress, provide strategic guidance and provide support on implementation barriers.
	b. Monitoring and evaluation system	The M&E system will follow the results framework developed based on the project expected outcomes. Each implementing agency will produce bi-annual reports on indicators and progress on the targets under their responsibility, to produce an integrated report. Performance monitoring and reporting will follow current World Bank practices. Project reviews will take place on bi-annual basis, aligned with the standard practice for CREWS projects, and will include reporting of progress sand outputs to date using the proposed data collection tools and reporting templates~~Project reviews will take place on an annual or bi-annual or quarterly basis and will include reporting of progress and outputs to date using the proposed data collection tools and reporting templates~~. An external evaluation at the end of the project will be carried out.
Project viability and sustainability	a. Main identified risks	***Delays due to natural hazards:*** During the last decade, Malawi has experienced a significant disaster every other year, either flooding or drought. In addition, two major tropical storms made landfall in Malawi during the last 4 years. These events require full dedication of many agencies of the government, in particular agencies that are central in the implementation of the CREWS project. This reinforces the need for the investment but also recognizes the inherent risks of delay in its implementation. This is addressed by using a modular approach to implementation to provide flexibility while TORs and investment plans will be formulated considering this risk.

		Long term financial sustainability: Because DCCMS and DWR have been systematically underfinanced, they face persistent challenges to keep their monitoring network operational and calibrated, their equipment, systems operational and secure sufficient human resources. The most challenging issues in this regard are resources to keep infrastructure updated and running and resources to cover recurrent costs such as maintenance, batteries, monitoring network communication fees and internet fees. Big investments are usually covered by international aid and financing but sometimes equipment is not updated on time and recurrent costs are expected to be covered by government. As a result, sometimes the infrastructure in place is not operational because of lack of funding for these relatively low recurrent costs. The project will embark on lobbying with the Government to increase funding allocation in order to meet minimal operational costs. A high-level strategy to manage this risk is described more in details in section c below.
	b. Critical assumptions	▪ Strong support and engagement from DCCMS, DWR and DoDMA. Openness to embrace new and efficient technologies, knowledge and standards. ▪ Strong support from agencies in government that are users or potential users of hydromet product and services. To incorporate DCCMS and DWR products and services into their operation and decision makings, and to advocate for appropriate funding from central government. ▪ MRCS staff and volunteers are willing to undertake dissemination of advisories/Early Warning Early Action messaging to the targeted communities on time
	c. Judgment on the project sustainability	Climate change and the recurrency of hydrometeorological disasters has elevated the issue related to sustaining hydromet infrastructure and services on the agenda of development agencies and development banks but recurrent costs are almost always expected to be covered by government. Coordination amongst development agencies and donors for efficient use of resources is key, as well as migrating to low-cost/low-maintenance alternatives such as cloud computing and awareness and commitments from the national government to allocate minimum required operational costs to the governmental agencies involved: ▪ Ensuring ownership by DCCMS, DWR, DoDMA, and the Malawi Government in general. The project has been designed following the guidance from DCCMS; they will delegate a technical focal point that will participate in the technical meetings of the project, guide and review TORs of all procurement and review outcomes. In addition, Management of DWR and DoDMA, will participate as members of the Project Steering Committee. Annual meetings with the

		Ministries in charge of DCCMS, DWR and DODMA, the Office of the Prime Minister and the Ministry of finance will be held to present progress and gain their support and mobilization of domestic resources for long term sustainability. ▪ Adopt low-cost/low-maintenance technology alternatives. Migrating to options such as cloud computing and investing high speed internet facilities which will eliminate the need for computer maintenance and increase speed of processing capacity, limiting the need for recurrent equipment replacement/upgrade. Low recurrent cost options also will increase sustainability, open source and free software will be preferred even if initial investment in customizing and developing tailor made solutions require a high initial investment. ▪ Increasing donor support and coordination: Investments made to date have resulted in limited sustainability of impact due to fragmentation of efforts, among other factors. Through the PSC and further mechanisms such as donor coordination meetings at various fora, the project team will make sure to coordinate and harmonize efforts with activities from other donors. ▪ Close coordination with ongoing and future World Bank Projects: i) Malawi Resilience and Disaster Risk Management Project (MRDRMP, P171877), ii) Roadmap from the Crisis Preparedness Gap Analysis, iii) alignment with any support to Malawi following Tropical Storm Ana. ▪ MRCS shall ensure sustainability of the interventions by engaging its network of volunteers as well as coordinating with the local structures in the respective districts.

Attachment 1: Budget Breakdown (USD)

Activity	Lead IP	Total	WB	WMO
Component 1: Strengthening the production of climate services and early warning services		**1,375,000**	**700,000**	**675,000**
Sub-component 1.1: Strengthening the provision of climate services				
Enhancing National Climate Services (ENACTS) sector applications and map rooms at the national level, as well as in selected districts, including training on priority topics such as Climate Data tool (CDT), remote sensing, sectorial forecasts, rainy onsets, length of rainy season, dry spells, etc.	WMO	150,000		150,000
Roll-out National Climate Outlook Forums in Malawi	WMO	50,000		50,000
Strengthening of the production of climate services tailored for priority socio-economic sectors through development and roll out of Climate Services Toolkit (CST) with a multi-hazard and multi-sectorial approaches in partnership with ICPAC and RIMES based on capacity gap analysis, technical training and setting up Climate Watch Advisory System (CWS)	WMO	200,000		200,000
Development of M&E framework for monitoring the implementation of the National Framework for Climate Services (NFCS)	WMO	70,000		70,000
Focal point for project implementation at DCCMS and M&E	WMO	50,000		50,000
Sub-component 1.2: Strengthening regional coordination and cooperation for effective EWS and climate services				
Adapt and Calibrate the Composite Drought Index (CDI) developed by the US National Drought Mitigation Center for use in Malawi, with potential collaboration with relevant regional centre(s), especially on agriculture drought monitoring and forecasts products and web-based information system	WB	195,000	170,000	25,000
Support DCCMS with a semiautomatic, easy to run, drought monitor based on the CDI.	WB	150,000	140,000	10,000
Design of a soil moisture monitoring network for future enhancement of the CDI and drought monitor.	WB	90,000	50,000	40,000
Measure effectiveness of EWS against indicators identified	WMO	80,000		80,000
Sub-component 1.3: Enhancement of Flood early warning system in the Shire basin				

Enhancement of the Operational Decision Support System (ODSS) 2D hydrological modelling, visual outputs and interaction with the users.	WB	180,000	180,000	
Training and capacity building of the technical team in charge of the operation (DWR and DCCMS)	WB	80,000	80,000	
Training and awareness of all users: National, regional and local authorities and communities.	WB	80,000	80,000	
Component 2: Strengthening early warning dissemination, preparedness and response		**982,035**	**670,000**	**312,035**
Sub-component 2.1: Strengthening early warning dissemination and preparedness/response capacity in the country				
Support the development of a gender sensitive and inclusive community based EWS, test and refine it through a pilot project for future roll-out for the rest of Malawi	WMO (with IFRC)	262,035		262,035
Sub-component 2.2: Strengthening urban flood risk management in the country				
Probabilistic Flood risk assessments for the cities of Zomba and Mzuzu	WB	250,000	250,000	
Formulation of flood risk management strategies for Zomba and Mzuzu	WB	150,000	100,000	50,000
Support the consolidation of the urban disaster management institutional framework.	WB	80,000	80,000	
Sub-component 2.3: Operationalization of the Risk Financing Strategy				
Support the design and establishment of the Disaster Risk Management Fund	WB	100,000	100,000	
Technical inputs to support decision making on adoption of Risk Financing Instruments	WB	90,000	90,000	
Exchange, awareness, and training of Risk Financing amongst Decision Makers	WB	50,000	50,000	
Component 3: Capacity Building		**335,000**		**305,000**
Sub-component 3.1: Capacity Development				
Training for NMHS staff and users on basic systems (observations, monitoring, modelling, prediction), research, development and delivery of services, and application of services, including ENACTS	WMO	205,000		205,000
Simulation exercise for DoDMA and DCCMS staff and other key EWS stakeholders	WMO (with IFRC)	100,000		100,000
Project Evaluation at closing	WB (with WMO and IFRC)	30,000	30,000	
Project Costs		**2,692,035**	**1,400,000**	**1,292,035**
Overhead (13% for WMO and UNDRR, 10% for WB)		**307,965**	**140,000**	**167,965**
TOTAL PROJECT COSTS		**3,000,000**	**1,540,000**	**1,460,000**

Attachment 2: Timeline for implementation

	2022			2023				2024				2025				2026			
	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Establishing baseline and targets			X	X	X														
Consultations with users/communities involved			X	X	X														
Component 1: Strengthening the production of climate services and early warning services																			
Sub-component 1.1: *Strengthening the provision of climate services*																			
Enhancing National Climate Services (ENACTS) sector applications and maprooms at the national level, as well as in selected districts, including training on priority topics such as Climate Data tool (CDT), remote sensing, sectorial forecasts, rainy onsets, length of rainy season, dry spells, etc.			X	X	X														
Roll-out National Climate Outlook Forums in Malawi						X				X									
Strengthening of the production of climate services tailored for priority socio-economic sectors through development and roll out of Climate Services Toolkit (CST) with a multi-hazard and multi-sectorial approaches in partnership with ICPAC and RIMES based on capacity gap analysis, technical training and setting up Climate Watch Advisory System (CWS)								X	X	X	X								
Development of M&E framework for monitoring the implementation of the National Framework for Climate Services (NFCS)							X	X											
Focal point for project implementation at DCCCMS and M&E	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Sub-component 1.2: *Strengthening regional coordination and cooperation for effective EWS and climate services*																			
Adapt and Calibrate the Composite Drought Index (CDI) developed by the US National Drought Mitigation Center to for use in Malawi, with potential collaboration with relevant regional centre(s), especially on agriculture drought monitoring and forecasts products and web-based information system				X	X	X	X	X	X										
Support DCCMS with a semiautomatic, easy to run, drought monitor based on the CDI.								X	X	X	X	X	X	X	X				
Design of a soil moisture monitoring network for future enhancement of the CDI and drought monitor.							X	X	X	X	X	X	X	X	X				
Measure effectiveness of EWS against indicators identified				X	X	X	X	X	X	X	X	X	X	X	X				
Sub-component 1.3: Enhancement of Flood early warning system in the Shire basin																			
Support to the enhancement of the Operational Decision Support System					X	X	X	X											

(ODSS) 2D hydrological modelling, visual outputs and interaction with the users.																				
Training and capacity building of the technical team in charge of the operation (DWR and DCCMS)								X	X	X	X	X								
Training and awareness of all users: National, regional and local authorities and communities.								X	X	X	X	X								
Component 2: Strengthening early warning dissemination, preparedness and response																				
Sub-component 2.1: *Strengthening early warning dissemination and preparedness/response capacity in the country*																				
Support the development of a gender sensitive and inclusive community based EWS, test and refine it through a pilot project for future roll-out for the rest of Malawi				X	X	X	X	X	X	X	X									
Sub-component 2.2: *Strengthening urban flood risk management in the country*																				
Probabilistic Flood risk assessments for the cities of Zomba and Mzuzu				X	X	X	X	X	X											
Formulation of flood risk management strategies for Zomba and Mzuzu								X	X	X	X	X								
Support the consolidation of the urban disaster management institutional framework.										X	X	X	X	X						
Sub-component 2.3: Operationalization of the Risk Financing Strategy																				
Support the design and establishment of the Disaster Risk Management Fund				X	X	X	X	X	X	X	X	X	X	X	X					
Technical inputs to support decision making on adoption of Risk Financing Instruments				X	X	X	X	X	X	X	X	X	X	X	X					
Exchange, awareness, and training of Risk Financing amongst Decision Makers				X	X	X	X	X	X	X	X	X	X	X	X					
Component 3: Capacity Building																				
Sub-component 3.1: Capacity development																				
Training for NMHS staff and users on basic systems (observations, monitoring, modelling, prediction), research, development and delivery of services, and application of services, including ENACTS			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
Simulation exercise for DoDMA and DCCMS staff and other key EWS stakeholders												X	X	X	X					
Project Evaluation at Closing																	X	X	X	

Attachment 3: Concise Logical framework

Activity	Result	Indicators	Means of Verification	Baseline	Target
CREWS program indicators					
Improving forecasting and warning capacities	Greater level of services provided by NMHS	'Level of Service' category of the National Meteorological and Hydrological Services (NMHS)	Checklist for climate services implementation	2- Essential	3 - Full
Improving capacity to prepare for and respond to warnings	Increased ability for end-users and on-the-ground responders to take action on the receipt of warnings. Roles and responsibilities for stakeholders clearly defined.	# of Least developed Countries (LDCs) and Small Island Developing States (SIDS) using standard operating procedures (SOPs) on how to respond in the face of an impending emergency	Bi-Annual Report, Completed SOPs accepted	0	1
Access to early warning	Better drought and flood early warning services provided	Number of people living in areas covered by forecasts and warnings for a given hazard	Bi-Annual Report, DCCMS reports	TBD	TBD
Use of Risk Information	Flood risk assessments conducted for the cities of Zomba and Mzuzu	# of LDCs and SIDS that have generated risk information to enhance the early warning system	Completed Flood Risk Assessment Reports	0	1
Supporting gender-sensitive design of early warning services	Increased ability for women to act upon early warning information	# of projects which apply the CREWS Operational Procedure Note No 3 for Gender-Sensitive Programming to the project cycle (programming, operations, M&E)	Report	0	2
Component 1: Strengthening the co-production of climate services and early warning services					
Sub-component 1.1: Strengthening the provision of climate services					
Enhancing National Climate Services (ENACTS) sector applications and maprooms at the national level, as well as in selected districts, including training on priority topics such as Climate Data tool (CDT), remote sensing, sectorial forecasts, rainy onsets, length of rainy season, dry spells, etc.	Maprooms developed to enhance the uptake and use of climate services for climate change adaptation	# of Maprooms	Website visits User survey (TBC)	TBD	TBD
Roll-out National Climate Outlook Forums (NCOFs) in Malawi	NCOFs to enhance user engagement, feedback and use of climate services in decision making processes	# NCOFs held	Meeting reports	TBD	TBD
Strengthening of the production of climate services tailored for priority socio-economic sectors through development and roll out of Climate Services Toolkit (CST) with a multi-hazard and multi-sectorial approaches	CST developed	# CST # of female and male users engaged in the design of each CST # of female and male users providing feedback used to refine each CST	Website	0 TBD TBD	1 TBD TBD

in partnership with ICPAC and RIMES based on capacity gap analysis, technical training and setting up Climate Watch Advisory System (CWS)					
Development of M&E framework for monitoring the implementation of the National Framework for Climate Services (NFCS)	M&E framework developed and implemented	# M&E framework	M&E Framework Document	0	1
Focal point for project implementation at DCCMS and M&E	Enhanced project management and coordination of DCCMS to implement the project				
Sub-component 1.2: *Strengthening regional coordination and cooperation for effective EWS and climate services*					
Adapt and Calibrate the Composite Drought Index (CDI) developed by the US National Drought Mitigation Center to for use in Malawi, with potential collaboration with relevant regional centre(s), especially on agriculture drought monitoring and forecasts products and web-based information system	Historical validation of drought conditions in Malawi and tool calibration	CDI Validation Completed (Yes/No)	Report on platform	No	Yes
Support DCCMS with a semiautomatic, easy to run, drought monitor based on the CDI.	Establishment of a Drought Monitor	Drought Monitor Established (Yes/No)	Report on platform	No	Yes
Design of a soil moisture monitoring network for future enhancement of the CDI and drought monitor.	Technical design considerations for a soil moisture network completed, to inform agricultural monitoring, weather prediction, and drought and flood early warning	Technical Design of Soil Moisture Network for Malawi, developed (Yes/No)	Report, Firm Deliverables	No	Yes
Measure effectiveness of EWS against indicators identified	M&E of EWS against indicators	M&E completed	Report	No	Yes
Sub-component 1.3: Enhancement of Flood early warning system in the Shire basin					
Support to the enhancement of the Operational Decision Support System (ODSS) 2D hydrological modelling, visual outputs and interaction with the users.	ODSS Upgraded	# of technical reports produced supporting the upscale and expansion of the ODSS as a key platform for managing water resources	Technical review of firm deliverables	0	3
Training and Capacity Building of Users	End users trained in the ODSS	Number of Trainings Conducted	Training/workshop minutes and reports	0	3
Component 2: Strengthening early warning dissemination, preparedness, and response					

Sub-component 2.1: Strengthening early warning dissemination and preparedness/response capacity in the country					
Support the development of a gender sensitive and inclusive community based EWS, test and refine it through a pilot project for future roll-out for the rest of Malawi	Design of a gender sensitive and inclusive community based EWS completed and pilot-tested	# EWS design and testing # of men and women engaged in design and testing	Report	No TBD	Yes TBD
Sub-component 2.2: *Strengthening urban flood risk management in the country*					
Probabilistic Flood risk assessments for the cities of Zomba and Mzuzu	Flood risk assessments for the cities of Zomba and Mzuzu carried out, to inform impact based early warning and preparedness	# of Urban Flood Risk Assessments Completed	Flood Risk Assessment Reports.	0	2
Formulation of flood risk management strategies for Zomba and Mzuzu	Flood risk management strategies for Zomba and Mzuzu completed to inform land use and city decision making based on projected urban growth in Malawi	# of Flood Risk Management Strategies completed	Reports	0	2
Consolidation of the urban disaster management institutional framework.	Development of an urban disaster management institutional framework supported, to aid in city-level disaster risk management and planning	Urban Disaster Management Institutional Framework (UDMIF) developed (Yes/No) (# of cities with DRM institutions in place in line with the UMIF)	Report	No	Yes
Sub-component 2.3: Operationalization of the Risk Financing Strategy					
Support the design and establishment of the Disaster Risk Management Fund	Inform the key provisions of the National Disaster Risk Financing Strategy and aid in the early technical requirements for the conceptualization and development of a DRM Fund for the country	# of Technical reports produced to aid in Government design and development of DRM Fund	Reports from the Ministry of Finance; technical reports produced under the program	0	2
Technical inputs to support decision making on adoption of Risk Financing Instruments	Technical support to uptake of ex-ante risk financing instruments established in alignment with the national DRF Strategy	# of ex-ante DRF instruments adopted, informed by Project inputs	Reports from Ministry of Finance	0	1
Exchange, awareness, and training in Risk Financing amongst Decision Makers		# of knowledge exchange and capacity development workshops	Workshop Minutes and outcomes	0	2
Component 3: Capacity Building					
Sub-component 3.1: Capacity Development					
Training for NMHS staff and users on basic systems (observations, monitoring, modelling, prediction), research, development and delivery of	Capacity of DCCMS enhanced	# trainings held # of women and men NMHS staff trained and utilized training # of users/user groups trained and utilized training	Reports	TBD	TBD

services, and application of services, including ENACTS					
Simulation exercise for DoDMA and DCCMS staff and other key EWS stakeholders	Preparedness capacity enhanced	Simulation exercise completed	Simulation workshop output/outcome documentation; lessons learned report	No	Yes
Project Evaluation at Closing	Assessment of achievement of Project results and contributions of CREWS resources to leveraging activities.	Project Evaluation Completed	External report completed endorsing results achieved by implementing partners	No	Yes

Acronyms

APA	**Adaptation Programme in Africa**
CDI	**Composite Drought Index**
COSMO	**Consortium for Small Scale Modeling**
CPT	**Climate Predictability Tool**
CST	**Climate Services Toolkit**
CWS	**Climate Watch Advisory System**
DCCMS	**Department of Climate Change and Meteorological Services**
DODMA	**Department of Disaster Management Affairs**
DRM	**Disaster Risk Management**
DWR	**Department of Water Resources**
EAP	**Early Action Protocols**
ENACTS	**Enhancing National Climate Services**
EWS	**Early Warning System**
FbF	**Forecast based Finance**
GCF	**Green Climate Fund**
GFCS	**Global Framework for climate services**
IFRC	**International Federation of the Red Cross**
M-CLIMES	**Modernized Climate Information and Early Warning Systems**
MoAG	**Ministry of Agriculture**
MRDRMP	**Malawi Resilience and Disaster Risk Management Project**
MRCS	**Malawi Red Cross Society**
NFCS	**National Framework for Climate Services**
NMHS	**National Meteorological and Hydrological Services**
NWRA	**National Water Resources Authority**
ODSS	**Operational Decision Support System**
PDNA	**Post Disaster Needs Assessment**
RCRC	**Red Cross Red Crescent Movement**
RCRCCC	**Red Cross and Red Crescent Climate Centre**
RIMES	**Regional Integrated Multi-Hazard Early Warning System for Africa and Asia**
SADC	**Southern African Development Community**
SARCOF	**Southern Africa Regional Climate Outlook Forum**
SRHR	**sexual and reproductive health rights**

UNDP	**United Nations Development Program**
WMO	**World Meteorological Organization**
WB	**World Bank**

Comment Matrix (synthesis of comments received from Experts nominated by CREWS Steering Committee Members)

Ref.	Comment	Response
	John Faragher, Met Office (United Kingdom)	
A.1	It would be great to see some statement about ensuring the sustainability of interventions. I see that there is some work included to look at establishing more stable funding for the NMHS, but something more specifically on ensuring that design of services and systems considers sustainability (i.e. future run/maintain costs, ability of NMHS to train new staff themselves and so on) as a key factor in deciding what to implement.	This seems to be covered under Section C on *Judgment on the project sustainability.* Though we can add additional aspects if necessary.
A.2	Is there a plan to use an NMHS partner involved in the capacity development of DCCMS (1.1 b, c; 3.1) – either a strong partner from the region (South Africa maybe) or from outside (one of the development focused NMHS such as Finland, Sweden, Switzerland or even the UK…)?	Yes, partnering or linking with one of the more advanced NMHSs is being considered. At the moment we envision working with the USA based International Research Institute for Climate and Societa (IRI) which developed the ENACTS approach and worked closely with DCCMS in an earlier phase.
A.3	Is there a plan to link to / support the Southern Africa SWFP as part of the capacity development aspects? This would seem a good option for forecaster training / development in 3.1	Linkages with the SWFP-Southern Africa will be pursued. This will be in the form of some in-country capacity building for DCCMS staff on the SWFP products and their use.
A.4	1.1d – ICPAC engagement with DCCMS. It should be noted that this is potentially politically sensitive, and also sets a precedent in terms of the way that development of NMHS / Regional Climate Centers operates in future. The RCC that that Malawi 'belongs' to is the SADC-CSC, and they should be the ones supporting the implementation of climate services and NCOF in this region. This does present challenges, as the SADC-CSC does not necessarily have the capacity themselves to do this (yet) and don't have the established suite of support services that ICPAC does, not the experience in using i.e. Maprooms, CPT, Objective Seasonal Analysis – however, in not using them the project would be bypassing the established governance / mandate structure in the region. I suggest that a chat with the East / Southern Africa WMO RA1 office (Mark Majodina mmajodina@wmo.int would be who I would contact) might be useful to discuss how any potential fall-out from this can be managed / avoided.	We agree that this should not set a precedent and SADC CSC should be the RCC supporting the climate services and NCOF activities within SADCS. Please note that CST activities of ICPAC are developed and implemented with the support of RIMES under the European Union funded project ClimSA. Under this EU supported project, RIMES is also committed to develop and operationalized a CST platform pertinent for a climate-sensitive sector in Angola, a selected focus country in the SADC subregion. Furthermore, RIMES has closely worked with SADC CSC, under ClimSA, to assess SADC CSC gaps and needs with respect to provision of objective seasonal forecasts. Thus, we envision to engage RIMES and involve SADC CSC experts in the CST activities in Malawi. We will engage the SADC CSC in these activities, through the WMO Regional Office in Addis or Sub-regional Office in Eastern Africa; and in parallel, WMO will continue to support the capacity of SADC CSC to be able to provide this support to members.
A.5	Finally – alongside a commitment to gender-sensitive design, it would be good to explicitly	"The actions undertaken will be implemented taking consideration of gender and social

	state that the project will look to include other traditionally under-represented groups. This could include users with poor (or no) literacy, users with disabilities, and (though slightly more difficult to define) those otherwise excluded from civil society by impact of religious, social or economic status.	inclusion (for example of the elderly) according to IFRCs knowledge and experience on Protection, Gender and Inclusion (PGI)". This statement has been included in the actions related to community engagement.