AFGHANISTAN Project Proposal

Project Title	AF HYDROMET & EARLY WARNING SERVICES FOR RESILIENCE - ENHANCING LEARNING/CAPACITY ON WEATHER AND CLIMATE INFORMATION (ELWIN[1])			
Project Reference	CREWS/CProj/10/Afghanistan			
Geographic coverage	*Afghanistan*			
LDC and/or SIDS profile	**Level of Disaster Risk:** Very High (ranking 35 in the World Risk Index 2018 with a WRI value of 10.45 (very high risk range)	**The average annual loss to disasters:** 500,000 people are affected annually by weather-related hazards. Some estimates for economic loss are Floods:US$54M extreme drought: US$ 3 billion Multi-hazard AAL figures from GAR 2015 are: US$ 238.98 million (Earthquake US$ 146.81 and Flood US$ 92.17)	**Access to information & communications (ICT index):** 1.95 (ranked 159 in 2017)	**The capacity of NMHS:** AMD (Afghanistan Meteorological department) can generate weather forecasts up to 3 days; with limited capacities and skills of numerical weather prediction (NWP) and nowcasting (important for flash floods); no seasonal outlooks (needed for agriculture); weak monitoring of cryosphere by MEW (Ministry of Energy and Water). Both AMD and MEW (hydrology) lack a comprehensive service delivery system and have significant capacity enhancement needs.
	Status of hydromet and EWS: Overall national challenge for effective operation and delivery of hydromet and EW services; Lack of a well-developed EWS for any hazard; extremely limited last mile connectivity	**Disaster loss and risk data to inform early warning:** Since 1980, disasters (natural hazards) have affected 9 million people and caused 20,000 fatalities **Floods**: average annual estimated losses US$ 54M, 100,000 people affected annually; Large floods damage US$ 500M; **Droughts**: 6.5 million people affected since 2000; The 2018 dought affected 13 million people and displaced 81,000 people villages; **Avalanches**: 50,000 people at risk of death and injury; National level disaster risk	**Demand/Priority:** A unified national strategy for the provision of hydromet and EW services to produce and deliver useful and usable information on the impact of different hazards on the lives social infrastructures and livelihoods of the population down to the village level as reflected in the Hydromet and Early Warning Services Roadmap as well as in National DRR strategy (approved in November and	**Leveraging potential:** The GoA/WB roadmap informs the current AF CREWS proposal of the most pressing needs. With the support of CREWS, priority activities to build a foundation for providing better hydromet and EW services will be addressed. The project will be implemented in close coordination with the hydromet component (USD 22.8 M) of the World Bank financed Irrigation Restoration and Development

[1] ELWIN is the Dari word for Climate.

		data have been generated by WB TA.	December 2018 respectively).	Project and the proposed USD 2M Recipient executed activities financed by the World Bank/DFID Programme on Asia Resilience to Climate Change Trust Fund (PARCC).

Timeframe	*July 2019 - June 2023*	
Total cost of CREWS Contribution	*USD 3.66 Million*	
Lead Implementing Partner	*The World Bank (lead implementing partner)*	
	a. Allocation requested for execution by Government	Only in kind
	b. Allocation requested for execution by Partner	USD 2,450,000
	c. Fees of Implementing Partner	USD 245,000
	d. Total	USD 2,695,000
Additional Implementing Partner	*WMO (technical support)*	
	a. Allocation requested for execution by Partner	US$858,407
	b. Fees of Implementing Partner	US$111,593 (13%)
	c. Total	US$970,000
Other Partners	*[Other partners involved in the project implementation and/or contributing funds]*	
	Financial Contribution	World Bank (ARTF): USD 22.8 M (IRDP, ongoing) World Bank/DFID PARCC USD 2 M (planned)
	Form of Contribution	Recipient Executed funds
Project Recipient/Beneficiary	*Government of the Islamic Republic of Afghanistan and its agencies (GIRoA) (such as Afghanistan Meteorological Department (AMD) in the Afghan Civil Aviation Authority (ACAA), Water Resource Department (WRD) of Ministry of Energy and Water (MEW), Ministry of Agriculture, Irrigation and Livestock (MAIL), Ministry of Rural Rehabilitation and Development (MRRD), Afghanistan National Disaster Management Authority (ANDMA) and others)*	
	Form of Contribution	In kind
Total Project Amount	*CREWS: USD 3.66 Million executed by The World Bank and WMO as Technical Assistance Recipient Executed: USD 2 Million PARCC TF (Afghanistan Meteorological Department, AMD); US 22.8 M IRDP (Water Resources Department, Ministry of Energy and Water, WRD/MEW)*	
Main objective(s)	**To strengthen the capacity of provider and user agencies for the development and delivery of weather, water and climate-related early warning services.** This will be done through developing and/or strengthening capacity related to i) production, translation and communication of weather forecasts, hydrological forecasts, and impact-based warnings focusing on the end-users' needs ; ii) delivery of services to stakeholders and end-users and assisting them to access, interpret utilize and provide feedback on the generated information for priority sectors such as agriculture, disaster, water, urban etc and through community based initiatives and strengthening capacities of provincial and district level disaster management, including improvement in the dissemination of warnings for public safety and economic security, incorporating traditional knowledge as appropriate, and ensuring "last-mile" connectivity; iii) improvement in the information base, including through regional collaboration; and iv) enhanced decision-making to mitigate the adverse impacts of natural hazards on life, livelihoods and property.	

Initial state of play - project rationale	a. Vulnerability, exposure to risks, disasters impacts (on people and economy)	Afghanistan is prone to many hydrometeorological hazards that have adversely affected the lives, properties, and livelihoods of the Afghan people for centuries. Wars and civil conflicts have increased the vulnerability of the Afghan people to natural disasters. Indeed, the country is consistently ranked high on the Global Climate Risk Index, and within the low-income countries takes second place, only surpassed by Haiti, in terms of the number of fatalities from natural disasters between 1980 and 2015. Each year an estimated 500,000 people are affected by weather-related hazards in Afghanistan. High altitudes, poor soil, harsh climate, and political turmoil mean an amplified impact of variance in temperature and precipitation, negatively affecting both agricultural productivity and road conditions for access to markets. The most devastating hydrometeorological hazards in terms of frequency, destruction, and human loss include floods, flash floods, droughts, landslides, avalanches and, extreme heat and cold. Since 1980, disasters caused by natural hazards have affected 9 million people and caused over 20,000 fatalities in Afghanistan. In addition to the safety of life and property issues, several economic sectors are highly weather-sensitive, especially agriculture, urban, energy and transportation. Given the projections of rainfall and average temperatures, the hydrologic impact is expected to result in a drop of water resource reserves. **Floods** are the most frequent hydrometeorological natural hazard historically, causing average annual damages of US$ 54 million and affect an estimated 100,000 people annually, large flood episodes can cause over US$500 million in damages. Future flood risk is projected to increase substantially partly due to climate change[2]. More of the population will be exposed to flooding (200,000-300,000 annually in 2050), and more assets will be at risk of damage (US$300-700 million annually in 2050). Afghanistan's rate of flood deaths compared to the population's flood exposure is one of the highest in the world. Heavy rains in 2014 caused extensive flooding, and trigged landslides in the province of Badakhshan which killed over 350 people. Recurrent floods have not only become violent, but also cause soil erosion. Flooding also impacts the spread of Malaria and other waterborne diseases. **Droughts** have affected 6.5 million people since 2000. While droughts have been recorded in every part of the country, an extreme drought could cause an estimated US$ 3 billion in agricultural losses, and lead to severe food shortages across the country. Rainfall is scarce and unpredictable, and a small snow pack resulting from a dry winter can result in low reservoir levels, dry streams, shortages of potable and irrigation water, and lead to food shortages and socio-economic problems. This has been the case in the winter season 2017-2018 triggered by La Niña with an estimated 70 per cent water deficit across the country. The 2017 wheat production was 57 per cent below the five-year average, and the 2018 harvest was forecasted to be even lower; down from 4.2 million metric tons to 3.5 million metric tons. The lives of 13 million people are at stake due to food insecurity, with 8 million already facing food shortages. In August 2018 alone 2,2 million people faced food and water scarcity, and 150,000 Afghans left their villages in Western Regions. (United Nations Office for the Coordination of Humanitarian Affairs, September 2018). Long periods of drought can be followed by intense rainfall with catastrophic consequences: water shortages, and water excess. Since 1960, average rainfall in Afghanistan has experienced a slight decline by around 2%

[2] Afghanistan – Multi-hazard risk assessment, cost-benefit analysis, and resilient design recommendations; final report, Deltares and the World Bank, 2016

		per month per decade. Increases in both urban and rural population will further stress water supply in the future. **Avalanches** are Afghanistan's third deadliest natural hazard, after earthquakes and floods. Two million people are exposed to avalanches. Strong snowfall and the resulting avalanches in Afghanistan's many mountainous regions cause significant loss of life and damage to infrastructure, property and livestock. Avalanches kill dozens of people each year, and in 2015 severe snowfalls led to avalanches which killed almost 300 people. 15% of Afghanistan's road network is exposed to avalanches including the Salang Pass, which is critical for the country's trading and logistics, and roads through mountain passes are frequently closed. Overall, 2,700 – 35,000 people are at risk of death due to snow avalanches, and 1,100 – 11,200 at risk of injury. **Landslides** and mudflows frequently occur in Afghanistan, but many are low-impact events or highly localized and are not comprehensively indexed. Three million people are exposed to very high or high landslide hazard risk.
	b. Status of the EWS, DRM agencies and NHMSs, actors / players present	In recent years, Meteorological and Hydrological capacity in Afghanistan has been developed on a project basis within different government organizations. The analysis of the operational systems of Afghanistan Meteorological Department (AMD) under the Afghanistan Civil Aviation Authority (ACAA), Water Resources Management Department (WRD) of the Ministry of Energy and Water (MEW) and key stakeholders such as (Ministry of Agriculture, Irrigation, and Livestock (MAIL) and Afghanistan National Disaster Management Authority (ANDMA) reveals areas of deficiency in: culture of service delivery; quality and accessibility of data and information to meet user needs; information sharing and coordinated actions among different institutions/departments, availability of electronic historical data; IT and data transmission infrastructure for the majority of data providers; capacity in data analysis, quality control, interpretation, optimum use of available global and regional models, forecasting and product development; human resources both in number and skills; integration of meteorological, hydrological, and disaster risk management (DRM) services; weather and hydromet hazard forecasting services; early warning (EW) services and disaster mitigation despite the availability of some potential service delivery means such as Community Development Councils (CDCs), radio and phone; adequate hydromet service delivery and; effective communication and engagement between the users and producers of hydromet data and products. A roadmap has been prepared for the Government of the Islamic Republic of Afghanistan (GIRoA) with support from the World Bank for strengthening the capabilities of national institutions by identifying the gaps and challenges in producing and delivering fit-for-purpose weather, climate and hydrological information and services as well as early warning services. A powerful tool for modern NMHSs to maximize the return on investment by ensuring the optimum use of resources is a Concept of Operations (CONOPS). The CONOPS provides a conceptual overview of the various building blocks (system and subsystems) and is intended to support the evolution of a fully integrated, modernized and functional NMHS to provide the level of services required by its users and stakeholders. In December 2018, the GIRoA also approved the Afghanistan National Strategy for Disaster Risk Reduction (2018-2030) which was formulated with support from UN Habitat and UNISDR. The implementation of this strategy is dependent on the strengthening of institutional and technical capacities of DRM systems.
	c. Projects and programs dealing with EWS and	The CREWS activity would build on activities related to hydromet and disaster risk management ongoing or completed in the recent past, including:

	hydromet under implementation or preparation	i. The USAID-OFDA supported US$ 2.3 Million, Afghanistan Early Warning System (EWS) Project (2015-2019) was implemented by WMO. The project has focused on strengthening of the Afghanistan Meteorology Department and delivered Afghanistan with basic public weather service capabilities and staff competencies; connected Afghanistan to the rest of the world through WMO Global Telecommunication System, delivered meteorological observation network, established 24/7 weather watch through a new weather forecasting centre, and delivered basic data and information dissemination capabilities through web, wap and social media. ii. The WMO HydroHub Project (2016-2020) is funded by the Swiss Agency for Development and Cooperation (SDC), and it systematically builds communities to identify common needs and gaps to connect NMHS with possible solution providers from research and the private sector to identify opportunities to create new solutions. The project is currently engaged with hydrological services of Afghanistan and Bhutan for improving the hydrometeorological observation networks through low-cost and sustainable hydrological instruments and Information and Communication Technologies (ICT). iii. The World Bank's Establishing Critical Risk Information Technical Assistance (ECRI) has financed the development of an EWS/Hydromet Roadmap to outline a design for the establishment/enhancement of hydromet and EW services; this was done through a robust consultative process that ensured broad ownership from the hydromet service providers and user agencies, and is well aligned with development partner engagements; iv. The World Bank financed Irrigation Restoration and Development Project (IRDP) supports WRD-MEW in strengthening hydromet monitoring networks, developing information products for river basin planning, dam development and operation, flood risk management, irrigation planning; and supporting the Legal and Institutional Framework for WRM and River Basin Planning; v. The USAID supported Famine Early Warning System Network (FEWS-NET) provides food security alerts and information on drought hazard; vi. JICA supported Enhancement on Hydrometeorological Management (HYMEP) which supports capacity within MEW on data quality control/data quality assurance and developing products such as runoff analysis, flow duration curves, flood and rainfall frequency analysis, basin-average rainfall, and basin water balance. This effort provides good lessons in scaling up towards a national hydromet database; vii. Twinning with Turkish State Meteorological Service (TSMS) has provided AMD support in IT services, meteorological data processing and visualization tools and training as in-kind contributions. TSMS has also established 2 Automated Weather Stations and donated five manual station sets. TSMS also provides hot-line support for helping AMD forecasters, observers, IT and Equipment Maintenance Divisions; viii. UK's Department for International Development (DFID) ARRCC program, implemented by the Met Office (UK) and the World Bank (PARCC) aims to strengthen weather forecasting systems across Asia and help vulnerable communities use weather warnings and forecasts to better prepare for climate-related shocks. The Met Office is developing technical support in the region across three timescales ARCCP, while the WB implemented PARCC will support investments aligned with the CREWS technical assistance in strengthening the capacity of AMD and the regional engagement to strengthen collaboration in South Asia on Hydromet, Early Warning and Climate Services.

	d. Describe the multiplier /leveraging potential of the CREWS investments	The initiatives listed in section C provide some much-needed assistance to improve hydromet and EW services in Afghanistan. Given that during the conflict years, Afghanistan's capacity to deliver such services was wiped out, there is a large ground to cover in this regard. In the meanwhile, it continues to be beset by a variety of natural disasters, significant drought and flash floods that had devastating impacts in this year alone. There is no denying the urgent need for stepping up and strengthening support for rebuilding the hydromet institutions with an emphasis to strengthen services delivery and enhancing institutional coordination with user sectors and access by local levels and vulnerable communities. The GIRoA has put in place a National level Early Warning Working group as an institutional mechanism to share information, coordinated by the National Statistics and Information Authority (NSIA) and including the participation of the hydromet institutions (AMD and WRD). The Hydromet and Early Warning Services Roadmap which was adopted by the Government of the Islamic Republic of Afghanistan in November 2018 provides a strategy on how to improve the capability of AMD and WRD-MEW to develop options for strengthening hydromet services generation and delivery in an FCV situation. The roadmap informs the current CREWS proposal of the most pressing needs in the country. In doing so, the CREWS funding will support priority activities to build a foundation for providing better hydromet and EW services contributing to strengthening the country's resilience to natural hazards and climate change and improve economic performance of weather-dependent sectors such as agriculture, urban, disaster risk, water management, hydropower, aviation and road transport. The CREWS funding will leverage the application of the innovative solutions (e.g., HydroHub) in Afghanistan for lowering the cost of establishing and operating hydrometeorological observation network, and improving the service capabilities for impact-based forecasting for the benefit of the population at risk.
	e. Describe measure to ensure coherence with existing initiatives	The focus of the existing initiatives is to reduce the risk from hydrometeorological disasters and climate change to exposed populations and assets. All activities under the CREWS funding will be fully aligned with this focus and aim to strengthen the resilience of the country through the provision of better weather, water and climate services. In support of the above objective, Afghanistan needs to take steps to enhance the implementation of its priorities for DRM, hydromet and EW services while more effectively interlinking these functions. Institutional coordination is essential to be solidify along the entire hydromet, EW and DRM value chain. The Hydromet and EW roadmap provides a specific example of the coherence of the CREWS proposal with ongoing initiatives. The roadmap provides a strategic pathway to guide the main hydromet and EW service providers in the country on responding to the most pressing and common needs of stakeholders and end-users in support of disaster and climate resilience. The planned CREWS activities are also in line with other initiatives such as those of the World Bank, WMO, USAID and UK Met Office and are linked to regional engagement through the South Asia Hydromet Forum (SAHF).
Grant design	a. Grant components and activities	This section describes the activities to be implemented by the World Bank, and the WMO, and with their technical advisory support in support of the GIRoA. **COMPONENT 1 - Enhancement of the service delivery system to develop/strengthen early warning and hydromet services** (estimated cost US$ 1.6 M)

		The consultations with stakeholders have clearly indicated requirements for more accurate, timely, location-specific, well-articulated, useful, and useable information. Enhancement of the AMD, WRD-MEW and MAIL service delivery process will focus on the improvement of public weather, climate, hydrological and agrometeorological services. Specific activities are expected to include: **(a) Developing and implementing a National Strategy for Service Delivery (SSD)** based on the WMO strategy for Service Delivery and its Implementation Plan.[3]The WMO Strategy explains the importance of service delivery and defines the various stages for a continuous process for developing and delivering services in a bid towards creating a service-oriented culture in NMHSs. The Implementation Plan guides the NMHSs through a number of steps in assessing and improving their current service delivery in line with their strategic objectives. An initial step in the development of a national SSD for AMD and WRD-MEW would be to assess the current level of service delivery using the Service Delivery Progress Model of the WMO Strategy document. The next step would be further close consultation with AMD's key stakeholders (DRM, agriculture, water resource management, transport) to develop specific requirements and demand for specialised services, in addition to the general information already available. Establishing a hydrometeorological user group has been recognized as a valuable tool in joint consultation of user requirements and to develop sector services. The component would support the process related to this technical working group, along with the development of an action plan with well-defined milestones for responding to the unfulfilled requirements and applying the latest innovations in the field of service delivery. This process and the resulting action plan will be essential in guiding the investments to respond to the actual requirements of the users. (b) **Establishing a collaborative approach between AMD and WRD-MEW in flood forecasting.** The existing cooperation between AMD and WRD-MEW is an excellent starting point and may be used to identify the products and services that could be provided in a collaborative approach by both organizations based on users' needs. Both organizations could combine their expertise to find a better means of providing the most complete assessment of operational flood risk, from the developing weather conditions through to the actual flooding event itself. This would require closer collaboration between the two departments in monitoring, recording, and archiving weather and hydrological data, weather and flood forecasting, and communicating them to the public and other users and; further assessment of different users' requirements for flood information. Developing flood maps is essential. A very important component would be establishing close communication between the two departments, and applying innovative approaches to hydrological and meteorological data management to ensure timely delivery of flood forecasts. The most efficient way to do this would be co-location at least during the periods of severe weather. A national flood forecasting centre or unit could be established where hydrologists and meteorologists can work together to produce extreme rainfall alerts, national flood guidance statements, and web services. In practical term this could be an operational desk preferably situated at AMD where operational forecasting is conducted. This would focus the expertise of both departments to produce timely and reliable information for users while respecting their individual expertise according to their respective mandates. The component

[3] WMO 2014, The WMO Strategy for Service Delivery and its Implementation Plan: WMO-No.1129

		would support the cross-collaboration, establishment of the forecaster desk and cross training of hydrologists and meteorologists. **(c) Enhancing public weather, climate and hydrological services and strengthening end-to-end early warning systems and services** through improving dissemination and communication of forecasts and warnings in a gender informed manner. Any EW delivery system must be well designed and tested to ensure "last mile connectivity." It is vital to engage local organizations, such as the Community Development Councils (CDCs), religious leaders, and local organizations like the Red Crescent Society with the EWS to ensure the population is informed about emergency procedures, meaning of warning signals, actions to be taken when a warning signal is received, and can provide feedback on the usefulness and accuracy of the warnings. The CDCs provide a good mechanism to address the "last mile" communication problem. CDCs also offer an important advantage in their capacity to provide face-to-face communication, which is especially valuable in issuing instructions of where to seek shelter during disasters. Products and operating protocols should be easily understood by communities and allow local government officials and community leaders take appropriate actions. The translation of AMD, WRD and MAIL information into early warning bulletins, and close communications between ANDMA, AMD, WRD and MAIL technical staff with participation of relevant mainline ministries, will be key in making a community-oriented EWS truly effective. In addition, there are multiple channels such as institutional structures established by MRRD and other key agencies will be used to reach to the 'last mile'. A pilot activity on Community Based Disaster Risk management and Early Warning is expected to provide some initial lessons on community consultation and offer opportunities for scaling up early warning services. In addition, the use of media for the dissemination of EW, including the use of modern tools such as operational websites, broadcast radio and TV, SMS messages to cellular phones, mobile platforms as well as more traditional methods such as sirens will be tested and evaluated. This component will use innovative approaches, and will support for the assessment and evaluation of the modes and formats of early warning dissemination and their uptake by vulnerable communities. Developing and implementing standard operating procedures by AMD, MAIL and WRD-MEW; introducing, pilot testing and operationalizing impact-based forecast and warning services in selected vulnerable districts/cities; implementing Common Alerting Protocol (CAP) capability at the AMD, WRD, MAIL and ANDMA; regular post-hazard event review process; and introducing two-way communication so that key users who receive the message can also send feedback to AMD, MAIL and WRD for further improvement of their services will be part of this sub-component. (d) **Enhancing agro-met services including, developing a drought monitoring programme.** Agriculture dominates the Afghan economy, contributing an estimated 31% of the GDP and providing employment and livelihoods for about 80% of the population. A large proportion of the population remains food insecure, especially, in years of poor harvest. Developing the agriculture sector is critical for economic growth. Rural Afghanistan exhibits a high correlation between population, water resource and agriculture. Whilst water resource management programmes, including damming, have improved the annual access to water and the regularity of supply, they have limited effectiveness against moderate to substantial meteorological droughts. Agricultural production is inextricably tied to climate, making agriculture the most climate-sensitive of all economic

		sectors. Some provinces are considered especially vulnerable due to a dependence on rain-fed agriculture. The impact of weather on the long-term economic growth and food security through agriculture is substantial. Developing and delivering agrometeorological information and services based upon collaboration and innovation would help in managing the risk of weather/seasonal impacts on agriculture and livestock. MAIL is a key partner and the component would support the development of a comprehensive set of capacity building to strengthen agromet services delivery in partnership with research organizations and universities. Agriculturally relevant weather forecasts will yield immediate benefits and facilitate the adaptation of farming practices to the local context. Farmers would benefit from better local hydrometeorological information and services, particularly for short-term temperature and precipitation forecasts. Afghanistan has a vision to reduce poverty, increase sustainable economic and social development, improve the quality of life for all Afghans, and ensure an adequate supply of water for future generations through better managing the country's water resources. The enhancement of capabilities of AMD, MAIL and MEW for proper data collection and processing, production of operational information systems for prediction of droughts and forecasting of floods as well as the effective dissemination of information to users for basin water allocation/distribution planning is a crucial requirement. Development of an Agriculture and Climate Advisory Service (ACAS) portal, including provision of hardware and software is an essential part of a drought monitoring program which should include AMD, WRD-MEW, MAIL, MRRD, NSIA and ANDMA and will support the operational use of hydrometeorological measurements, meteorological and hydrological data and models for applying the most suitable drought indices for forecasting. This is a critical part of the planned response to the drought situation and the objectives associated with the Poverty, Food Insecurity and Water Scarcity engagement. **(e) Introducing a Quality Management System (QMS) for hydromet operations to support quality service delivery** A QMS is defined as the organizational structures, procedures, processes and resources needed to develop and successfully implement management of the organization's delivery of products and services[4]. The introduction of a QMS in AMD will support the continual enhancement of its products and services focusing on quality control, quality assurance and quality improvement. QMS is implemented in the form of the ISO 9000 family of quality management systems standards by nearly all NMHSs in the provision of services to the aviation sector in compliance with the requirements of the International Civil Aviation Organization (ICAO), and by many NMHSs in the entire operation of the NMHS. ISO 9001 deals with the requirements that organizations wishing to meet the standard must fulfil. The implementation of QMS as part of the strategy to modernize the AMD as a whole will have a positive impact on the quality of services and management practices, as well as the user/stakeholder perception. The introduction of QMS will also contribute to AMD's long-term goal of introducing and operationalizing aviation services, the responsibilities for which now reside with the Operation Resolute Support (ORS).

[4] WMO, 2013: Guide to the Implementation of a Quality Management System for Meteorological and Hydrological Services (WMO-No.1100)

		OUTPUT Comp 1: Enhancement of the service delivery system to develop/strengthen early warning and hydromet services a) Development of a Strategy for Service Delivery and; establishment of a hydrometeorological user group and action plan for improving service delivery; b) Establishment of a national joint flood forecasting centre or unit c) Provide technical support for DRM/EW in the operation of key stakeholders such as MAIL and MRRD d) Strengthening of Early Warning dissemination and decision support (including Common alerting protocol/CAP) to enhance last mile connectivity through multiple media and channels such as internet, mobile platforms/SMS, mass and social media, CDCs and community leaders (village councils), NGO networks etc., with attention to gender considerations and needs of vulnerable populations. e) Provide technical support for the implementation of an agromet program with MAIL (coordination with MEW) including development of agromet decision support systems f) Development of a drought monitoring programme (participation of MAIL and MEW for agriculture and water management components), including an ACAS portal, g) Introduction of a QMS for AMD (including aeronautical meteorology) **COMPONENT 2 - Institutional Strengthening and capacity building** (US$ 1.0 M) This component will aim to improve the performance of AMD and WRD-MEW in line with international best practices. There needs to be formal clarity on the roles and responsibilities of each institution. (a) **Reinforce the legal and institutional framework** of the hydromet and DRM services providers (AMD, MEW, MAIL, ANDMA) in order to strengthen partnerships by developing new/revising existing (i) Memoranda of Understanding (MOUs) among service providers and between service providers and key stakeholders to help pave the way for negotiations and agreements, and (ii) Standard Operating Procedures (SOPs) for delivery of service, which articulate operational procedures for early warning and response for rapid- and slow- onset hazards, protocols of information exchange among hydromet and DRM institutions, strengthening capacities and tools for information management, analysis and sharing. (b) **The development of a Concept of Operations (CONOPS)** will be essential to guide and support the transformation of AMD, MAIL, WRD-MEW and ANDMA into fully integrated, modernized and functional organizations, capable of providing fit-for-purpose services. (c) **Building capacity** to improve the sustainability of the modernization of AMD and WRD-MEW is indispensable. While strengthening hydrometeorological and EW services of AMD, WRD, MAIL, MRRD, ANDMA and other institutions in Afghanistan is essential, regional collaboration is crucial. Climate and weather patterns that impact Afghanistan are trans-boundary and the data gathered in the country is an important input to regional centers to enable them to make improved forecasts of regional and sub-regional weather phenomenon that can benefit all affected countries. Regional collaboration can help facilitate this exchange. Economies of scale in regional collaboration are also an important consideration. For example, at present, Afghanistan does not have the capacity to forecast extreme events such as flash floods with sufficient lead time and accuracy, or the capacity for seasonal prediction. Regional collaboration can allow Afghanistan to build

		on the information and forecasts already being produced by regional entities and benefit from capacities of the larger and more developed institutions. It can also allow Afghanistan to learn from and contribute to innovations in the development and delivery of weather and hydrological services in key sectors such as disaster risk management and agriculture that commonly affect various countries in the region. For a strong and effective WRD-MEW, MAIL and AMD, continuous access to new skills for all staff through provision of short- and long-term training courses at home and abroad, operational on-the-job training, and twinning with more developed NMHS is essential. Access to such training opportunities and facilities in the region will benefit the staff who can share knowledge with and benefit from experiences of their colleagues facing similar challenges. Afghanistan is a member of the South Asia Hydromet Forum and support will be provided to continue regional engagements with South Asia as well as with Central Asia. Awareness raising and educating stakeholders/end users in the application of hydrometeorological products for decision-making is equally essential and should be undertaken through various channels including workshops, distribution of flyers, publications, production of public service videos using social media and posting educational materials on the relevant organizations' websites. Joint training of service provides, and users will be conducted. In addition, community-level capacity building will be planned in a gender-sensitive manner and implemented in collaboration with CDCs. (d) **Building project management capacity (of AMD)** Institutional strengthening is critical to the sustainability and success of any hydromet modernization and early warning services delivery. Hydrometeorological agencies are generally not familiar with project management on a relatively large scale. Capacity building must therefore be a concerted effort throughout the implementation to ensure proper capacity for procurement, international contract management, financial management, audits, and monitoring and reporting that will form the basis for successful implementation of any investments and are a critical part of institutional strengthening. A Project Implementation Unit (PIU) will be needed to ensure smooth implementation, facilitation and coordination of grant activities, as well as of coordinated activities (IRDP, PARCC RETF etc). It is essential that the capacity of the PIU be developed to reach the required level of competency. **OUTPUT Comp 2: Institutional Strengthening and capacity building** a) Strengthening of the institutional and legal frameworks and institutional capacity building including through MOUs and SOPs b) Development of a CONOPS c) Delivery of the technical capacity and competencies through national and regional training programs at home and abroad; education of stakeholders and end-user on the application of the information d) Development of project management, procurement and financial management capacity in AMD and strengthening in MEW **COMPONENT 3 - Strengthening data management and forecasting capabilities** (US$ 0.82M) (a) **Building a readily accessible digital hydrological, meteorological and vulnerability database** is urgently needed to develop a range of warning and forecast services. The AMD, MAIL and WRD-MEW improvement in forecasting and service delivery will require significant improvements in ICT capacity to address issues related to harmonized database management

		systems for all hydromet data including data transmission, near-real-time QA/QC procedures and archiving and developing SOPs for ICT operations, in line with the latest innovations in meteorology and hydrology. Related software, web access and social media will be needed to establish a modern software/hardware environment. At the core of this activity, it will support the development of a unified and secure hydrometeorological data processing and archiving platform. The platform will be the backbone for all future forecasting and service delivery improvements and will support the implementation of the other related projects. Support for this activity will be coordinated with the planned Recipient executed funding from PARCC. The platform would allow to, among others: - Integrate the national and global meteorological, hydrological and climatological data; - Strengthen the data, information and report QC/QM, archiving and sharing processes; - Improve the operational use and security of data, reports and information for service providers (AMD, WRD, MAIL, MRRD, NSIA, and the Early Warning working group); and - Improve the security and operability of the historical data, product and information for controlled and encrypted third-party access (e.g., research, stakeholders, application of WMO Res-40[5]). (b) **Developing a modern impact-based weather forecasting process** is needed that will allow the generation of information on the actual impact of hazards on the population rather than just the hazards. This process will require access to NWP digital data and products (short-, medium-, extended- and long-range forecasts) from a global centre(s) and move from deterministic to ensemble prediction systems (EPS) for production of probabilistic forecasts; the required licenses; uninterrupted broadband internet; developing and applying flood models to support flood forecasting; implementation of real-time forecast process monitoring and verification, quality control of observations, nowcasting and impact-based forecasting techniques. To produce impact-based forecasts and risk-based warnings, in addition to hydromet data, vulnerability and exposure data will be required. Development of warning messages which take into account the local exposure and vulnerability information will require making use of innovative IT techniques. Collaboration among organizations in the country that may already have vulnerability data is therefore indispensable. In addition to the short-range forecasts, there is a need to develop (monthly and seasonal) long-range forecasts (LRF). AMD, MAIL and WRD-MEW will be able to use internationally available products where possible (to achieve economic efficiency) such as satellite products, numerical weather prediction (NWP) / ensemble prediction systems (NWP/EPS) data and products from global and regional centres and, required software for data handling (i.e. license). A basic forecast validation system will be introduced. The development of impact-based forecasting will be supported by interrelated activities, including: - Collecting and operationalising the available geo-morphological and socio-morphological data for

[5] WMO Res 40: Policy and practice for the exchange of meteorological and Related data and products including guidelines on relationships in Commercial meteorological activities

		mapping the vulnerabilities and exposure to disasters; - Using CBDRM to assess and incorporate culturally sensitive practices and locally relevant knowledge and risk perceptioninto warning design; - Developing disaster risk matrices and controls for obtaining/anticipating the social and economic impact of the hydrometeorological disasters; and - Providing decision aid tools for supporting the disaster risk management; improving the thresholds, triggers etc. Through these activities, it is expected that AMD would also: - Improve the nowcasting capabilities (0-6 hours); - Develop the short, medium and long-range forecasting capacities and skills; - Establish national climate prediction capabilities; and - Improve the accuracy of the forecast through the application of the processes such as QC/QM, verification, data assimilation. (c) **Enhancing Flash Flood forecasting and alerting systems:** Strengthening the forecasting capabilities (e.g., application of limited area models and staff capacity building activities), data collection, processing, and visualization systems, hydrometeorological models, software licenses, training events, quality management, in line with latest updates and innovations. **OUTPUT comp 3: Strengthening data management and forecasting capabilities**: a) Development of a platform that is unifying, collecting and operating the national and global data b) Strengthening the technical capacity and establishing the processes and SOPs for nowcasting and high-resolution numerical weather prediction for hydrometeorological disasters (e.g., drought, frost, flash floods, riverine floods, landslides, avalanches, extreme temperatures, storms, heavy precipitation) c) Development of impact-based forecasting
	b. Logical framework and work plan	*Annex 1 and 2*
Organization and operating procedure	a. Institutional framework	The grant will be executed by the World Bank with technical support from WMO (facilitated by the WMO focal person). The hydromet, EW and climate services working group (including representatives of AMD, MEW/WRD, MAIL, MRRD, ANDMA and other key user stakeholders) will provide the committee for consultations and engagement with the government, and will be the mechanism for progress updates, guidance and information sharing. A core group of representatives from WB, WMO, AMD, MEW, MAIL, MRRD and ANDMA, under the leadership of the WB team lead will form a coordination team to ensure facilitation of implementation.
	b. Monitoring and evaluation system	The M&E system will be based on the results framework that is an integral part of the implementation of grant activities. Performance monitoring and reporting will follow current WB/GFDRR practices for technical assistance related to hydromet modernization for WB implemented activities. Activities implemented by WMO activities will be monitored by the WMO focal point who will provide input into the overall Reporting. The indicators will be, as applicable, gender disaggregated. An M&E framework and associated indicators will be refined after grant approval. Grant activity reviews will take place on an annual basis and will include reporting of progress and outputs to date.
Project viability and	a. Main identified	***Operational risks:***

sustainability	risks	• Low commitment to coordinate and collaborate at the national level (risk level moderate). In order to manage this risk, it will be critical to carry out a highly participatory and transparent process, and take small, financially and institutionally sustainable steps. It is essential to oversee and follow the progress of each step in a consistent and properly managed manner. This will require increased management and implementation support effort from the implementation partners. • Delays due to natural hazards-induced disasters (risk level moderate): Large scale floods or earthquakes may possibly lead to delays in the implementation of the grant activities proposed in this document. In order to mitigate this risk, flexible adjustment of the sequence of activities is required. Continuous learning from disasters and the related forecasting and early warning services offers a great opportunity for this activity to be relevant. • Complexity and coordination with development partners (risk level moderate): A key factor in the successful implementation of the CREWS supported activities will be coordination among the development partners, and with other active projects to avoid duplication and overlap. Collaboration among all stakeholders will be equally important to ensure the best possible outcome from the investment. In order to reduce complexity, the team will draw on lessons learnt from other projects in Afghanistan and the experience and structure of existing government institutions • Delays due to security situation in the country (risk level high): although there is a level of normalcy in the everyday life of citizens, there are still large threats of insurgencies, unrest and attacks from different conflicting factions in Afghanistan which may pose a risk to the smooth and uninterrupted implementation of the grant activities.
	b. Critical assumptions	For grant activities to be successful, the following assumptions are critical: ▪ Strong commitment from the implementing partners; ▪ Strong interest and engagement, particularly from leadership of, ACAA/AMD, WRD-MEW, MAIL and ANDMA as main agencies in the country for the provision and application of meteorological, hydrological and climatological services; ▪ Openness and willingness to collaborate regionally and globally.
	c. Judgment on the project sustainability	Sustainability of grant activities will be ensured in the long run through: ▪ Close coordination with the ongoing and future Projects supported by the World Bank and other development partners: this proposed work would build on and closely coordinate with the ongoing and planned projects of the World Bank and development partners in order to ensure sustainability of investments from the lending operations. Similarly, findings from this activity will inform content and design of future World Bank projects and aim at continuing efforts. ▪ Ensuring ownership by AMD, WRD-MEW and key stakeholders, during implementation of grant activities: stakeholder participation and engagement will be an important aspect of the program development and implementation process. The objectives and activities supported by this funding are in line with national priorities and needs and are realistic in scope. This is considered an important element for the sustainability of this work. ▪ Increasing donor support and coordination: Investments made to date have targeted individual and specific areas for development without enough consideration for integration of the systems and coordination of efforts. This has contributed to outcomes with often limited impacts and sustainability over long term. Through

		the coordination mechanism in Govt as well as donor coordination meetings at various fora, the WB team will make sure to coordinate and harmonize efforts with relevant activities from other donors. ▪ Support Afghanistan to access international funds to further strengthen hydromet and DRM services: Through demonstrating the positive outcomes and results of this capacity support activity and highlighting the needs for additional investments to achieve even greater progress, this work will support Afghanistan to make a case for accessing other funds from international sources for further strengthening of hydromet and EWS. ▪ Support mobilization of domestic resources: Advocacy at high levels of the government for better support and ensuring sustainability of investments is a key element of this agenda. ▪ Within the implementation of the grant activities, opportunities would be identified for revenue generation or cost recovery. For the foreseeable future, the only potential source of such funding may be cost recovery from aviation services once those services are sufficiently developed with support from CREWS funding.

Annex 1: **Strengthening Hydro-Meteorological and Early Warning Services in Afghanistan– Timeline for implementation (to be revised)**

	FY 2020				FY 2021				FY 2022				FY 2023			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Component 1) Enhancement of service delivery system to develop/strengthen early warning and hydromet services																
(a) Developing a Strategy for Service Delivery	x	x	x	x	x	x										
(b) Establishing a collaborative approach between AMD, MAIL and WRD-MEW	x	x	x	x	x	x	x	x	x							
(c) Enhancing public weather and hydrological services for the provision of the end-to-end early warning systems and services including last mile connectivity			x	x	x	x	x	x	x	x	x	x	x	x	x	x
(d) Developing agro-met services and a drought monitoring programme			x	x	x	x										
(e) Introducing QMS across operations of AMD and WRD-MEW		x	x	x	x	x	x	x	x	x						
Component 2) Institutional Strengthening and capacity building																
(a) Reinforce the legal and institutional framework		x	x	x	x	x	x	x	x							
(b) The development of a Concept of Operations (CONOPS) for AMD, MAIL and WRD-MEW	x	x	x	x	x	x	x									
(c) Capacity building		x	x	x	x	x	x	x	x	x	x	x	x			
(d) Building project management capacity (e) Coordination with DRM and other actors	x	x	x	x	x	x	x	x	x	x	x					
Component 3) Strengthening data management, forecasting and service delivery platforms																
a) Building a readily accessible digital hydrological, meteorological and vulnerability database		x	x	x	x	x	x	x								
b) Developing a modern impact-based weather forecasting process		x	x	x	x	x	x	x	x	x						
c) Enhancing Flash Flood forecasting and alerting systems		x	x	x	x	x	x	x	x	x	x	x	x	x	x	

Concise Logical framework with results and impacts indicators (to be revised)

Objective	Indicator	Means of Verification (MoV)	Baseline	Target	
				Mid-term (if applicable)	Final
Enhancement of service delivery system to develop/strengthen early warning and hydromet services	Establishing: i) national flood forecasting centre/unit to produce early warnings on floods; ii) drought monitoring programme	**Ref: Section 14a, Component 1** The two new tools/mechanisms as indicated	i) 0 ii) 0		i) 1 ii) 1
	Increased satisfaction of departments and communities with the new AMD/WRD/MAIL services in flood forecasting, agriculture and climate	For Departments: Regular consultations with key stakeholder departments For Communities: (1) Public surveys conforming with WMO methodologies, disaggregated where possible for gender and vulnerable groups. (2) Direct feedback from users through AMD and ANDMA websites	0	30%	50%
	Introduction of QMS to AMD operations	AMD certified with ISO 9001:2015	0		1
Institutional Strengthening and capacity building	Guiding and facilitating the development of a Concept of Operations (CONOPS) for AMD	**Ref: Section 14, Component 2** The CONOPS document	0	0	1
	i) Developing the technical capacity of AMD staff; ii) developing capacity among stakeholders and end users in understanding and application of services and products of AMD	i) Evaluation of staff capability following short- and long-term training courses at home and abroad, on-the-job training, and twinning with developed NMHS; ii) percentage of people reached in communities with awareness and education programmes through workshops, flyers, publications and public service videos, and educational materials on the relevant organizations' websites to reach.	i) 20% ii) 0%	i) 45% ii) 30%	i) 90% ii) 60%

Strengthening data management and forecasting capabilities	Building a readily accessible digital hydrological, meteorological and vulnerability database iii) putting in place coordination mechanisms with DRM	**Ref: Section 14 , Component 3** A modern data management environment comprising hardware, harmonized database management systems including servers, software and, web access	0	50%	100%
	National Forecasting and Prediction Platform	**Ref: Section 14, Component 3** Establishment of the facilities, capacities and capabilities on nowcasting and forecasting	0	50%	%100
		The percentage of the forecast quality improvement against previous year (temporal and spatial improvement)	0	5%	5%
	Developing an impact-based weather forecasting process	**Ref: Section 14, Component 3** Number of actions by ANDMA/year based on the impact of disasters as indicated in forecasts in a selected community	0	30	60