I. Introduction and Context

Country Context
The Republic of Yemen, situated on the southern end of the Arabian Peninsula, is one of the poorest countries in the world. Yemen has a population of some 24 million, of which about 76 percent live in rural areas where poverty incidence is particularly high. The country ranks 140 out of 182 countries in the 2009 Human Development Index. Yemen is among the ten countries in the world with the highest rates of food insecurity. The country ranked third for the highest level of malnutrition in the world. Yemen is also facing rapid population growth (over 3.5% a year), lack of clear alternatives to the oil economy, limited institutional capacity and outreach of the State, very limited and rapidly depleting water reserves, poor infrastructure, limited human development, and acute gender inequality issues.

The impact of the recent security, political and economic crisis is significant in all key development domains. Yemen experienced intense and far-reaching country unrest from February until November 2011. The long lasting conflict and turmoil, and severe shortages of food and fuel, combined with high commodity prices have left many poor unprotected. During this period of crisis, the economy has contracted by 10.5 percent and the number of those living below poverty line is estimated to have increased by 8 percentage points to 50 percent of the Yemeni population.
Yemen is particularly reliant on its natural resources outside the extractive industries. Agriculture plays a leading role in Yemen’s economy and employs more than half of the labor force. It also account for more than 90% of all water use. Unlike most of the world, economic dependence on agriculture is also growing because of reduced growth in the industrial, manufacturing and service sectors since 2000. Half of agricultural land is rainfed while 40% relies on rapidly depleting groundwater resources.

In addition to significant development challenges, Yemen is particularly vulnerable to climate change. Rainfall is erratic and variable, a situation made worse by high evapotranspiration rates. Flash floods and droughts are frequent hazards claiming lives, displacing thousands, and causing significant damage to assets and livelihoods. The floods of 2008, for example, claimed the lives of 180 people, displaced 10,000 and caused damage equivalent to 6% of Yemen’s GDP. In 2010 heavy rains hit the Capital Sana’a causing 9 deaths, the collapse of many houses in the old city of Sana’a, a UNESCO World Heritage Site, and disrupting electricity service for several days. A serious drought occurred during 1962–70 and had lasting social and economic consequences. Institutional weaknesses undermine the state’s ability to adjust to demographic pressures, a problem made more difficult by the poor economic outlook. In addition, a lack of long-term, systematic records of rainfall and temperature severely hampers efforts to quantify long-term changes in climate, assess renewable natural resources such as water, prepare climate projections, and develop adequate policy and program responses.

Sectoral and Institutional Context

Yemen is located in arid and semi-arid climate zones. The diverse physical and topographical features of Yemen, mountain chains, plateaus, plains and wadis, leads to variations in climatic conditions resulting in distinct agro-climatic zones. There are two main weather patterns: the northerly winds (from the Mediterranean basin) in winter and the southwestern monsoon winds, which bring the primary rains in the summer. Rainfall is highly variable. Lengthy droughts are common to all regions. For example, severe drought has recently displaced thousands of residents in Al Mahwit governorate, some 113 km northwest of the capital Sana’a.

A comprehensive network of rainfall and temperature observations is needed to assess accurately climate impacts on agriculture and water resources. Long-term, systematic records of rainfall and temperature are scarce. The lack of data hampers efforts to quantify long-term changes in climate and to assess renewable natural resources such as water. Nonetheless, the Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report (FAR) projects higher rates of warming over East Africa and the Arabian Peninsula than the global average. Since the 1950s, summer precipitation totals have declined across the Sahel, extending into the Yemen Highlands. The seasonal distribution of rainfall is also changing.

Agriculture is most vulnerable to flood risk and has incurred the highest level of losses in physical assets. In the 2008 floods, losses in agriculture were 63% of the total damages. Floods are the most recurrent natural disaster in Yemen causing significant economic damage and loss. Reducing and managing flood and drought risk through improvement of hydro-meteorological data and forecasting would have significant positive impact in building resilience of the agriculture sector to climate change.

Improving weather, climate and water information services and associated actions in Yemen is essential for stable social and economic development. Knowledge of climate variability and change,
and reliable meteorological and hydrological forecasts and warnings are necessary for the sustainable development of the country. Monitoring and forecasting of meteorological and hydrological variables would help address several of the key risks identified in Yemen’s National Adaptation Program of Action (NAPA; 2009). In particular, improving the monitoring and prediction of rainfall and temperature would help assess drought frequency, quantify temperature increases, and changes in precipitation patterns to manage better water resources, agricultural productivity and climate-sensitive diseases; more accurate and timely forecasts and warnings of extreme hydrometeorological events would reduce threats to lives, livelihoods and property. Climate monitoring, including marine observations, would contribute to understanding the impact on climate change on habitats, biodiversity and the coastal zone.

Improving weather, climate and water services in Yemen will contribute to building resilience to climate change and reduce vulnerabilities. Three areas need to be addressed: (i) institutional capacity, including overcoming the factors inhibiting data sharing and coordination; (ii) improving the meteorological and hydrological observing and forecasting systems; (iii) improving hydromet services delivery to stakeholders including the government and the public. Success would lead to the development of knowledge systems that could contribute to stable social and economic development and stem recurring economic losses and the loss of human lives from weather- and climate-related disasters.

In an effort to strengthen the institutional capacity related to climate change the Government has established the Inter-Ministerial Committee for Climate Change (IMCCC) which was approved by the Cabinet on November 10, 2009 (Cabinet Decree No. 349; Annex 1). The IMCCC reflects the Government’s strategic institutional framework that adaptation initiatives need to be implemented as part of a broader set of actions within Yemen’s existing development processes, decision cycles and institutional arrangements. The IMCCC, is a Sub-Committee of the Cabinet, and is chaired by the Minister of Planning and International Cooperation and constitutes the Ministers of all line Ministries. The IMCCC has the full support of the Government of National Reconciliation. The IMCCC will be supported by a Technical Committee which entails representatives from related agencies, and the EPA is mandated to host the Technical Secretariat and to coordinate the activities.

There are a range of entities operating fragmented and largely inefficient or outdated networks and the benefits to end-users are limited. For example, the Civil Aviation Meteorological Authority / Yemen Meteorological Service (CAMA/YMS) is the national authority for weather and climate forecasts and warnings, providing aviation weather services, public weather services, and weather services to government and to the private sector. Currently, CAMA/YMS competently operates a network of synoptic meteorological stations that underpin its forecasting and warning services. While suitable to meet basic aviation needs, this network does not cover the entire country. The existing climatological record is based on this network of synoptic observations. The principal government stakeholders for the provision of climate information are the Ministry of Agriculture and Irrigation (MAI), Agricultural Research and Extension Authority (AREA), and the National Water Resources Authority (NWRA). Each operates their own agro-meteorological and hydro-meteorological networks, which need to be refurbished, expanded and integrated in line with international standards for agro-meteorological and hydro-meteorological monitoring and to be integrated into a National Framework for Climate Services. This would enable the development of new products and services for rainfall and climate prediction for agricultural production, development of forecasts for flood control measures and other services which would be supplied by the CAMA/YMS.
Relationship to CAS

The proposed project is fully consistent with the FY13-14 Interim Strategy Note (ISN, draft). The ISN highlights climate change as one of the main threats to economic development and stresses the lack of long-term, systematic records of rainfall and temperature which severely hampers efforts to quantify long-term changes in climate, assess potential of renewable natural resources such as solar radiation, water and wind, prepare climate projections, and outline possible policy and program responses.

The project also aligned with the World Bank’s commitment as an implementing agency of the Climate Investment Funds’ Pilot Program for Climate Resilience (PPCR). Yemen is one of the 9 single-country pilots under the PPCR, which aims to pilot and demonstrate ways in which climate risk and resilience may be integrated into core development planning and implementation and promote transformational change as needed. The PPCR is implemented in two phases, with the first Phase focused on the design of the Strategic Program for Climate Resilience (SPCR) and the development of relevant studies to inform the implementation of Phase II. The SPCR aims to guide the preparation and subsequent implementation of priority investments under Phase II of the PPCR. Phase I is being implemented by the EPA with the support of a Project Coordination Unit (PPCR-PCU). The SPCR was developed by the Government of Yemen in cooperation with the World Bank and the International Finance Corporation through a 2 year stakeholder consultation process under the guidance of the IMCCC. The proposed project is one of the 4 activities identified in Yemen’s SPCR. The PPCR Sub-Committee endorsed the SPCR in April 2012 and approved the grant funding for this project. The EPA in its capacity as National Focal Point to the United Nations Framework Convention on Climate Change and Technical Secretariat to the IMCCC has been appointed to serve as the PPCR.

II. Proposed Development Objective(s)

Proposed Development Objective(s) (From PCN)

The main development objective of the proposed project is: i) to strengthen human resources, institutional, and technical capacity to improve the quality of hydro-meteorological and climate services provided to end-users; and ii) to maintain Program Coordination of the PPCR.

Key Results (From PCN)

The project will support the improvement of hydrometeorological and climate services delivery; increase climate resilience and reduce future economic losses associated with extreme weather caused by climate variability and change; and improve coordination and information sharing between all of agencies responsible for the collection of climate data, analysis and decision-support as well as maintain the oversight of the PPCR program, particularly in regards to knowledge management, awareness rising and information sharing with stakeholders. Several of the meteorological and hydrological indicators have existing baselines; for many, however, there are none. These will be established during the first year of the program.

The key performance indicators are as follows:

• Extension and modernization of meteorological, hydrological and related networks operated by CAMA/YMS, MAI, AREA and NWRA with 90% reliability in the transmission and reception of quality-assured data from each network;
• Increased accuracy and timeliness of cascading forecasts – nowcasts (0-6 h), short-range
weather forecasts (6 – 24 h), medium range weather forecasts (1-5 days), and sub-seasonal and seasonal climate outlooks – covering all of Yemen with skill of nowcasts and short-range forecasts exceeding 85% and the skill at all other time scales increased by 50% from current scores. The longer-range forecasts are based on better utilization of Global Data Processing and Forecasting System (GDPFS) Centers’ products. Very short-range forecasts rely heavily on local observations. Hence the skill score is proportionately higher for very short-range forecasts;

• Introduction of a multi-hazard warning system including authoritative meteorological and hydrological warnings for extreme and high impact events. Establishing a baseline for accuracy and timeliness and providing year on year improvements that meet stakeholders’ expectations and needs for accuracy and users’ ability to understand and to act on the information;

• Increased satisfaction of users with weather and climate services measured through surveys of sectors and the public with the goal of a composite satisfaction index of 80% or better. This a tool that should be based on WMO Public Weather Service survey instruments; and

• Effective management and coordination of overall PPCR activities measured by in time execution and reporting of the projects.

III. Preliminary Description

Concept Description

The project would consist of the following four components:

(i) Component A. Institutional Strengthening and Capacity Building Support (US$2.7 million): This component aims to create the conditions that ensure institutional, staffing and financial sustainability of organizations improving climate resilience in Yemen through provision of weather, climate and water services that meet stakeholders’ needs. Specific activities include: a) institutional strengthening and development of a legal and regulatory framework; b) capacity building and training, and c) technical implementation support.

(ii) Component B. Modernization and Expansion of the Observation and Forecasting System (US$9.08 million): This component aims to upgrade and expand the meteorological observations networks for meteorology, agro-meteorology and hydro-meteorology, ensuring that these networks are interoperable between CAMA/YMS, MAI, NWRA and AREA to ensure the efficient and timely transmission of information that is essential for management of disaster risks, agriculture and water resources. Collection of high-quality data is the foundation of producing reliable weather forecasts and warnings as well as monthly and longer term climate outlooks. Specific activities include: a) technical modernization of the observing networks; b) modernization of the communication and ICT system, and c) design and pilot operation of an environmental monitoring system.

(iii) Component C. Enhancement of the Service Delivery System (US$3.5 million): This component aims to enhance the delivery of services. This is a key program component that provides for the implementation of a systematic upgrade of the weather, climate and water-related end-to-end services provided to all agencies, communities and individuals. Specific activities include: a) enhancement of public weather service; b) support of disaster risk management operations for all DRM stakeholders; c) improvement of service delivery to stakeholders; d) creation of the national climate service.

(iv) Component D: PPCR Program Management and Knowledge Sharing (US$3.72 million). This umbrella component aims to provide a single entry point for the management of the overall PPCR
Program in particular in regards to coordination, awareness rising and knowledge management. This component will purchase equipment, software, and technologies and will provide consultancy services to support investment and incremental operational costs of program management including that of consulting staff and training housed in the PPCR-PCU established in the EPA. Specific activities include: a) carry out the coordination of the PPCR program implementation; b) Regularly consolidate the results achieved; c) carry out public education and outreach activities; d) develop and disseminate targeted knowledge products; e) support and monitor the integration of gender sensitive approaches; and f) project management.

IV. Safeguard Policies that might apply

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