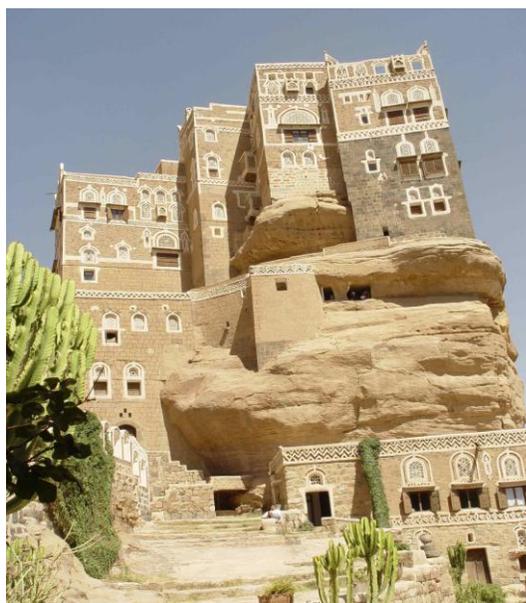




IMPROVING THE RELIABILITY OF WEATHER AND CLIMATE SERVICES IN YEMEN

Lia Carol Sieghart and David Rogers¹



Picture courtesy: Lia Sieghart

Introduction: The Republic of Yemen, situated on the southern end of the Arabian Peninsula, is one of the poorest countries in the world. The country has a GNI per capita of US\$1,070 (2010)

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compared with an average of US\$2,321 for lower middle-income countries. 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. Based on current high water consumption for irrigation and water supplies, it is expected that groundwater reserves will be nearly exhausted in next few decades. Flash floods and droughts are frequent hazards displacing thousands, causing loss of life and significant damage to assets and livelihoods. The floods of 2008, for example, killed 180 people, displaced 10,000 and caused damage and losses to infrastructure, shelter, and livelihoods equivalent to US\$1,638 million amounting to 6% of Yemen's GDP². Sustainable social and economic development in Yemen depends on knowledge of climate variability and change, and reliable and actionable meteorological and hydrological forecasts and warnings. Upgrading weather, climate and water information will reduce vulnerabilities to natural hazards and increase food and water security.

Agricultural Challenges: 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 accounts for more than 90 percent of all water use. Unlike most of the rest of the world,

² Government of Yemen (2009). Damage, Loss and Needs Assessment, October 2008 Tropical Storm and Floods, Hadramout and Al-Mahara., Republic of Yemen. Joint Assessment of the Government of Yemen, World Bank, UNISDR and IFRC, supported by GFDRR.

economic dependence on agriculture is growing because of reduced growth in the manufacturing and service sectors since 2000. Half of agricultural land is rain-fed while 40 percent relies on rapidly depleting groundwater resources.

Agriculture is most vulnerable to flood risk and has incurred the highest level of losses in physical assets³. In the 2008 flood, losses in agriculture were nearly 64 percent of total damages⁴. Floods are the most recurrent natural disaster in Yemen causing significant economic damage and losses. Reducing and managing flood and drought risk through more reliable forecasts to improve decision-making would help build resilience of the agriculture sector to climate change.



Picture courtesy: Lia Sieghart

Weather, Climate and Water Services: The Civil Aviation and Meteorological Authority / Yemen Meteorological Service (CAMA/YMS) is the primary source of weather and climate information in Yemen. In addition, the Ministry of Agriculture and Irrigation (MAI) is responsible for agro-meteorological

observations and the National Water Resources Authority (NWRA) is responsible for hydrological observations. The Environmental Protection Authority (EPA) also plays a role in climate services and needs to increase its capability to monitor air quality.

Building Climate Resilience: This requires several things: (i) reliable monitoring and prediction of rainfall and temperature to help assess drought frequency, (ii) better management of water resources, (iii) increase agricultural productivity and minimize climate-sensitive diseases; (iv) more accurate and timely forecasts and warnings of extreme hydro-meteorological events to reduce threats to lives, livelihoods and property; and (v) climate monitoring, including marine observations to contribute to understanding the impact of climate change on habitats, biodiversity and the coastal zone.

The Pilot Program for Climate Resilience (PPCR): Through the PPCR, Yemen aims to better manage water resources, increasing agricultural productivity and reducing the risk of climate-sensitive diseases. This will be done by improving the monitoring and assessment of climate variability and change and providing targeted and reliable information for decision making. Significant social and economic benefits are expected by managing risk in weather-related disasters, which disproportionately affect the poor and vulnerable. Key expected improvements include:

A framework for better climate information: A framework for National Climate Services will link Yemen to the Global Framework of Climate Services – an initiative of the World Meteorological Organization to improve the reliability and use of short- medium and long-range climate information everywhere.

Upgraded Weather and hydrological forecasts and warnings: Upgrading the existing meteorological and hydrological observing networks and forecasting systems will improve the reliability, timeliness and accuracy of weather and flood forecasts and warnings resulting in better weather, climate and water services.

³ Source: Yemen Strategic Program for Climate Resilience (SPCR 2011). Available online: <https://www.climateinvestmentfunds.org/cifnet/?q=country/yemen>

⁴ Ibid.

Enhanced Decision-making: Better decision-making and planning in key vulnerable water resources dependent sectors, particularly agriculture is expected. Stronger partnerships between the providers and users of weather, climate and water information through dedicated climate working groups and existing community organizations will ensure better uptake and use of weather, climate and water information.



Picture courtesy: Anwar Noaman

Better Intra-Government Coordination: Improving coordination and information sharing between all of agencies responsible for the collection of climate data, analysis and decision-support will also lead to better informed decisions.

Project Components: The project has four components including institutional strengthening, modernization of observing and forecasting systems, enhancing the delivery of services, and PPCR program management and knowledge sharing.

Component A - Institutional Strengthening and Capacity Building: This will improve climate resilience in Yemen by strengthening weather, climate and water services that meet stakeholders' needs. The aim is to ensure the institutional, staffing and financial sustainability of the key service providers (CAMA/YMS, MAI and NWRA). This includes revising and updating institutional strategies, revising and adopting legal frameworks and introducing standard operating procedures. Training will build capacity by providing access to new skills and opportunities within each of the participating organizations.

Component B - Modernizing and Expanding Yemen's Hydro-meteorological and Environmental Monitoring Networks: The project aims to ensure that these networks are interoperable between CAMA/YMS, MAI, NWRA and the development authorities. This will enable the efficient and timely transmission of information, which is essential for management of disaster risks and agriculture and water resources. Collection and timely communication of high-quality data is the foundation of reliable weather forecasts and warnings as well as monthly and longer-term climate outlooks. The modernization of the observing networks includes rehabilitating and extending the MAI and NWRA agrometeorological and hydro-meteorological networks; extending the CAMA/YMS weather and climate surface and upper air network, and installing a Doppler weather radar, which will be used for enhanced precipitation measurement, and severe weather and flood forecasting. The project will also modernize the communication and ICT systems to transmit data more efficiently. The component also includes the design and pilot operation of an environmental monitoring system to be operated by the EPA.

Component C - Enhancing Service Delivery: This will be achieved by systematically upgrading the weather, climate and water-related end-to-end services provided to all agencies, communities and individuals. In particular, it will extend the forecasting, analysis and service delivery capabilities of CAMA/YMS to provide guidance to agriculture, water resources and irrigation, disaster risk management (DRM), media, civil aviation, health and renewable energy. It will also provide demographic-specific services where differentiated information is targeted to specific vulnerable groups and individuals.

- Gender Focus: The project is particularly sensitive to the needs of women – given their role in the community. Information specific to rural women will be developed and emphasized because of their high vulnerability in livelihood development.
- Early Warning Systems: Given the importance of warning systems for flash

floods - two pilots will focus on implementing end-to-end early warning systems developed together by CAMA/YMS, MAI, NWRA and Civil Defense Authority, on behalf of the wider disaster risk management community, and in consultation with other DRM efforts. This component will also help CAMA/YMS, MAI and NWRA improve the quality of their services to their various stakeholders.

Component D - Oversight of the PPCR implementation: This component will include synthesizing the main results achieved by investments under the PPCR. Knowledge sharing activities will be carried on all PPCR investments to increase public awareness of climate variability and change and its impact on people's day-to-day activities. This component will also guide the initial development of the climate database management system by establishing procedures to ensure open access to climate information by all users.

- Public education and outreach activities will be geared towards improving information access and increasing awareness of the challenges caused by climate change. Particular attention will be given to communities, which need to take preparatory action to mitigate adverse consequences of the climate and hydro-meteorological hazards. The goals are to improve community response to flood warnings, improve management of surface water resources, enhance food security, improve health outcomes, improve climate-resilient coastal zone management, and provide better rural livelihoods.

Other Key Issues Addressed by the PPCR:

Operations and Maintenance: A major issue in all hydro-meteorological modernization programs is how to sustain the financing of operating and maintaining new equipment. Without additional support, new systems quickly fall into disrepair and disuse. In Yemen, the Government recognized that this has been a major issue in past projects and made a commitment to support operations and

maintenance in the amount of up to US\$1.5 million annually. This is a major step forward in the modernization of National Meteorological and Hydrological Services.

Gender Smart Management Framework: Greater equality in the workplace is a hallmark of PPCR projects. One of the steps included the Government of Yemen agreeing to second and finance female technical specialists to the PPCR Program Coordination Unit where they will benefit from additional technical training as well as have the opportunity to make a significant contribution to the overall success of the program. The results will be closely monitored by a women's NGO in cooperation with the Environment and Women Unit at EPA.

Data Sharing: Data sharing between government departments has been a perennial problem in Yemen and has slowed the development of services that depend on intra-government cooperation. However, in the earliest stages of PPCR's development, all of the parties signed a Memorandum of Understanding committing to a data sharing policy that will significantly enhance their capacity to exchange data and deliver reliable weather, climate and water services.

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