Cover Report – WMO LoA 2024

Introduction

This report provides an overview of the deliverables submitted by IDEMS under the terms of reference (ToRs) of the 2024 WMO Letter of Agreement (LoA) and its first amendment. The primary objective of this LoA was to support national meteorological agencies in Uganda, Bangladesh, and Liberia in enhancing their capacity to rescue and utilize climate data for variability and risk assessments.

Objectives and Terms of Reference

As outlined in the original LoA , IDEMS was to provide remote support to the three countries to achieve the following objectives:-

1. Assessing the status of data rescue in their organisations according to the guidance provided in WMO-No. 1182, *Guidelines on Best Practices for Climate Data Rescue*.
2. Developing a data rescue plan for 2024 with an outlook for future years, where appropriate.
3. Generating 30+ years climate-relevant data sets, extended backwards through data rescue
4. Applying robust basic statistics (e.g. R-Instat) underpinning climate services and EW4All
5. Addressing any challenges and opportunities around data rescue, as appropriate and feasible.

However, following an inception meeting that provided insights into status of climate data in the three countries, the LoA was amended to include face-to-face training sessions for Uganda and Bangladesh as follows: -

1. One-week on-site training to kickstart data rescue
2. A second one-week onsite training workshop to facilitate time-series generation of climate parameters

For Liberia, it was agreed that IDEMS would continue to provide remote support to the NMHS in recovering lost data from international data centres.

Deliverables and Alignment with ToRs

Upon completion of the planned activities, IDEMS is submitting the following five (5) reports to document the work undertaken and its alignment with the LoA objectives:

1. Status of Climate Database at UNMA (Uganda National Meteorological Authority)
    - Summarizes the outcomes of the Climsoft database audit in Uganda.
    - Corresponds to the first five-day on-site training in Uganda to help kick-start data rescue.
2. Basic Climate Statistics Workshop in UNMA (Uganda National Meteorological Authority)
    - Details the design and implementation of a training workshop focused on time-series analysis and tailored climate product generation.
    - Represents the second training activity conducted in Uganda.
3. Historical Data Report for BMD (Bangladesh Meteorological Department)
    - Summarizes the outcomes of the climate database audit in Bangladesh.
    - Aligns with the first five-day on-site training session to support data rescue efforts.
4. Basic Climate Statistics Workshop in BMD (Bangladesh Meteorological Department)
    - Documents the training workshop designed to facilitate time-series analysis and tailored climate product development.
    - Represents the second training activity in Bangladesh.
5. Liberia Data Rescue Report
    - Lists datasets recovered from international data centers to aid Liberia in restoring lost climate records.

Key Lessons and Challenges

This section summarizes the key takeaways from the work undertaken by IDEMS under the terms of the WMO LoA. Each country presented unique challenges and opportunities.

Uganda

1. The climate database contains historical gaps that must be addressed to ensure comprehensive and reliable climate information generation.
2. Expediting data entry into Climsoft is critical to eliminating manual digitization backlogs, particularly for temperature and other climate elements.

3. Additional technical support is required to enhance Climsoft's functionality, including preventing duplicate records and fully integrating AWS data.
4. Limited funding and insufficient staffing for digitization tasks pose significant challenges to progress in data rescue efforts.
5. Hands-on training significantly improved participants' skills in data inventory, quality control, and time-series analysis.
6. Participants expressed strong interest in continued training to build on foundational skills and explore advanced climate data applications.

Bangladesh

1. The Bangladesh Meteorological Department (BMD) operates a well-functioning Fortran-based climate data management system that effectively processes historical and current climate data.
2. While BMD has received external support (e.g., World Bank funding for Clidata), concerns remain about the sustainability of licensing fees for Clidata.
3. BMD is considering integrating Climsoft, an open-source climate data management system, as a replacement or complement to their existing Fortran-based system. A two-week Climsoft installation and training session is recommended, with potential support from the UK Met Office.
4. BMD operates 250 AWS stations, presenting an opportunity to integrate AWS data into Climsoft alongside manual station data.
5. Participants successfully learned to use R-Instat for climate data checks, error correction, and visualization, but further training is needed on climate product development.

Liberia

1. Liberia's experience highlights the critical role of external archives in recovering lost national climate records, reinforcing the importance of international collaboration.
2. Reliance on international sources for data recovery can be slow and requires sustained partnerships for continued access.
3. Liberia's adoption of satellite-derived climate datasets (CHIRPS, CHIRP, CHIRTS, AgERA5) demonstrates the value of these estimates as alternative data sources.
4. Building staff capacity with the necessary analytical skills to evaluate and interpret satellite-based climate estimates is essential for effective data utilization.

Conclusion

The activities undertaken under this LoA have significantly contributed to building the capacity of meteorological agencies in Uganda, Bangladesh, and Liberia to strengthen their climate data management systems and generate reliable climate summaries required for understanding climate variability and estimating climate risks. By conducting the database audits in Uganda and Bangladesh, the NMHS can now prioritize their data rescue efforts to ensure their database is complete and comprehensive. In Liberia, there is now some historical data available to complement the records collected by AWS since the civil war ended. There is more to be done but the progress achieved lays a strong foundation for further work in climate data rescue and utilization in these countries.