Strengthening National Climate Services through Improved Climate Data Availability, Access, and Use

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1. Summary

Enhancing National Climate Services (ENACTS) is an internationally recognized approach for strengthening national climate services by improving the availability, accessibility, and use of climate information. Developed in close collaboration with National Meteorological and Hydrological Services (NMHSs), ENACTS has been implemented in more than 20 countries across Africa and beyond through partnerships with regional climate centers and development organizations.

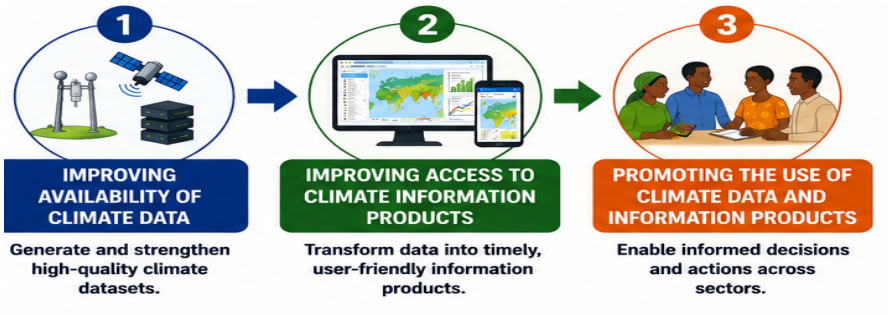
ENACTS addresses one of the most significant challenges facing climate services in many developing countries—the lack of reliable, spatially and temporally complete historical climate datasets. It overcomes this challenge by combining quality-controlled national station observations with globally available satellite rainfall estimates and climate reanalysis products to generate high-resolution national climate datasets.

These datasets typically provide more than 45 years of historical climate records, deliver rainfall and temperature data at approximately 4–5 km spatial resolution, offer complete spatial and temporal coverage, and support climate monitoring, early warning, risk assessment, forecasting, and sector-specific decision-making.

ENACTS goes beyond data production. It provides an interactive web-based platform through which users can access, explore, and use climate information products on the past, present, and future. It also strengthens the technical capacity of NMHSs while engaging users from climate-sensitive sectors to ensure that climate information is effectively integrated into planning and operational decision-making. A defining feature of ENACTS is that NMHSs remain at the centre of implementation. Climate datasets remain nationally owned, information products are tailored to national priorities, and local experts receive practical training to ensure long-term sustainability.

2. The Three Pillars of ENACTS

The ENACTS approach is built around three mutually reinforcing pillars that together improve the production, delivery, and application of climate information.



Pillar 1 – Improving the Availability of Climate Data

ENACTS combines national observations with global products to generate high-quality, spatially complete, nationally owned climate datasets. This includes organizing station observations, quality controlling rainfall and temperature data, merging observations with satellite rainfall estimates and reanalysis temperature products, and producing continuous national rainfall and temperature datasets suitable for climate analysis and decision support.

Pillar 2 – Improving Access to Climate Information

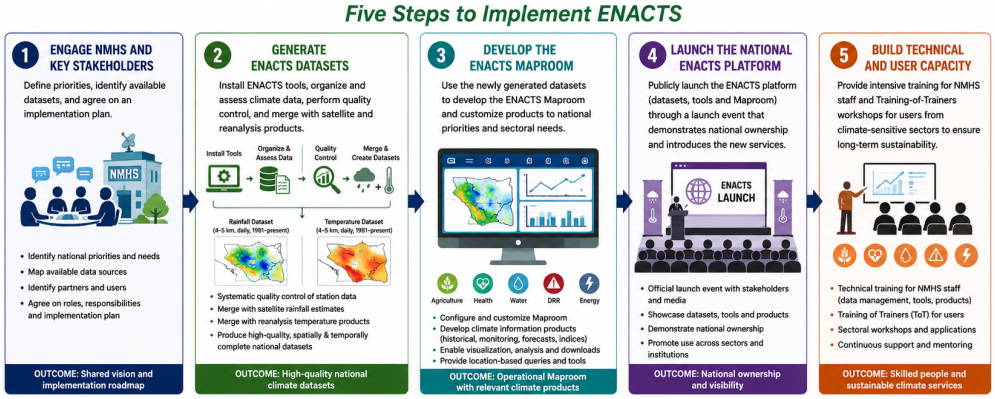
The second pillar transforms climate datasets into user-friendly climate information products delivered primarily through the ENACTS Maproom—an interactive web-based platform that enables users to visualize, analyse, and download climate information without requiring advanced technical expertise.

Pillar 3 – Promoting the Use of Climate Information

The third pillar promotes the routine use of climate information through technical training, stakeholder engagement, and co-production of climate services. Users from agriculture, health, water, disaster risk management, and other sectors actively participate in designing climate products, increasing their relevance, ownership, and long-term use.

3. Implementation

Although ENACTS implementation is tailored to each country's needs, it generally follows a common sequence of five steps.



Step 1. Engage the NMHS and key stakeholders to define priorities, identify available datasets, and agree on an implementation plan.

Step 2. Generate ENACTS datasets by installing ENACTS software tools, organizing and assessing climate data, performing systematic quality control, and merging quality-controlled station observations with satellite rainfall estimates and reanalysis temperature products.

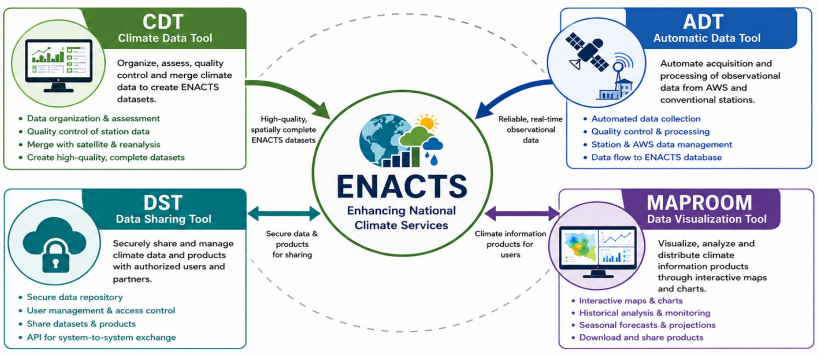
Step 3. Develop the ENACTS Maproom using the newly generated national datasets and customize products to national priorities and sectoral needs.

Step 4. Launch the national ENACTS platform, including the datasets, tools, and Maproom, through a public event that demonstrates national ownership and introduces stakeholders to the new climate services.

Step 5. Build technical and user capacity through intensive training for NMHS staff and Training-of-Trainers workshops for users from climate-sensitive sectors to ensure long-term sustainability.

4. ENACTS Tools

ENACTS implementation is supported by several complementary software tools.



The Climate Data Tool (CDT) supports the organization, quality control, analysis, and visualization of climate data. It enables the integration of station observations with satellite rainfall estimates and reanalysis temperature data to produce high-resolution, spatially complete datasets.

The Automatic Weather Station Data Tool (ADT) automates the collection, harmonization, and management of observations from multiple automatic weather station networks. It addresses challenges related to inconsistent data formats and fragmented data systems by standardizing and synchronizing AWS data into a unified structure and supports integration with WMO Information System 2.0 (WIS2).

The Data Sharing Tool (DST) enables secure, controlled sharing of climate data through APIs and user-specific permissions while maintaining national ownership. Through API-based access and user-specific credentials, DST allows NMHS to disseminate selected datasets to partners, researchers, and sectoral systems while maintaining data ownership and control.

The ENACTS Maproom provides an interactive web-based platform through which users can explore historical climate conditions, monitor current conditions, analyse variability and extremes, and access tailored climate information products.

5. Summary

ENACTS is a comprehensive framework for strengthening national climate services by simultaneously improving the availability, accessibility, and use of climate information. By combining quality-controlled station observations with satellite and reanalysis products, ENACTS produces high-resolution national climate datasets that underpin interactive Maprooms and sector-specific climate information products.

Equally important, ENACTS strengthens institutions, develops technical capacity, and promotes the co-production and operational use of climate information. This integrated approach enables NMHSs to sustainably generate, disseminate, and apply climate information that supports climate-resilient development across agriculture, health, water resources, disaster risk reduction, and many other sectors. As a result, ENACTS has become one of the most successful and widely adopted frameworks for strengthening national climate services in Africa and is increasingly being adapted in other regions.