



ENACTS

ENHANCED NATIONAL CLIMATE SERVICES

Why ENACTS?

Training Module

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International Research Institute
for Climate and Society
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1	Why ENACTS?	1
1.1	What Is ENACTS?	1
1.2	What Is ENACTS' goal?	2
1.3	How is ENACTS data produced?	2
1.4	What challenge is ENACTS designed to overcome?	2
1.5	What are the objectives of ENACTS?	4
1.6	What can ENACTS be used for:	4
1.7	Access Interpretation	4
1.8	Access	4
1.9	The Climate Analysis Maproom	5
1.10	The Climate Monitoring Maproom	6
1.11	The Climate Forecasting Maproom	6
1.12	Sector Based Maprooms	6
1.13	Quiz	9
1.14	References	10

WHY ENACTS?

1.1 What Is ENACTS?

The ENACTS (Enhancing National Climate Services) initiative is an ambitious effort to simultaneously improve the availability, access and use of climate information by working directly with National Meteorological and Hydrological Services (NMHS).

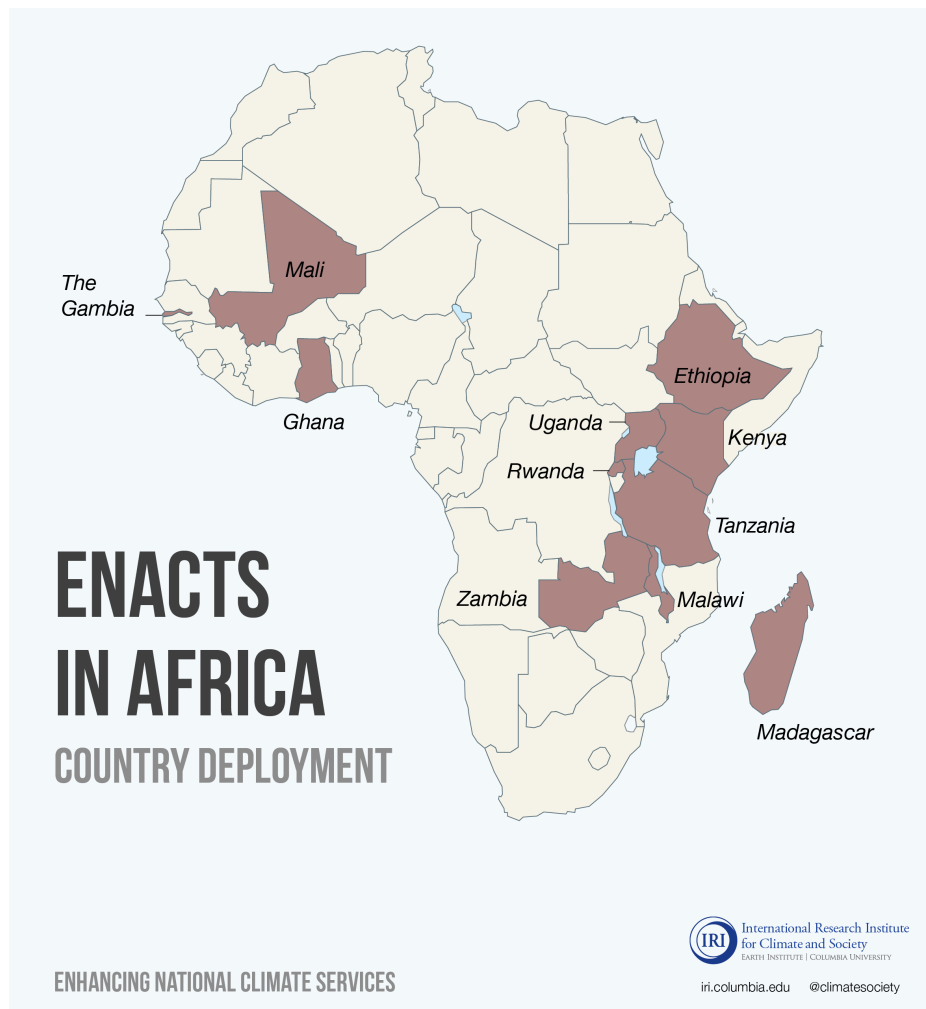


Fig. 1.1: ENACTS coverage in Africa

1.2 What Is ENACTS' goal?

ENACTS is much more than just data. The goal of ENACTS is to transform local, national and regional climate-sensitive development decisions through the widespread uptake of timely, relevant, locally enhanced quality assured climate information at relevant spatial and temporal scales.

1.3 How is ENACTS data produced?

Availability of ENACTS climate data is generated by quality control of data from the national observation network and combining station observations with satellite estimates for rainfall, and digital elevation models and reanalysis products for temperature (Figure 1.2). Developed data and derived products are disseminated for the Meteorological agency website and through other means. The new quality assessed, spatially and temporally complete ENACTS data products allow for characterization of climate risks at a local scale, and offer a low-cost, high impact opportunity to support applications and research. Hence the steps to produce ENACTS data are: * Assess available data * Perform quality check * Perform Merging

The approach thus combines the spatial information from the proxies with the accuracy from point station measurements. The final products are datasets with 30 or more years of rainfall and temperature time-series data for every 4km grid across a country. These quality assessed, spatially and temporally complete ENACTS data products allow for characterization of climate risks at a local scale, and offer a low-cost, high impact opportunity to support applications and research.

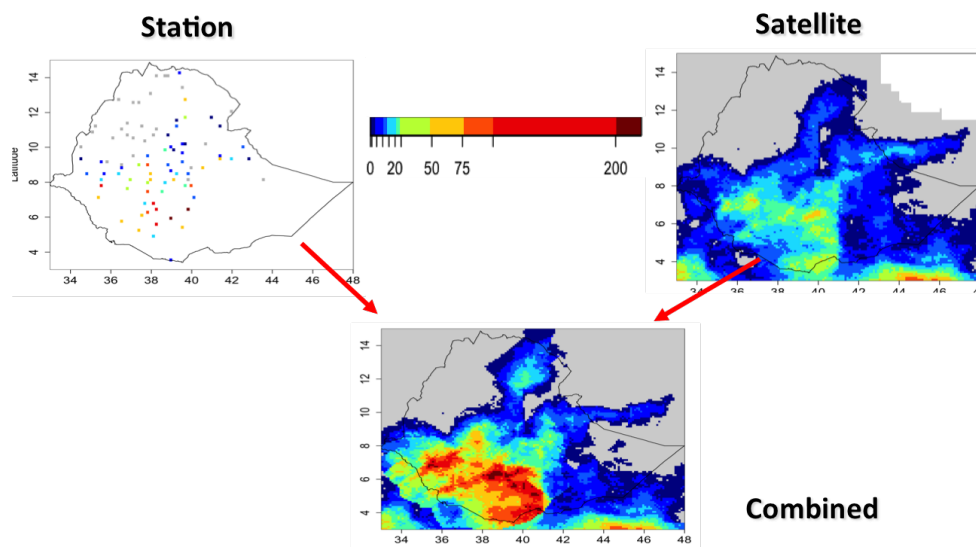


Fig. 1.2: Ethiopian rainfall gauge data a) available from National Meteorological Agency (NMA) to GTS, b) available in near real time at NMA and c) incorporated into archived ENACTS data and disseminated by NMA

1.4 What challenge is ENACTS designed to overcome?

Priority outcomes for long-term ENACTS sustainability are the effective understanding and uses of the past, present and future climate information, demanded from national stakeholders communities to use in decision making processes. Some key problems that ENACTS has recognized is the decline in investments, such as Madagascar (see Figure 1.3) and civil unrest, in Rwanda (see Figure 1.4) have resulted in the decline of number of stations.

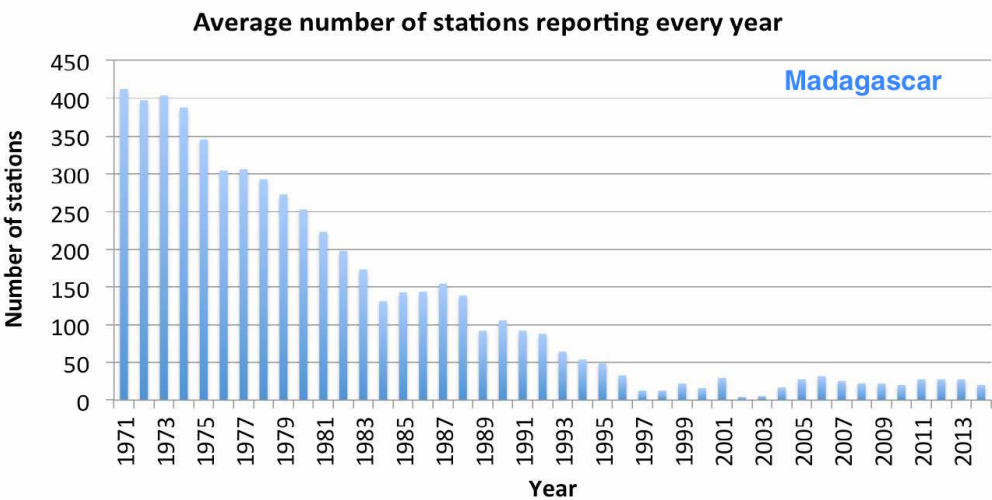


Fig. 1.3: Decline in investments in Madagascar resulted in decline in number of observation stations

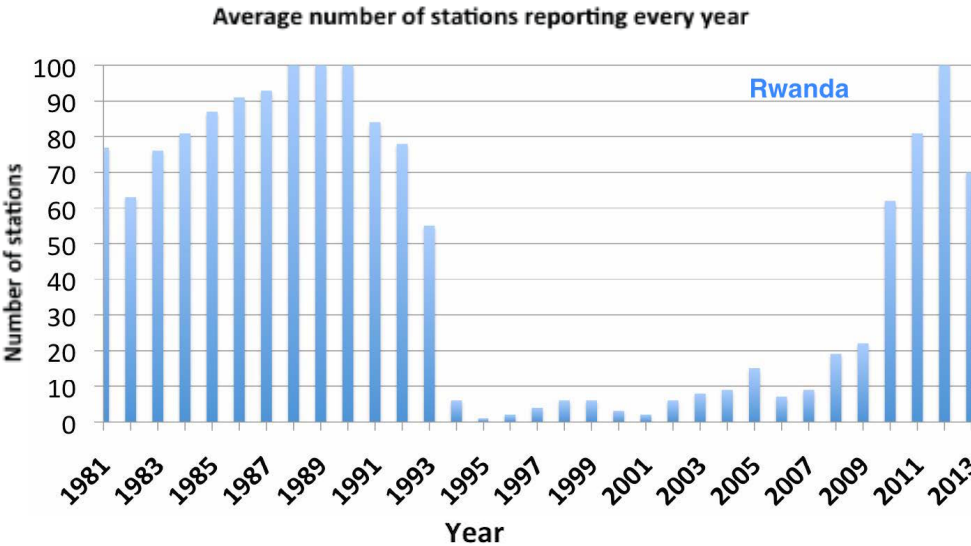


Fig. 1.4: Civic unrest in Rwanda due to the genocide resulted in decline of observation stations

In addition, most global products themselves depend on national observations that utilize the data from the national observation stations and due to the decline of these stations, global products suffer from a decline in reported data. Thus, the quality of ENACTS datasets are superior than many global products due to the merging of station data with global satellite proxies. Also because, by working directly with NMHS, ENACTS has access to many more stations than available to the global products.

1.5 What are the objectives of ENACTS?

Objective 1 Improve the availability of quality assured climate information products on the past, present and future climate at the national and local levels through the development of historical and monitoring climate information at the national level by blending all relevant national observations with global products.

Objective 2 Enhance access to climate information products and services relevant to the needs of the public, national and local practitioners in climate sensitive sectors, policy makers, private sector and researchers through web interface that uses IRI Data Library technology and linked to National Meteorological Agency's Website.

Objective 3 Unleash pent up demand for locally relevant, high quality, climate information through effective stakeholder engagement in health, agriculture, water, disasters, national planning etc.

1.6 What can ENACTS be used for:

- Climate analysis
- Climate monitoring
- Climate predictability
- Utilization sector based Maprooms

What can current ENACTS tools NOT be used for:

- Weather forecasting (too short term)

1.7 Access Interpretation

The ENACTS approach makes access to climate information products easier by making information products available online. This is accomplished by customizing and installing the very powerful IRI Data Library (<http://iridl.ldeo.columbia.edu>) (Blumenthal et al. 2014) at the NMHS and developing an online mapping service that provides user-friendly tools for the analysis, visualization, and download of climate information products. The online tool currently includes “maprooms,” one each for climate analysis, climate monitoring, climate forecast and Climate and Health.

1.8 Access

When available, the ENACTS Maprooms can be accessed through the following links:

- Ethiopia: <http://www.ethiometmaprooms.gov.et:8082/maproom/>
- Ghana: <http://maps.meteo.gov.gh:89/maproom/>
- ICPAC: <http://digilib.icpac.net/maproom/>
- Kenya: <http://kmddl.meteo.go.ke:8081/maproom/>

- Madagascar: <http://map.meteomadagascar.mg/maproom/>
- Mali: <http://197.155.140.164/maproom/>
- Rwanda: <http://maproom.meteorwanda.gov.rw/maproom/>
- Tanzania: <http://www.ethiometmaprooms.gov.et:8082/maproom/>
- Zambia: <http://41.72.104.142/maproom/>

The links to the Maprooms can also be found on the IRI ENACTS website: <http://iri.columbia.edu/resources/enacts/>

1.9 The Climate Analysis Maproom

This Maproom provides information on the historical mean climate at any given point or at national and sub-national levels. Extracting and presenting information at any administrative level enables focus on a specific area of interest. This data set can also be used to assess the quality of global products and downscale forecasts. Rainfall climatology and historical anomalies are readily accessed for any administrative level across Ethiopia (Figure 1.5).

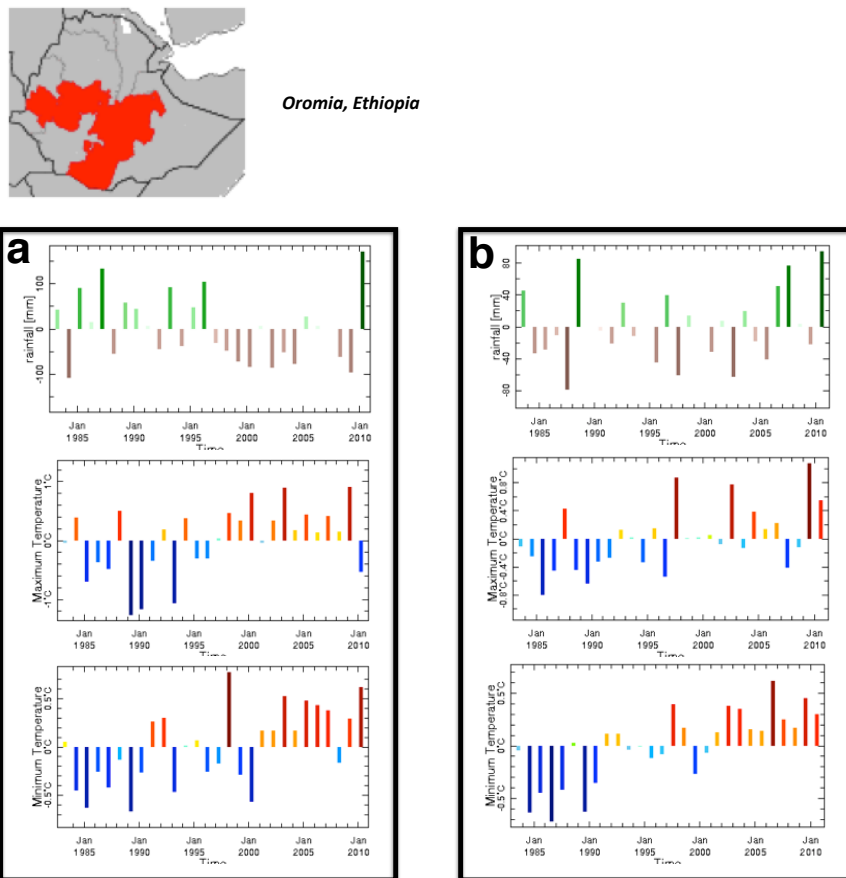


Fig. 1.5: Figure 1.5 a & b Climate analysis tool used to examine recent climate trends for the two rainy seasons-the Belg and Meher (Kiremt) for Oromia Ethiopia-are set out below. Substantial warming can be observed in both seasons over the time period 1983-2010. This warming may make highland regions more susceptible to malaria. An extended drought period from 1997-2009 for the Belg season can be observed. a) Trend in rainfall (top) max T (middle) and min T (bottom) for the Belg rainy season (Feb-May). b) Trend in rainfall (top) max T (middle) and min T (bottom) for the Kiremt rainy season (Jun-Sep).

1.10 The Climate Monitoring Maproom

This Maproom provides routinely updated dekadal (10-day) and monthly rainfall estimates for the whole country along with analysis tools. It enables monitoring of the current season, allowing for the comparison of the current season to either the mean or data from recent years (Figure 1.6).

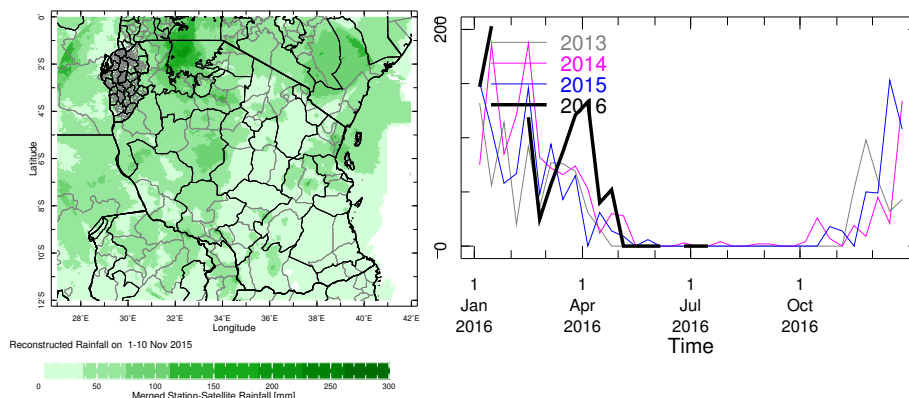


Fig. 1.6: ENACTS rainfall estimate 1-10 November 2016 Tanzania (left) and ENACTS rainfall in Tabora province Tanzania comparison of 2015 with previous 3 years (right)

1.11 The Climate Forecasting Maproom

One of the tools in the Climate Forecasting Maproom is the ENSO Maproom which provides tools for the analysis of the impact of different phases of the El Niño-Southern Oscillation (ENSO) and the Indian Ocean Dipole (IOD) on rainfall and temperature. In other words, it shows the historical probability (given in percentile) of seasonal average monthly rainfall and or temperature falling within the upper (wet), middle (normal), or bottom (dry) one-third (“tercile”) of the 1983-2010 historical distribution in the country given the state of ENSO (El Niño, Neutral, La Niña) or during that same season (Figure 1.7). In the future we expect these Maprooms to include climate forecasts.

1.12 Sector Based Maprooms

In addition each ENACTS Maproom also includes a Sector-specific Maproom - the Malaria Maproom where derived products are tailored to the specific needs of the malaria community. For example:

- Climate Suitability for Malaria Transmission (CSMT) (Figure 1.9)
- Weighted Average Standardised Precipitation (WASP) index

These plots below show the time series of 12-month Weighted Anomaly Standardization Precipitation (WASP) index relative to a baseline period (Lyon 2004). The purpose of this tool is to provide a simple visual means of relating averaged precipitation to a reference period of interest (Figure 1.8).

In the future we expect to create new Maprooms based on user demand.

1.12.1 Conclusion

ENACTS products have generated a great deal of interest in the meteorological, humanitarian, and development communities. As a result, strengthening and replicating ENACTS in other countries is a key priority. To do this, it will be

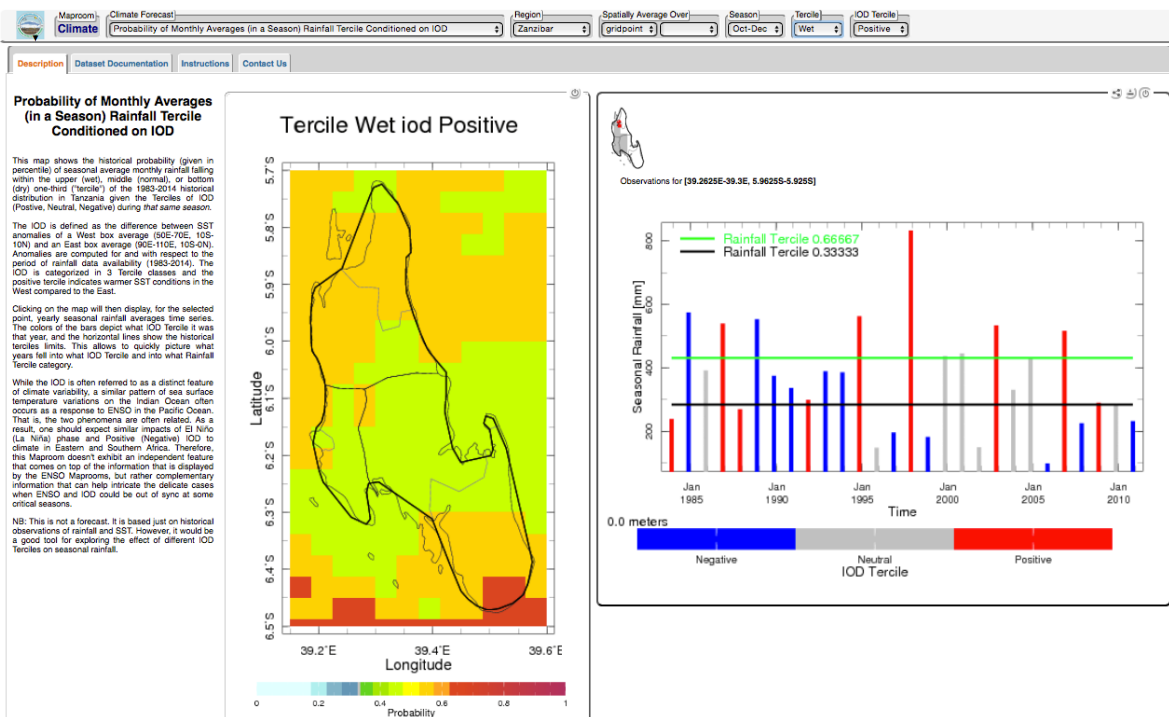


Fig. 1.7: Probability of rainfall conditioned on ENSO (El Niño) in Zanzibar (Tanzania)

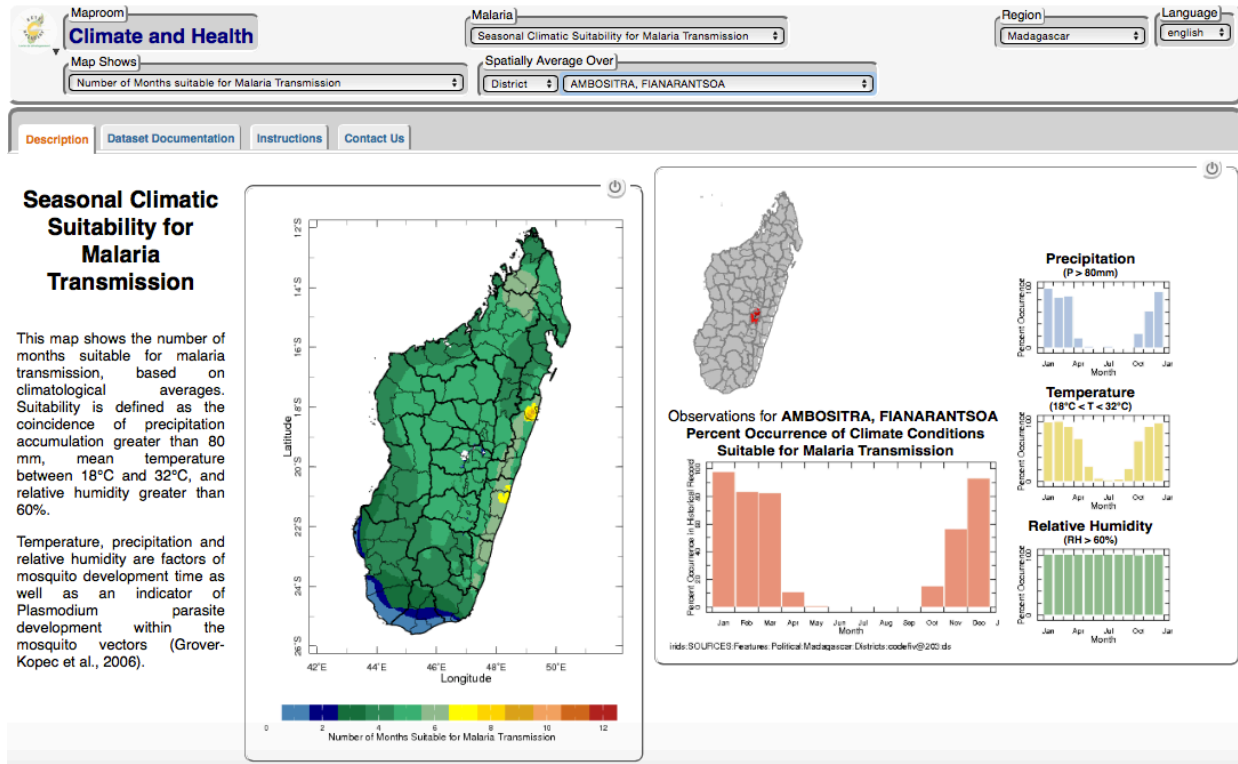


Fig. 1.8: Seasonal Climatic Suitability for Malaria Transmission in Ambositra, Fianarantsoa - Madagascar

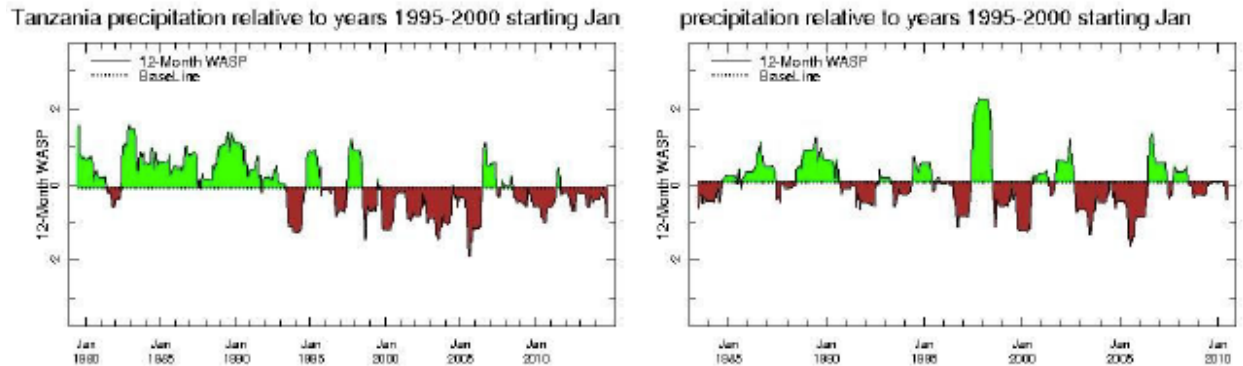


Fig. 1.9: WASP analysis for Tanzania (left) with CMAP, (right) with ENACTS. Note the significant difference in the 1997/8 El Niño in both images.

necessary to both strengthen current ENACTS networks while expanding ENACTS to other countries.

1.12.2 Summary

Climate information must play a crucial role in national development planning. High quality climate data allows decision makers to better manage risks and maximize opportunities from a changing climate. Availability of decision-relevant information about the past climate, recent trends, likely future trajectories, and associated impacts is thus a prerequisite for climate-informed decision making. However, the declining availability of observation data in African countries threatens the quality of climate science and information products at all scales from local to national, regional to global.

Climate observation networks in many parts of Africa face challenges that limit the availability of even the most basic climate information. As a result, useful information is often not available or, if it does exist, is inaccessible to those that need it most. One effort to improve the availability of climate data and information products is the Enhancing National Climate Services (ENACTS) initiative, which is led by the International Research Institute for Climate and Society (IRI). ENACTS focuses on the creation of reliable climate information that is suitable for all levels of decision-making. Through ENACTS, data availability is improved by combining quality-controlled data from the national observation network with proxies such as satellite and reanalysis products. Online tools for data analysis, visualization, and engagement make the data available to stakeholders, while ongoing engagement ensures that it will be meaningfully deployed.

For all of its benefits, ENACTS data products cannot replace the need for increasing the climate observation network in Africa. The main focus of ENACTS is making the best use of the available data from national and global sources, and the ENACTS approach could help to reduce the number of stations needed for measuring rainfall and temperature. However, investment in observation systems is still needed to meet the Africa's climate data requirement.

1.13 Quiz

Please answer the following questions:

- Q1. What does ENACTS stand for?
- Q2. What are the steps to producing ENACTS data?
- Q3. What are the three objectives of ENACTS?
- Q4. What can ENACTS be used for?
- Q5. What can ENACTS not be used for?

1.13.1 Quiz - Responses

A1. * Enhancing National Climate Services

A2.

- Assess available data
- Perform quality check
- Perform Merging

A3.

- Improve Availability
- Enhance Access

- Promote Use

A4.

- Climate analysis
- Climate monitoring
- Climate predictability
- Utilization of sector based Maprooms

A5.

- Weather forecasting (too short term)

1.14 References

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