Importance of Seasonal Climate Prediction for Agricultural Research Planning

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NASA IDS: Seasonal Prediction of Hydro-Climatic Extremes in the Greater Horn of Africa
The Second Participatory Research Workshop and Project Meeting
July 28 - 29, 2015
Washington Hotel, Addis Ababa, Ethiopia
• Introduction
• Importance of Climate Prediction for Agriculture sector
• Objective
• Features and rain bearing mechanizes during kiremt season
• Data and Methods
• Sample Result and Discussion
• Recommendation
• In Ethiopia, the demand for agriculture output will grow exponentially over coming decades due to population growth and expanding economies.

• To meet this expanding demand, agriculture must become more adept at anticipating climate changes and variations and finding ways of adapting to these changes.

• It depends on by quality information relating to climate predictions that fulfil needs of decision maker, farmers and agribusinesses.

• Climate prediction information has the potential to reduce the impact of adverse weather events.
Climate prediction is in its infancy. However, the payoff from the research and development of reliable climate prediction information can be substantial for the agricultural industry. This is especially important considering the increased frequency of the extreme weather events that we are experiencing and will experience in coming decades.

Climate prediction information can be utilized by crop and livestock producers and agribusinesses to adapt to and minimize the impact of changing weather patterns and adverse weather events.
Predictions with longer time scale, such as long-term forecasting and then seasonal and inter-annual prediction, have important role in increasing benefits,

- improving crop yield,
- improving production input planning (e.g., fertilizers, pesticides, fungicides)
- reducing risk, reducing losses of extreme climate events,
- making decisions of agricultural development plan.

Short-term and mid-term forecasts are often directly applied in various management strategies,

- land preparation
- Crop & variety selection
- agricultural operation activities (irrigation, fertilizer, herbicide, insecticide application),
- processing and transporting of agricultural products, etc.
Due to the pressure on the agricultural sector to produce food, fuel and fiber for an expanding country economy, methods of improving agricultural productivity must be identified and exploited.

The situation is worsened by the challenges of climate change which will modify temperature and precipitation patterns and increase the frequency of extreme weather events.

Research to help predict the timing, location and intensity of these changes and events will provide valuable and actionable information to agricultural decision makers to increase production, reduce risk and mitigate the environmental impacts of these events.
Objective

➢ To develop high resolution seasonal climate forecast for 2015 kiremt season to the purpose of agricultural research planning.
Features and rain bearing mechanisms during Kiremt season

- **Global**
  - Mascarene and St. Helena high pressure areas
  - ENSO (El-Nino/southern oscillation)
  - Inter tropical convergence zone (ITCZ)

- **Regional**
  - Low level jet (LLJ, Somali jet)
  - Tropical easterly jet (TEJ)

- **Local**
  - Topography effect

The diagram shows the distribution of high pressure areas (H) and low pressure areas (L) across the globe with the Inter-tropical Convergence Zone (ITCZ) and Jet Streams (LLJ, TEJ) indicated. The image also highlights the seasonal variation with January and July labeled.
Data and Product Used

Data

- Historical precipitation station data (EIAR, NMA)
- Historical temperature station data (EIAR, NMA)
- NOAA NCDC ERSST global SST anomaly
- Historical and predicted SST anomaly of Nino 3.4 region
- African Rainfall Climatology (ARC) data set
- Gridded rainfall and temperature dataset
- CPC/IRI ENSO forecast
- AgMERRA Data
Forecasting techniques,

- Teleconnection method
- Analogue method
- Probabilistic methods
- Empirical-Statistical methods
- Dynamical Methods /GLOBO/
There is a strong tendency for *below normal* rainfall in
- Fogera,
- Pawe,
- Assosa,
- Sebeta,
- Werer,
- Tepi

Agricultural research center.
Tercile rainfall probability for Kiremt 2015 season

Legend
Above normal
Near normal
Below normal

High probability for enhanced rainfall

National Meteorology Agency
Tercile Probability for Homogenous Rainfall Zone, EIAR
Cessation Dates of Kiremt Rainfall, E1AR
• Kiremt 2015
  • Gridded Monthly and Weekly Forecast
  • Rangeland WRSI
  • Crop WRSI

For more information and update:

www.eiar.gov.et/AgroWeatherAdvisory/climatefrcst or
www.agrometeeiar.gov.et/AgroWeatherAdvisory/climatefrcst
AR-CGRD Research Focus Area

- Undertaking research on Climate Modeling
- Undertaking research on Climate change impact assessment
- Undertaking research on Climate change vulnerability assessment and mapping
- Characterization of Climate induced risks
- Enhancing the adaptive capacity of rural communities to climate change and variability through enhanced utilization of climate forecasts and agrometeorological advisories
- Undertaking land suitability mapping for selected crop varieties in Ethiopia.

Main research thematic areas can be summarized with the following broad research areas:

![Graph showing precipitation change in Ethiopia over time for different RCP scenarios (RCP8.5, RCP4.5, RCP2.6, historical) with 25th and 50th percentiles for annual precipitation.](image)
Special Thanks

• EIAR Top Management
• Melkasa Agricultural Research Center
• Debreziet Agricultural Research Center
• Dr. Alberto Manzuri (ISAC-CNR, Italy)
• Arbaminch University
• All Data Center Provider, especially AgMIP Climate Team Leader Prof. Alex
Thank You