Pastoral Climate Advisory for Ethiopia: Enhancing the Resilience of Mixed Crop-Livestock Production Systems in Lowlands of Ethiopia

(From July to Sep 2025)

June 2025

ACRONYMS

BoM	Bureau of Meteorology
EIAR	Ethiopian Institute of Agricultural Research
EMI	Ethiopian Meteorological Institute
ENSO	El Niño Southern Oscillation
HSI	Heat Stress Index
IOD	Indian Ocean Dipole
GCM	Global Climate Models
ITCZ	Intertropical Convergence Zone
IRI	International Research Institute
JAS	July, August, September
JJAS	June, July, August & September
MAM	March, April and May
MME	Multi-Model Ensemble
NOAA	National Oceanic and Atmospheric Administration
THI	Temperature-Humidity Index
PCA	Pastoral Climate Advisory
PCoPs	Pastoral Community of Practice
WRSI	Water Requirement Satisfaction Index

Acknowledgment

This pastoral climate advisory was produced by the leadership of the team of researchers from the Climate and Computational Science Research Directorate(C&CSRD) of the Ethiopian Institute Agricultural Research (EIAR), in close collaboration with the Yabello Pastoral and Dryland Agriculture Research Centre, Ministry of Agriculture and the Alliance of Bioversity International and CIAT.

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DISCLAIMER

The JAS climate outlook for pastoral communities is developed with field experiment data, GCM outputs and reanalysis of data from satellites. With the possibilities of uncertainty in GCM and satellite outputs, a cascaded effect during data assimilation is highly probable. In such cases, EIAR will not guarantee this pastoral outlook accuracy, and neither will accept any liability for any loss or damage resulting from its use**. We also strongly advice users to reinforce their decisions with the intra-season updates from Ethiopian Meteorological Institute (EMI).**

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Preamble

The Southern and Southeastern lowlands of Ethiopia typically experienced dry climatic condition from July to September. Borana, part of these lowlands, usually experiences cold-dry conditions during July and August while SON rain usually starts in September. Climate drivers influencing the region are El Niño–Southern Oscillation (ENSO) and Indian Ocean Dipole (IOD) (WMO). Current forecasts indicate that ENSO is likely to remain in a neutral phase with a 70% probability during July, August and September. Similarly, the IOD is expected to remain neutral at least until August, following a warming of sea surface temperatures south of Java and cooling near the Horn of Africa (BoM). During July-September, climate model guidance favors a drier period in most of lowlands except for the "*kiremt*" rainfall receiving areas in Northern Somali region. During these months (July to September), significant heat stress is anticipated across much of the pastoral regions of the country. However, Borana Zone will be an exception, as it enters its cold and dry season during this period. Therefore, this climate outlook information and forecast driven pastoral and agro-pastoral climate seasonal and sub-seasonal advisory could support pastoral and agro-pastoral communities and relevant stakeholders in making informed decisions to protect livestock, reduce crop loss and manage rangeland resources more effectively under expected climatic stress.

This advisory is part of the CGIAR Scaling for Impact Science Program, which works to deliver actionable, climate-informed solutions that help communities build resilience and scale sustainable practices across regions facing climatic challenges.

1. Background

During March- May ’25, the main rain season of the lowlands, pastoralist areas experienced rainfall deficits dominating a negative anomaly as shown in the graph with brown shades., which varies from -100 mm to -300 mm range. Afar regions in the northeast and the Eastern parts of the country exhibited significant rainfall deficits. which has aligned with the March to May Pastoral Climate Advisory with a drier-than-normal season for these lowlands. In contrast to this, the South Omo, eastern parts of Borana zone and the Southern tips of Dolo and Shebelle zones experienced positive rainfall anomalies indicating areas received near-normal to above-normal rainfall. These areas are shaded as light green and darker green respectively. Some pocket areas have experienced anomalies of +100 mm to +200 mm, and possibly higher in some localized spots.

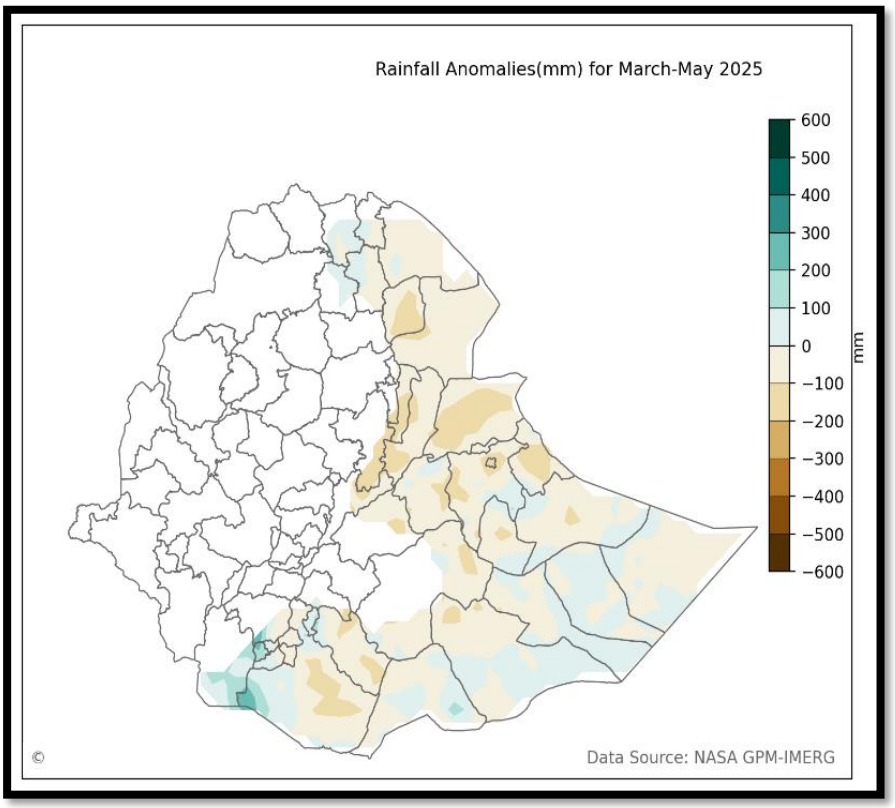


Figure 1: Rainfall anomaly for MAM’25 season

2. Rainfall Forecast for JAS

July to September (JAS) is expected to be predominantly dry across most of Ethiopia’s lowland areas, with near-normal rainfall mainly limited to the *'kiremt'*[1] rainfall-receiving zones, particularly in the northern Somali region and parts of the Afar region.

In July, much of the southeastern, eastern, and northeastern lowlands are likely to experience significantly dry conditions. By August, some improvements are expected, with Fafan, Siti, and Erer zones in the northern Somali region, along with Zones 3 and 4 in the Afar region, forecasted to receive near-normal to above-normal rainfall with better distribution.

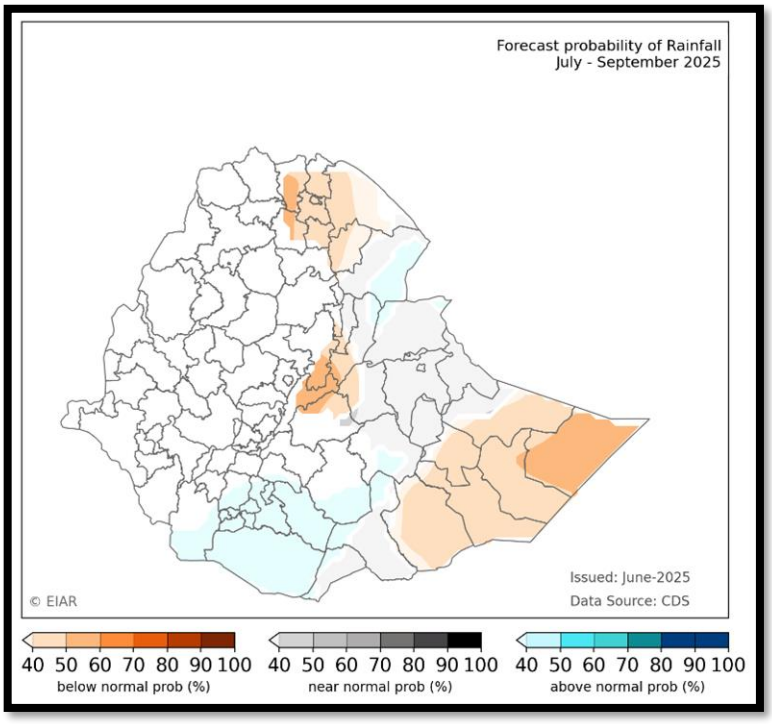


Figure 2: Rainfall forecast for JAS’25 season

[1] *Karan* rainy season in Somali and Afar region.

Additionally, there is a chance of unseasonal rainfall in the Borana Zone, especially in woredas bordering the Southern Ethiopian Region. Moving into September, rainfall is anticipated to continue in early September across Fafan, Erer, Siti, and Zones 2, 3, and 4 of the Afar region, while dry conditions are likely to persist across the remaining lowland areas. The Borana Zone is also expected to commence its short rainfall season in late September.

3. JAS 2025 Rangeland WRSI

The recent March-to-May (MAM) rainfall season in the country's pastoral areas has had a negative impact on rangeland productivity. This has directly led to poor pasture conditions across many parts of various pastoral regions, raising concerns for livestock and livelihood resilience. As the season is mostly impacted by IOD and ENSO climate drivers. The prevailed negative Indian Ocean Dipole (IOD) has played a significant role in the decline of the pasture condition, and this is expected to continue during the upcoming JAS 2025 (Fig. 2). The monthly outlook forecast suggests that very poor pasture conditions will probably occur in July and improve slightly through September. As shown in the Figure, average to poor rangeland conditions is expected across most areas of the pastoral and agro-pastoral zones of the country. Specifically, Borena, Guji, southern East Bale and Bale, East Hararge in Oromia, Daawa, northern Liban, and Afder, Nogob, Erer, and Fafan in the Somali region, as well as Siti, Zone 1, Zone 4, and Zone 2 in Afar, are projected to have poor pasture conditions during the upcoming JAS. Conversely, average pasture conditions are expected in the southern and southeastern parts of the Somali region. The Borana and Guji zones with the start of the upcoming short rainfall season September to November pasture improvement spatially is expected.

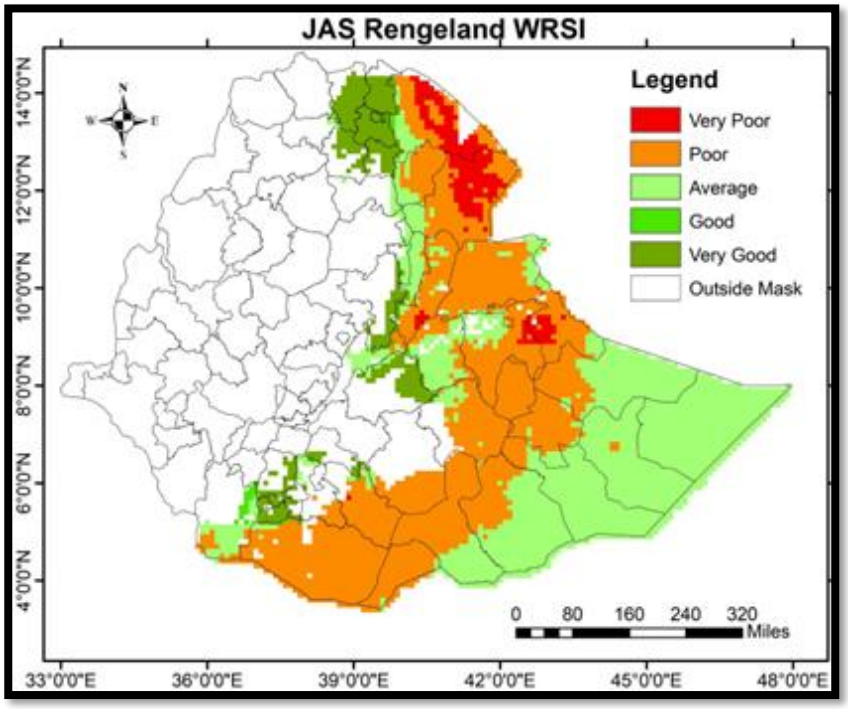


Figure 3: Expected Rangeland performance for the coming July to September months

Advisory

The risk of livestock mortality and morbidity may rise with prolonged heat stress. Therefore,

- Adequate temporary shades and shelters with proper ventilation are needed for vulnerable cattle (calves, kids, pregnant and lactating group).
- Pastoralists are advised to move their herd to and from grazing and watering points during early morning or late afternoon when the environment gets cooler.
- It is recommended to increase watering frequency for weak livestock herd than normal season.
- Veterinary experts should be well organized and mobilized to address and mitigate the challenges of common livestock diseases during ***Adolesa*** season such as Lumpy skin disease (LSD), Contagious caprine pleuropneumonia (CCPP), Blackleg, Mysterious camel disease (Yabello Veterinary Laboratory) as well as potential heat-related diseases outbreaks like Rift Valley Fever (RVF), Foot-and-moth disease (FMD), Anthrax, and tick-borne diseases in the area. RVF outbreaks are often linked to climate change, specifically warmer temperatures and increased rainfall, which can create favorable conditions for mosquito vectors that transmit the disease.

4. Livestock Water Point Advisory

At the beginning of the March-May "*Gena*" rain season most of the waterpoints in the Borana zone were in alert and near-dry status due to drier-than-normal conditions and an extended dry spell to month March. However, starting from the second week of April, a better distribution of rainfall was observed, leading to waterpoints holding a relatively good amount of water by the end of the season. From our daily monitoring, small ponds depict a sharp decline in water level, *Jilo, Dinagmo and Liben, Dimtu,* for more please visit on ET-monitoring. In the coming couple of months, July and August, it is expected to lose more of their contained water season mainly with the user. While the big ponds like *Beke, Burr, Reppe, Argene, Dembi Korba and Boru Wario* will maintain the rain collected. Since rain is not expected for the next two months, water levels at the water points are expected to decline with livestock and human consumption. It is highly advised to take precautions and efficiently utilize the waterpoints.

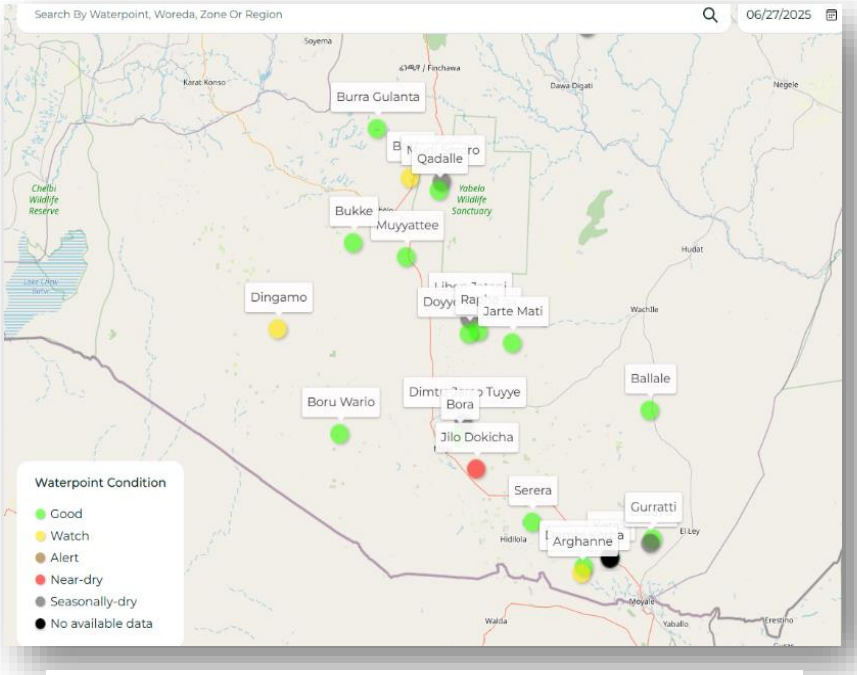


Figure 4: Current status of the water points in Borana zone (Source: EET-monitoring platform)

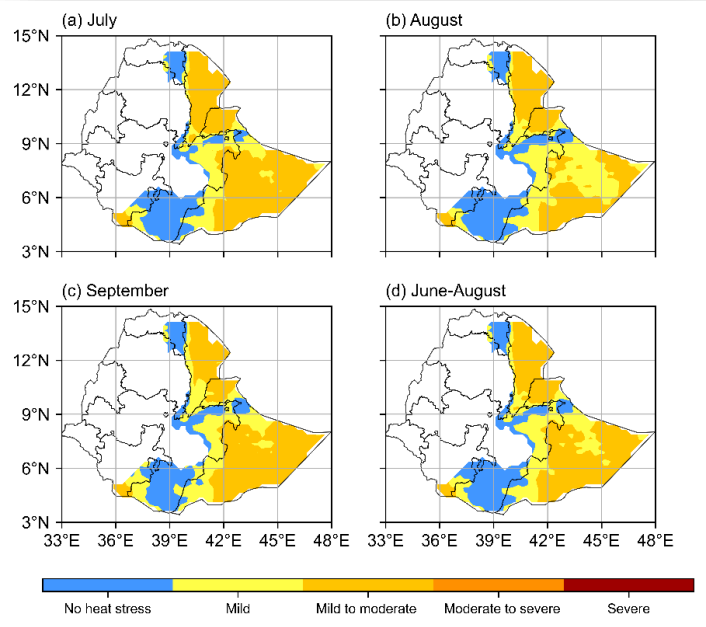
Figure 5: Community Information Center at Haro Dimtu water point, Borana Zone

Advisory

- With the absence of livestock troughs at the water points leads livestock to contaminate the water by stepping in it. It is strongly advised to treat the water with a local solution before any domestic use
- It is strongly advised to reduce or stop water withdrawal from the waterpoints for irrigation and other purposes
- Burra Waterpoint requires a designated area for livestock watering to ensure water quality standards to meet.
- Waterpoint managers and pastoralists are advised to follow the installe waterpoints Community Information Center within Kebele centers. Also, Stakeholders are advised to closely monitor the integrated rangeland and waterpoint monitoring platform (ET - Monitoring)for planning and making informed decisions.
- Water managers advised to mobilize the community for sediment removal and surrounding erosion control measures to minimize sedimentation and maximize water retention.
- For water points in alert and near-dry condition community water manager should start considering the water prioritization for week livestock and domestic uses.

5. Temperature-Humidity Index (THI)

The July to September forecast shows a minimal spatial variation in heat stress to be experienced monthly across a significant portion of the country's pastoral areas. The eastern, northeastern and southeastern lowlands will experience "Mild" to "Mild to moderate" heat stress during these months. These areas are shaded in orange color on the maps. The Mild to moderate stress is not widespread in August. Mild is concentrated in the eastern and southeastern lowlands, and along some river valleys or lower-lying areas in the north. While Boran zone and the eastern Gu rainfall receiving isolated pockets in Somali region are generally expected to experience "no heat stress" or "mild" conditions.



The pattern of heat stress for September is very similar to July, indicating a consistent heat stress distribution during these peak summer months. The presence of "Mild to Moderate " heat stress in these extensive pastoral regions may pose a risk to livestock health and productivity. Due to this, livestock in these regions may face challenges with reduced feed intake, decreased productivity and increased vulnerability to the risk of disease outbreaks. Livestock in these heat stress areas require specific management and strategic interventions to alleviate potential risks

Figure 6: Expected Rangeland performance for the coming July to September months

Advisory

The risk of livestock mortality and morbidity may rise with prolonged heat stress. Therefore,

- Adequate temporary shades and shelters with proper ventilation are needed for vulnerable cattle (calves, kids, pregnant and lactating group).
- Pastoralists are advised to move their herd to and from grazing and watering points during early morning or late afternoon when the environment gets cooler.
- It is recommended to increase watering frequency for weak livestock herd than normal season.
- Promote provision of supplementary animal feeding and water supply
- Facilitate community awareness about expected rains to plant fodder, present animals for vaccination, harvest and conserve water & pastures.
- Promote rehabilitation and servicing of critical water sources or points
- Strengthen coordination of anticipatory action by multi-disciplinary/ sectoral agencies.
- Promote rehabilitation and servicing of critical water sources or points
- Promote resource mobilization efforts to support anticipatory actions
- Strengthen coordination of anticipatory action by multi-disciplinary/ sectoral agencies.

6. Agro-Climate Outlook to Crop Advisories

The agro-climate outlook for the upcoming JAS months indicates that rainfall in Siti and Erer zones is expected to begin during the third dekad[2] of July, while Fafan zone is likely to experience the onset of rain after this period. In contrast, Gabi Rasu (Zone 3) and Fanti Rasu (zone 4) of the Afar region is expected to receive rain starting from the second week of July. The cessation of rainfall across the agricultural areas of the Somali and Afar regions is anticipated to occur before the first dekad of September. The effective length of the growing period is estimated to range between 30 to 40 days in the Kiremt-benefiting zones of both regions.

Sorghum remains the primary staple crop across most agropastoral zones in the Afar and Somali regions. It is particularly crucial for food security among low-income households and serves as an essential source of livestock feed. Sorghum's drought resistance and adaptability to rainfed conditions with minimal inputs make it highly suitable for these semi-arid areas. According to Ethiopian Statistics Service (ESS, 2021), sorghum consistently ranks among the top two grains cultivated in these regions. However, farmers continue to face multiple challenges that limit productivity. These include reliance on traditional farming practices, limited access to improved seeds, fertilizers, and mechanization, poor seed quality, lack of row planting, late planting, and erratic rainfall patterns. As a result, yields often fall below one ton per hectare, significantly lower than the national average.

To address these challenges, it is recommended to promote the use of early-maturing and drought-tolerant sorghum varieties such as *Teshale* and *Dekeba,* enhance farmer-led seed multiplication initiatives, and strengthen climate advisory services by linking seasonal forecasts with timely agricultural advice. For the Kiremt 2025 season, four short-maturing sorghum varieties—ESH-1, ESH-2, *Teshale,* and *Melkam*—were evaluated for their suitability considering the anticipated late onset and early cessation of rains. Among these, ESH-1 is expected to be the best-performing variety this season, with potential yields ranging from 10 to 20 tons per hectare under proper agronomic management.

Melkam is also strongly recommended, particularly in the lowlands and in mixed cropping systems, due to its historical high yields and superior biomass production. In the Afar Region, it is also recommended to use the preferred drought tolerant varieties like "*Seredo"* and "*Degalit*". For optimal productivity, it is advised to apply 50 kilograms of Urea and 100 kilograms of NPK fertilizer per hectare. The recommended planting configuration includes 15 cm spacing within rows, 75 cm between rows, and a planting density of approximately 8.9 plants per square meter. To minimize the risk of crop failure, planting should commence only after the effective onset of rainfall, which is expected between the last week of July and the first week of August in both regions. Continuous monitoring of local weather conditions, especially in late July, is essential to inform planting decisions.

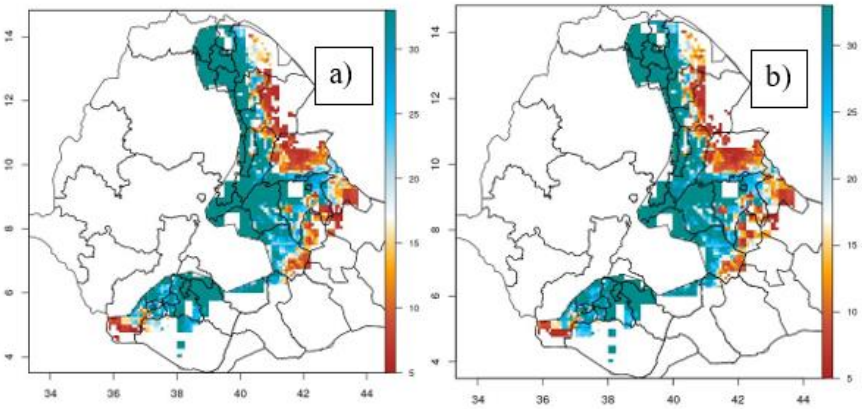


Figure 7 (a): ESH-1 variety *Figure 7 (b): Melkam variety*

[2] first dekad = the first ten days of the month, 1-10, second dekad = the second ten days of the month 11-20 & third dekad = the last ten days of the month 21-28/30/31

Additionally, farmers are strongly encouraged to implement water conservation practices, such as tied ridges or Zai pits, to maximize rainwater capture and retention throughout the growing period**. These practices will help mitigate the impacts of the short growing season and improve overall crop resilience.**

Advisory

- Begin planting only after the effective onset of rainfall, expected between the last week of July and the first week of August, to avoid crop failure due to erratic rains.
- Use varieties such as ESH-1*, Melkam, Teshale,* and *Seredo* that are well-suited for short growing seasons and dry conditions.
- Use 50 kg/ha Urea and 100 kg/ha NPK, with a planting spacing of 15 cm between plants and 75 cm between rows, aiming for 8.9 plants/m² for optimal yield.
- Adopt smart agricultural practices such as tied ridges or Zai pits to enhance rainwater retention and improve soil moisture during the short rainy season.
- Link seasonal forecasts with timely agricultural guidance through extension services to support decision-making and increase climate resilience.

7. Climate Security Advisory

The pastoral lowlands of Ethiopia experienced significant rainfall deficits during the March–May 2025 season. The cumulative impact of these consecutive dry periods now poses heightened climate security risks. Although the July–September 2025 forecast indicates mostly normal rainfall across the JJAA rainfall beneficiary pastoral zones, specific areas remain a concern. Borana is expected to cold and dry (called *Adolessa* season), while most Somali regions will continue to face dry conditions, with only isolated pockets likely to receive Karan[3] rainfall. The combined effects of the previous rainfall deficits and the current dry outlook are expected to place additional pressure on already depleted water sources and degraded pastures. Areas that benefited from localized rainfall during March–May—such as South Omo, eastern Borana, and the southern tips of Dolo and Shebelle—are likely to become key convergence points for migrating pastoralists from surrounding drought-affected regions. This concentration of livestock and people may intensify competition over limited resources, significantly increasing the risk of inter-community disputes and violent conflict. The Somali region is particularly vulnerable due to prolonged dryness and limited prospects for pasture regeneration. As a result, migration pressure is expected to increase toward areas with positive *Kiremt* rainfall anomalies, potentially leading to uncoordinated livestock movements and disputes over grazing rights and water access.

Advisory

- **Strengthen Community-Based Conflict Resolution Mechanisms:** Enhance the engagement of local citizens in governance systems that address climate security issues. This includes empowering local peace committees and customary institutions to mediate emerging disputes and facilitate agreements on the shared use of pasture and water resources.
- **Coordinate Cross-Border and Inter-Community Dialogues:** Facilitate dialogue between neighboring zones and regions (especially Afar, Somali, Borana, and South Omo) to support peaceful negotiation of migration routes and shared resource use agreements.
- **Support Livelihood Diversification and Resource Management:** Promote alternative income-generating activities and invest in sustainable rangeland management to reduce pressure on critical resources and strengthen community resilience. Mobilize resources for emergency water supply interventions, pasture restoration, and livelihood support, especially in areas affected by prolonged dryness and resource degradation.
- **Prepare Targeted Humanitarian and Security Support:** Ensure readiness for timely humanitarian interventions, conflict mediation support, and security sector engagement in areas most at risk of resource-based conflicts to prevent escalation.
- **Strengthen Rapid Response Capacities:** Prepare for the swift deployment of humanitarian, mediation, and security support in emerging hotspots. Ensure the availability of mobile veterinary services and feed support to protect livestock during migration and reduce potential losses.

[3] *Karan* is the rainy season in Somali and Afar region.

Conclusion

The July-Sep 2025 pastoral and agropastoral climate outlook shows late onset and early cessation with the below normal to normal rainfall distribution expected to lowlands which benefit from *Kirmet* seasonal rainfall. While the rest of the lowlands are projected to normally dry and with high temperatures, pastoralists should have to prepare for the heat stress. In contrast, Borana will experience the cold dry season with unseasonal rainfall in August. Pasture condition is considerably declining due to the negative Indian Ocean Dipole (IOD) which suppressed the rainfall distribution in lowlands during MAM season and expected to remain poor condition.

For agropastoral areas in Somali and Afar regional areas, planting locally preferred short maturing varieties on effective date of onset week is strongly encouraged and recommended to employ climate smart practices to conserve water resources. Similarly, with the deteriorating rangeland in the season pastoralists might be forced to move their herds to find natural resources, and this is expected to induce disputes. Administrative units in all neighboring regions should encourage community-based conflict resolution methods to resolve resource disputes, and proactive methods should be employed to avoid them.

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