

Central America and Haiti: El Niño-induced dry conditions Updated November 30, 2023 likely to result in two consecutive poor cropping seasons

Highlights

- Poor yields resulted for the recently completed *Primera* cropping season across the region due to persistent dry and hot conditions, significantly impacting smallholder and subsistence farmers.
- The *Segunda/Postrema* cropping season is currently underway, and there is concern across the region due to a continuation of hot and dry conditions in September followed by irregular and periodic torrential rains since October.
- Forecasts indicate the likelihood of average to below-average rains and hot weather through February 2024.
- If forecasts materialize, both the current *Segunda/Postrema* cropping season and upcoming *Apante* cropping season could experience poor yield outcomes with potentially severe food security implications.

Overview

Central America recently experienced a poor *Primera* cropping season from April to September, characterized by persistent below-average and irregular rainfall as well as above-average temperatures that contributed to high evapotranspiration rates, adversely affecting maize and bean crops. Some areas, including parts of Guatemala, western El Salvador, and northern Honduras, witnessed historically low rainfall totals (Figure 1 top-left), and some farmers chose to forego planting or abandoned their fields in the worst affected areas. While aggregate national cereal production remained near-average in El Salvador, Honduras, and Nicaragua, production was below the five-year average in Guatemala, and yield reductions were observed across all countries (Figure 1 bottom-left) with a notable impact on smallholder and subsistence farmers. With the start of the *Segunda* maize and *Postrema* beans seasons in September, Central America faced ongoing dry and hot conditions, causing planting delays. El Niño-induced below-average rains persisted into September but were followed by irregular and periods of sporadic high intensity rainfall from October (Figure 1 top-right), though the rains received have been generally insufficient to support normal crop development (Figure 1 bottom-right) and also elevate the risks of pests and disease. The rains also led to flash flooding that may adversely impact bean crops, which are predominantly produced during the *Postrema* season and are sensitive to excess moisture. Additionally, above-average temperatures are exacerbating dry conditions and contributing to reduced soil moisture levels. Below-average and irregular rainfall, along with high temperatures, are forecast to continue through February 2024, potentially resulting in a second consecutive season with poor yield outcomes.

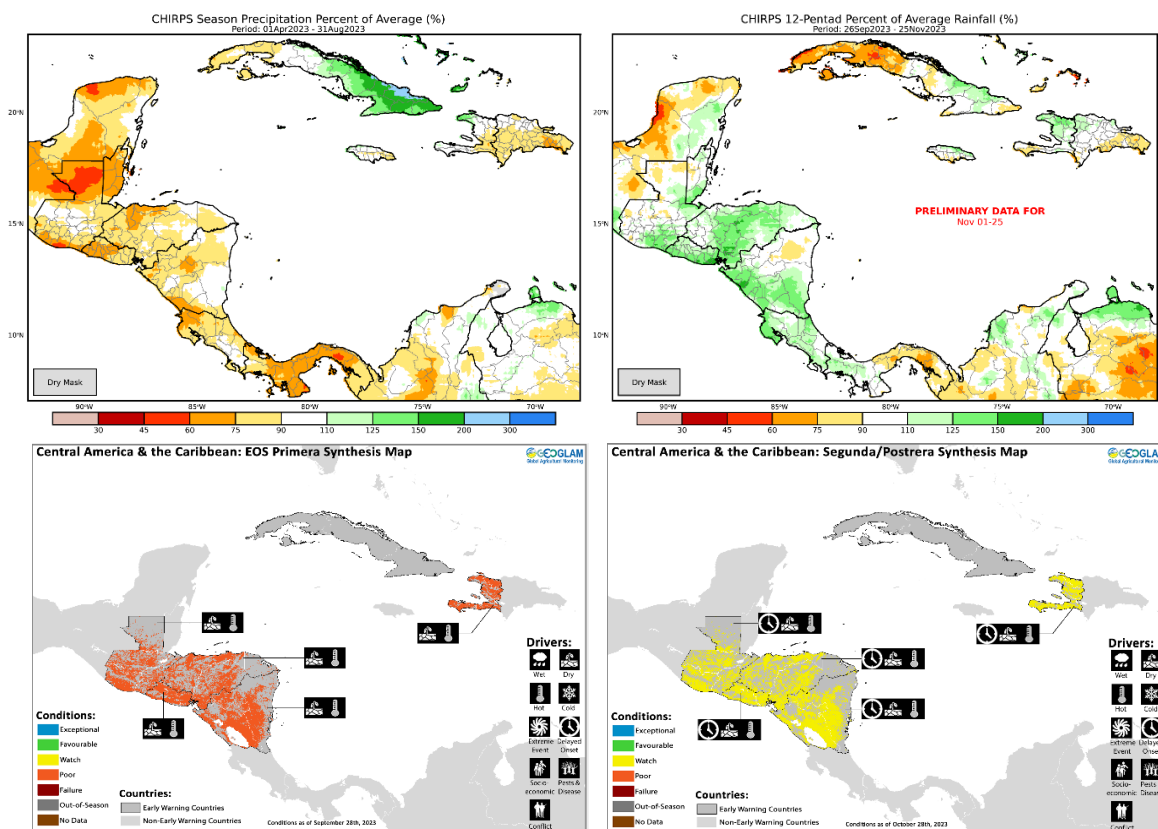


Figure 1: **Top left:** Percent of average precipitation for April 1st to August 31st, 2023. **Bottom left:** Crop condition map synthesizing end of *Primera* season maize and bean conditions as of September 28th. **Top right:** Percent of average rainfall for Sep 26th to Nov. 25th, 2023. **Bottom right:** Crop condition map synthesizing *Segunda* season maize and *Postrema* season bean conditions as of October 28th.

Previous Cropping Season Impacts: Poor *Primera* Yield Outcomes

Regional Summary

In Central America, yield declines resulted in all countries for *Primera* season (main season) maize and bean crops, which are typically planted from April and harvested by September, as the region experienced a combination of significant seasonal rainfall deficits, irregular rainfall distribution, and hot temperatures throughout the season (Figure 1 top-left and bottom-left), with significant impacts to smallholder and subsistence farmers. Even prior to the start of the *Primera* season, much of the region had been impacted by below-average rainfall amounts and distribution as well as above-average temperatures since late November 2022. While rainfall over the Pacific basin helped alleviate dry soil conditions for the start of the season in April, high temperatures contributed to elevated evapotranspiration rates, which made it difficult for soils to retain moisture. Some additional rains in late May helped to reduce some deficits, but not enough to provide substantial crop improvement.



Figure 2: Abandoned crop field and resultant overgrowth in El Progreso, Honduras due to insufficient rainfall received.

By July 2023, rainfall totals were among the lowest in 42 years across much of **Guatemala**, western **El Salvador**, and parts of northern **Honduras**. Some farmers ultimately decided not to plant due to the uncertainty of seasonal rainfall performance and potential losses. To increase the production capacity of smallholder farmers, the governments of several countries distributed free seeds and/or fertilizers to offset high input costs and boost yields in anticipation of drought conditions related to the transition to an El Niño event in July. In August, field trips and official information confirmed that crops were impacted in multiple stages of growth during the *Primera* season, and reports also confirmed irreversible crop damage despite the rainfall improvements towards the end of the season. The lack of rainfall required subsistence farmers to sow crops multiple times, and even large farms were affected by the irregular temporal distribution of rainfall. In some worst-affected areas, farmers abandoned their crops (Figure 2).

Towards the end of the season in September, some areas like the Pacific region of **Nicaragua** received only 30 percent of the expected seasonal rainfall. In parts of **Honduras**, the rainfall deficits in the north were severe enough to result in cracked soil (Figure 3). Conversely, crops in parts of central-western **Guatemala**, southern **Honduras**, and southeastern areas of **Nicaragua** were less severely impacted by the drought conditions, and heavy rains resulted in localized flooding in some areas during parts of the season. Harvesting finalized a month later than normal in October, and yield reductions were observed across all countries, particularly in the Dry Corridor and the Gulf of Fonseca region with a notable impact on smallholder and subsistence farmers. Although the rains were inadequate to support normal crop development in affected areas, aggregate cereal production at the national level remained near-average in **El Salvador**, **Honduras**, and **Nicaragua**. Conversely, according to the [November FAO CPFS report](#), **Guatemala** experienced a decline in aggregate production at the national level compared to the five-year average.



Figure 3: Despite August rains, the high temperatures in La Lima, Honduras led to cracked soil, prompting re-sowing activities.

Country Specific Impacts

In **Guatemala**, below-average rainfall and high temperatures had a significant impact on the start of the *Primera* season. A significant number of small-scale farmers in Chiquimula located in the east reported being unable to plant their crops, with some experiencing losses due to poor germination. Additionally, northern areas exhibited significant crop stress across several agrometeorological indicators. For example, Petén Department, which is an important grain producing area for the

country located in the north, experienced significant negative anomalies for vegetation greenness that fell far below the ten-year minimum (See Figure 4 top-left graph). Field information from UCSB/USGS/FEWSNET in July indicated that limited rains helped to reduce crop losses in the eastern departments of Zacapa, El Progreso, and Jalapa, especially for medium to large-scale farms. However, in these same areas, some small-scale farmers sowed two or more times due to the irregular distribution of rainfall received. Towards the end of the season in August, additional rainfall events included flash floods and landslides that disrupted harvesting activities. Overall, while the sporadic precipitation received in July and August benefited basic grain crops to some extent, water stress resulting from rainfall deficits and high temperatures caused delayed *Primera* season harvests and yield declines.

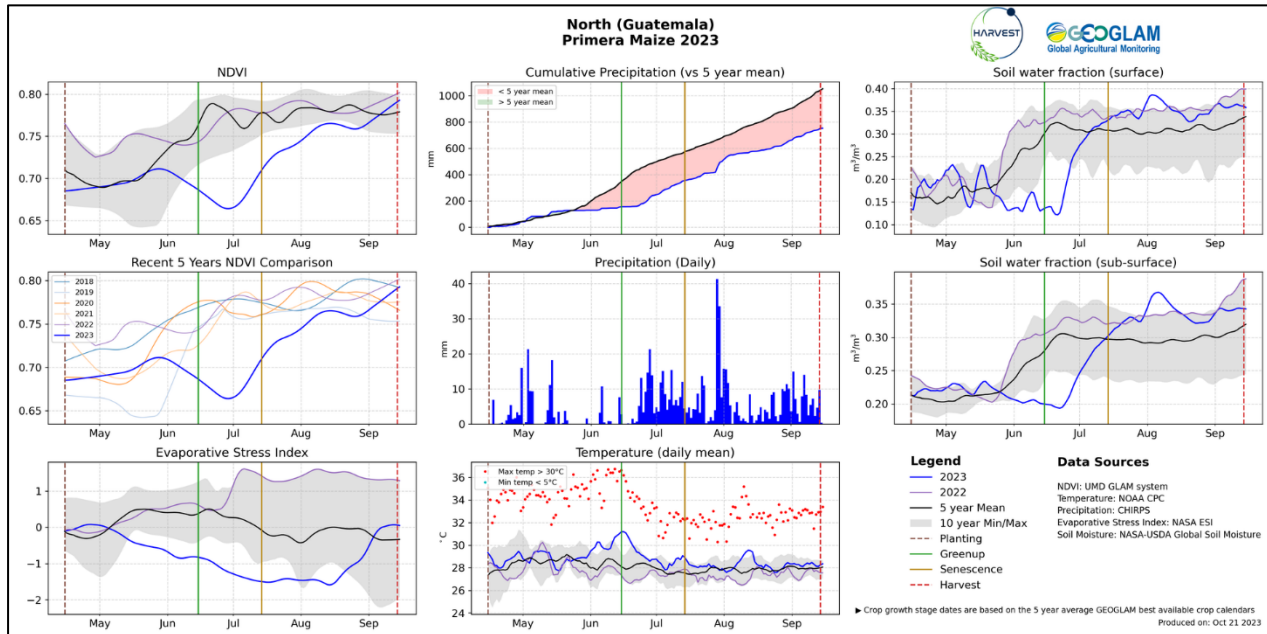


Figure 4. Agrometeorological indicators over the 2023 *Primera* cropping season in North Guatemala. Source: [NASA Harvest](#).

In **El Salvador**, El Niño-induced drought conditions from May to June, along with the peak of the summer heat in July known as the canícula period, resulted in significant *Primera* season yield losses. These dry and hot weather impacts also resulted in a decline in both *Primera* season maize and bean production, though outcomes were still near-average at the national scale.

In **Honduras**, below-average rains at the start of the season in April and May negatively impacted minor producing northern areas, though soil moisture levels were adequate in June in the main producing central-eastern Olancho and El Paraíso departments. In addition, limited fertilizer imports contributed to reduced domestic availability of fertilizer and increased prices. To combat this challenge, the government initiated a program to distribute free seeds to benefit at least 300,000 smallholder farmers. Enhanced precipitation in August improved crop conditions in the main producing central-western provinces of Comayagua, Cortés, and Intibucá. While near-average final production resulted at the national scale, yield reductions occurred for both maize and beans.

In **Haiti**, *Printemps* season maize and bean crops are typically planted from March and fully harvested by August. This year, planting activities were delayed due to below-average rainfall and limited soil moisture across the country as well as some limited availability of agricultural inputs. Heavy rainfall in early June, particularly in the Ouest and Centre departments, in combination with a 5.5 magnitude earthquake in the Grand'Anse department resulted in flooding and landslides that damaged crops in the maturation phase, which were already affected by drought conditions. While the enhanced rains helped to reduce deficits, generally irregular and below-average rains throughout the season and hot weather impacted the normal development of crops, particularly for small-scale and subsistence farmers. These poor weather outcomes, in combination with high input prices, inadequate public investments, and farmers' limited financial capacity, contributed to below-average yields and a decline in harvests. Additionally, main season (March to October) rice harvesting recently finalized under poor conditions as a result of late and below-average rains at the beginning of the season that resulted in limited availability of irrigation water supply and a subsequent yield decline.

Current Cropping Season Impacts: Concern for *Segunda/Postrema* Yield Outcomes

For *Segunda* season (second season) maize and *Postrema* season (second season) beans, which are typically planted from September and harvested by January, sowing was delayed at the start of the season, and there is now concern across all countries due to a continuation of hot and dry conditions in September followed by irregular and periodic torrential rains since October (Figure 1 top-right and bottom-right). In August and September, below-average rains persisted across much of Central America, especially along the border of **Honduras** and **Nicaragua** and in parts of **Guatemala**, including Petén, Sacatepéquez, Guatemala, and Chimaltenango Departments. While some areas received high rainfall amounts over a short

time period that helped to reduce deficits, it was not sufficient to support the typical planting schedule or the normal development of crops. Additionally, above-average temperatures over Central America, with records exceeded in many regions, have exacerbated the dry conditions and reduced soil moisture levels. Many subsistence farmers are still waiting for adequate soil moisture to begin planting, and large farmers are experiencing issues related to a lack of irrigation water supply.

Conversely, above-average rains in October led to flash flooding in southern **Guatemala** and the Alta Verapaz region just south of Petén, as well as in the Gulf of Fonseca region. In areas that plant for the *Postrera* season, this may impact bean crops which are sensitive to excessive moisture. In the Alta Verapaz region of **Guatemala**, this heavy rain led to landslides as well as interrupted harvesting activities and caused moisture damage to already harvested crops. Additionally, in late October, Tropical Storm Pilar caused persistent rainfall in areas of **El Salvador**, **Honduras**, and **Nicaragua** facing the Pacific coast before turning westward out to sea. High intensity rainfall events such as Pilar and other recent weather systems have brought additional intermittent heavy rains to parts of the region (See Rainfall Outlook Pg. 4). Forecasts indicate erratic rainfall conditions are expected to continue in late November, followed by average to below-average rainfall in December through the end of the *Segunda/Postrera* cycle through January 2024, and negative yield impacts are expected.

In **Haiti**, *Été* season maize and bean crops are typically planted from July and fully harvested by November. This year, the season began with concern due to the residual dry conditions from the previous season. Additionally, planting activities were likely affected by the limited availability of inputs such as seeds, which are normally sourced from antecedent spring *Printemps* season harvests. Despite some improvements in vegetation due to some rains received in September, particularly in the centre, cumulative amounts were below-average as of late September, and overall rainfall performance in September and October resulted in increased deficits over southern areas. Harvesting of *Été* season maize and bean crops is now underway and will finalize in November, and a combination of delayed and below-average rains and hot temperatures is expected to result in yield declines.

The *Apante* season is a third growing season starting from November through March during which beans are produced primarily in **Nicaragua** as well as parts of **Guatemala** and **Honduras**. The start of the *Apante* season has been mixed, and below-average precipitation is expected to persist over *Apante*-producing areas from December to February, likely impacting seasonal production outputs. Rainfall distribution outcomes through early next year will be critical for adequate crop development.

Rainfall Outlook

Below-average rainfall is forecast during the next two weeks in eastern Honduras, eastern Nicaragua, and western Guatemala, while Haiti and other areas in Central America may receive above-average rainfall (Figure 5-left). According to the U.S. National Weather Service, as of November 15th, stormy conditions in the southwestern Caribbean Sea may develop into a stronger system throughout the week (50% chance). Heavy rains could produce flash flooding and mudslides as the system moves northeastward, potentially impacting Haiti, other Caribbean island locations, and some coastal areas in Central America.

Forecasts indicate erratic rainfall conditions in late November, followed by average to below-average rainfall in December, according to the [extended range ECMWF forecast](#). During late October and early November, high cumulative rainfall has been reported over the Caribbean basin of Guatemala, Honduras, and Nicaragua. Farmers in flooded areas will need to wait for water levels to drop before beginning *Apante* season sowing activities, leading to delays in affected areas. Also, the reported excess moisture will reduce *Segunda* season crop yields in localized areas, due to the likely development of fungus during harvesting time.

There are concerns that below-average or irregular rainfall and above-average temperatures during the next several months may negatively impact the *Apante* season, which is an important season for bean production and regional market supply. Multi-model ensemble forecasts from the WMO (Figure 5-middle), NMME, and C3S all predict elevated chances of below-

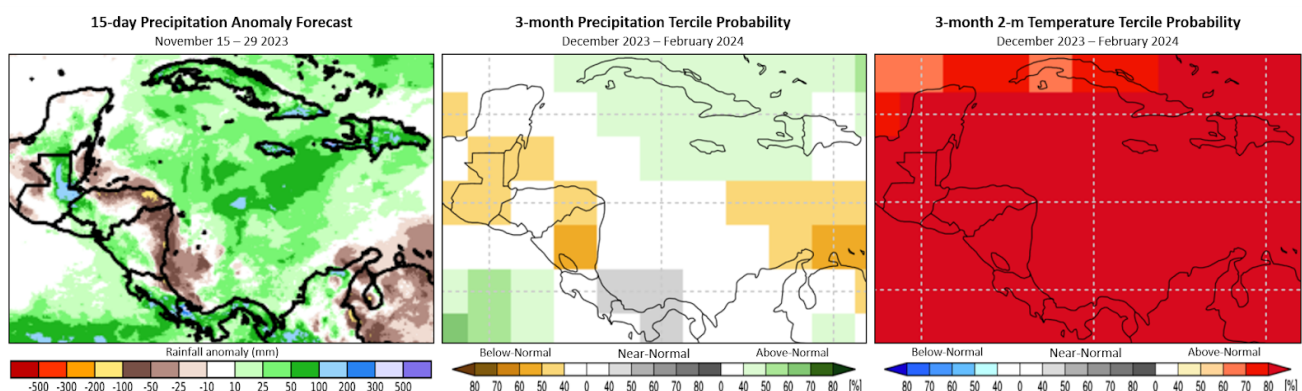


Figure 5: Left: A 15-day [CHIRPS-GEFS](#) rainfall anomaly forecast for Nov. 15th - 29th. Middle & Right: WMO probabilistic forecasts for Dec. 2023 to Feb. 2024 precipitation and 2-m temperature, based on models initialized in November. From the [WMO Lead Centre Long-Range Forecast Multi-Model Ensemble](#).

normal December 2023 to February 2024 (DJF) rainfall in Nicaragua, Guatemala, and in portions of Honduras and El Salvador, and this is consistent with dry outcomes during some past El Niños. The current El Niño event is strong and is forecast to continue into Spring of 2024. In Haiti, models currently indicate average to above-average rainfall during DJF 2023-2024. There are high chances that above-average temperatures will continue across the region (Figure 5-right), which can increase risks of crop losses from heat stress and rapid drying of soils.

Food Security Impacts

According to the [September](#) and [October](#) FEWS NET food security assessments, the poorest households in Central America, primarily located in the Dry Corridor of Guatemala, El Salvador, and Honduras, and in the highlands and Alta Verapaz in Guatemala, are expected to experience Crisis (IPC Phase 3) levels of food insecurity until the start of the *Segunda/Postre* harvest. Beginning in October, the domestic harvests will cause the prices of staple grains to decrease temporarily, and there will be more income-earning opportunities available until January 2024. Following the end of harvesting activities in January 2024, some households will shift to Stressed (IPC Phase 2) levels of food insecurity while others will remain in Crisis due to crop losses as well as persistently high food prices that will exacerbate the lean season. Additionally, subsistence farmers are expected to experience a decrease in both their *Primera* and *Segunda/Postre* crop production due to irregular and insufficient rainfall, worsened by unusually high temperatures. This will require these households to rely on market food supply earlier than normal, and food prices currently remain higher than the five-year average. An increase in labour demand with the start of harvesting activities in October will improve household income, but labour opportunities will be impacted by harvest volume. According to the latest IPC projection for Haiti, one of the most food insecure countries in the region, the country is forecast to have 44 percent of its population experiencing Crises (IPC Phase 3) or worse levels of food insecurity through February 2024.

Conclusions

Heightened monitoring is critical as Central America nears the end of the *Segunda/Postre* season and the beginning of the *Apante* season. Persistent dry conditions from late 2022 have significantly diminished the region's ability to recover, even when sporadic and sometimes high-intensity rains are received. Additionally, high temperatures are compounding the challenges of below-average precipitation as hot weather accelerates evapotranspiration rates and prevents soils from adequately absorbing and retaining moisture during rainfall events. These conditions have led to persistent deficits in soil moisture levels, making it increasingly difficult for farmers to achieve favourable cropping outcomes. The poorest households in the Dry Corridor of Central America are expected to face Crisis (IPC Phase 3) levels of food insecurity until the start of the *Segunda/Postre* harvest, which will bring temporary relief in staple grain prices and increased income opportunities from October to January 2024.

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