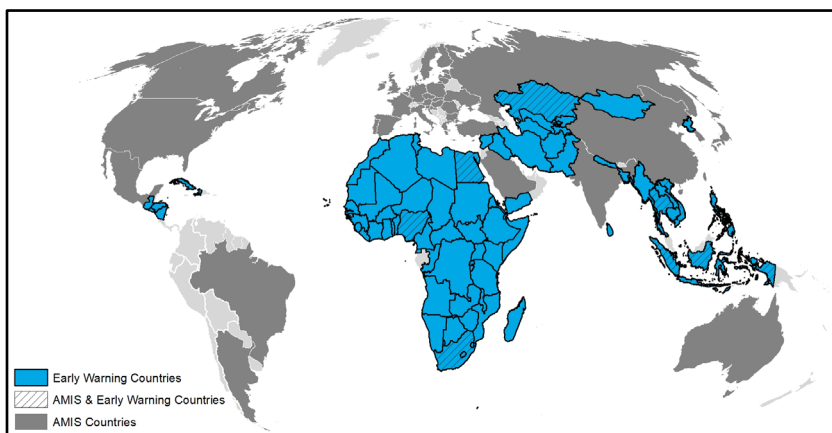


Crop Monitor

EARLY WARNING

Overview:

In **East Africa**, concern remains for *Belg* season planting in Ethiopia due to dry conditions during the start of the season and residual socio-economic challenges in the north. In the south of the subregion, concern remains for main season cereals in some areas due to the compounding impacts of several consecutive dry seasons from October to December 2020. However, above-average March rainfall brought unexpected and much needed relief to many deficit areas (See Regional Outlook Pg. 6). In **West Africa**, land preparation and planting for main season cereals is now underway in the south while harvesting of second season rice is wrapping up in the north, and overall conditions are favourable except in conflict-affected areas. In the **Middle East and North Africa**, dry conditions continue to impact crops in Morocco, Algeria, Tunisia, Syria, northern Iraq, and northern Iran with below-average production expected in some areas. In **Southern Africa**, harvesting of main season cereals is underway, and overall conditions are mixed due to persistent dryness in several central and western areas as well as the passage of Tropical Cyclone Freddy across parts of Madagascar, Mozambique, and Malawi that resulted in severe crop losses in affected areas (See Special Highlight Pg. 9). In **Central and South Asia**, concern remains for winter wheat in most areas due to ongoing dry and hot conditions, and planting of spring wheat will begin in April. In northern **Southeast Asia**, conditions are generally favourable for dry-season rice except in South Viet Nam due to slowly receding flood waters that have resulted in pests and diseases. In Indonesia, conditions are favourable for harvesting of wet-season rice. In **Central America and the Caribbean**, harvesting of *Segunda/Postera* season cereals mostly finalized in February under favourable conditions. Persistent dry conditions are causing concern for crop planting and development in Haiti and Cuba and are expected to continue throughout the subregion through July, likely resulting in an irregular start to the *Primera* season with high probabilities of delayed sowing activities (See Regional Outlook Pg. 14).



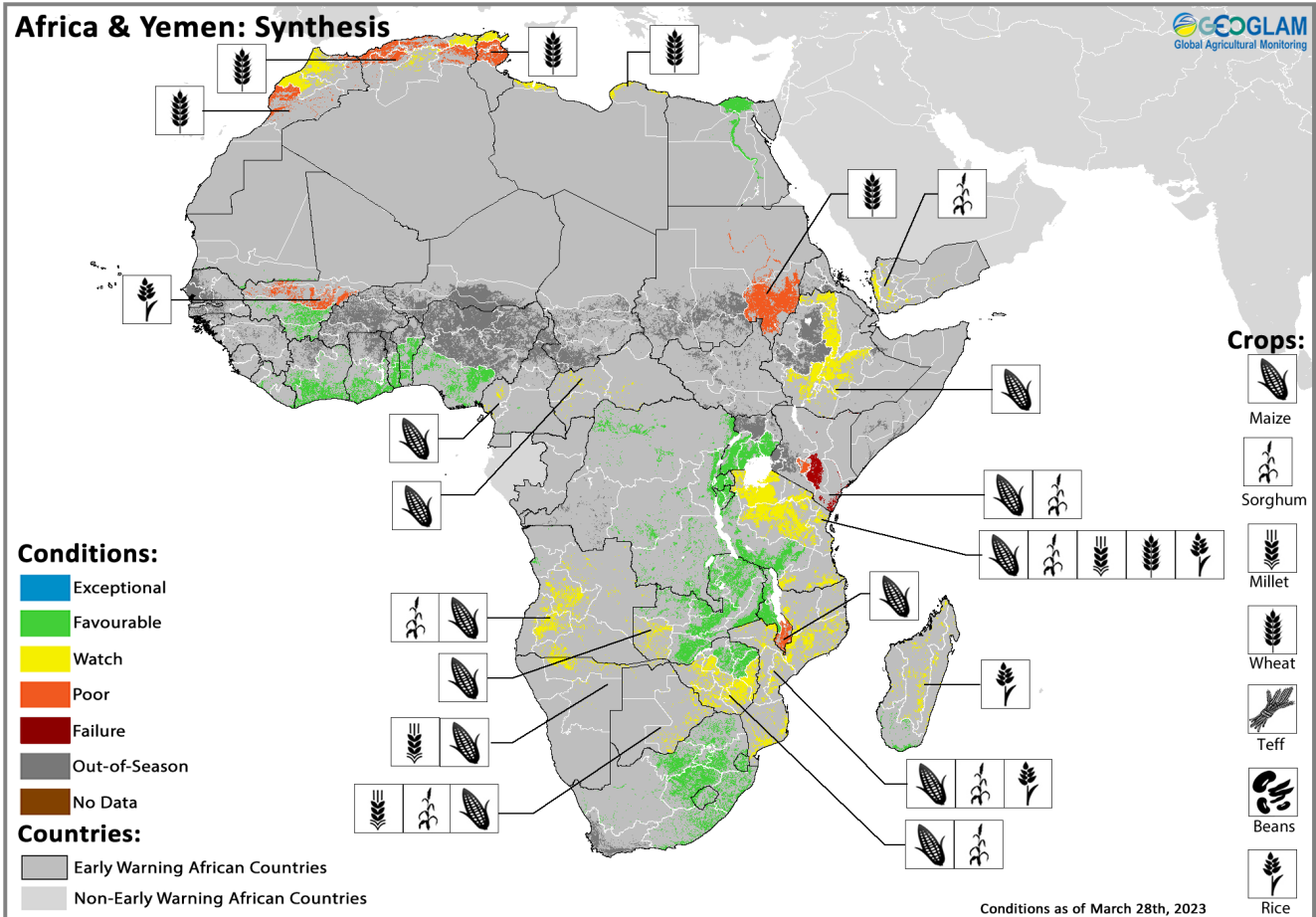
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GEOGLAM Crop Monitor for Early Warning

Crop Conditions at a Glance

based on best available information as of March 28th



Crop condition map synthesizing information for all Crop Monitor for Early Warning crops as of March 28th. Crop conditions over the main growing areas are based on a combination of inputs including remotely sensed data, ground observations, field reports, national, and regional experts. **Regions that are in other than favourable conditions are labeled on the map with a symbol representing the crop(s) affected.**

EAST AFRICA: Concern remains for *Belg* season cereals in Ethiopia despite improvement from recent rains in March. In the south of the subregion, planting of main season cereals is just beginning under mixed conditions due to impacts from several consecutive seasons of below-average rainfall since late 2020 and a mixed start of the season with wetter than average conditions across parts of Uganda, western Kenya, and western United Republic of Tanzania and drier than average conditions over southeastern United Republic of Tanzania and southern Kenya (See Regional Outlook Pg. 6).

WEST AFRICA: Land preparation and planting of main season cereals is just beginning in the south while harvesting of second season rice is nearing completion in the north, and overall conditions are favourable except in conflict-affected areas of the Central African Republic, Cameroon, and Mali.

MIDDLE EAST & NORTH AFRICA: Wheat crops continue to develop for harvest from April, and below-average yields are expected in parts of Morocco, Algeria, Tunisia, northeastern Syria and northern Iraq due to persistent dry conditions. Conversely, recent rainfall has improved conditions in central-western Iran.

SOUTHERN AFRICA: Harvesting of main season cereals is now underway, and conditions remain mixed due to persisting and, in some cases, extreme dryness in parts of Angola, Namibia,

Botswana, Zambia, Zimbabwe, and Mozambique. Conversely, the passage of Tropical Cyclone Freddy, which is likely the longest-lived tropical cyclone and most energetic storm on record, in February and March resulted in large crop losses in Madagascar, Mozambique, and southern Malawi (See Special Highlight Pg. 9).

CENTRAL & SOUTH ASIA: Concern remains for winter wheat development in most areas due to ongoing impacts of persistent dryness and high temperatures, except in Pakistan where conditions remain favourable. Land preparation for spring wheat is now underway.

SOUTHEAST ASIA: Dry-season rice crops are developing in the north under generally favourable conditions as crops in Laos and North Viet Nam have recovered from previous concerns regarding prolonged cold weather. In Indonesia, harvesting of wet-season rice is progressing at a faster pace than last year with good yields.

CENTRAL AMERICA & CARIBBEAN: Harvesting of *Segunda/Postrema* season cereals mostly finalized last month under generally favourable conditions except in Haiti, where poor outcomes resulted due to persistent dry conditions and high temperatures. Below-average rainfall is forecast across the subregion through July and is likely to result in an irregular start of the *Primera* season and delayed sowing activities (See Regional Outlook Pg. 14).

Global Climate Outlook: Two-week Forecast of Areas with Above or Below-Average Precipitation

The two-week forecast (Figure 1) indicates a likelihood of above-average rainfall over the US southern Great Plains and Southeast, northeast Mexico, coastal Ecuador, coastal Peru, central and eastern Brazil, central Algeria, southern Côte d'Ivoire, southern Ghana, southern Togo, southern Benin, southern Nigeria, the western Democratic Republic of the Congo, northwest Angola, southern Namibia, southern South Africa, Malawi, northern Mozambique, southern Tanzania, northern Somalia, Djibouti, western Yemen, central Saudi Arabia, northern Kazakhstan, and northern Australia.

There is also a likelihood of below-average rainfall over the western Prairies in Canada, the northwestern US, the Dominican Republic, Guatemala, Belize, Honduras, Nicaragua, Costa Rica, Panama, northern Colombia, Venezuela, Guyana, Suriname, French Guiana, northern and southern Brazil, Uruguay, northern and central Argentina, southern Chile, Norway, Sweden, Finland, Ireland, the United Kingdom, northwest Spain, France, Belgium, the Netherlands, Germany, Poland, Czechia, Slovakia, Lithuania, Latvia, Estonia, northern Italy, Sierra Leone, Guinea, southern South Sudan, northeast DRC, Uganda, western Kenya, southwest Ethiopia, southern Somalia, northern Tanzania, northeast Iran, eastern Turkmenistan, eastern Kyrgyzstan, Siberia and the Far East of the Russian Federation, Mongolia, northeast and southeast China, southern Japan, the northern Philippines, southern India, northern and coastal Myanmar, eastern Thailand, southern Laos, Cambodia, central Viet Nam, Malaysia, and Indonesia.

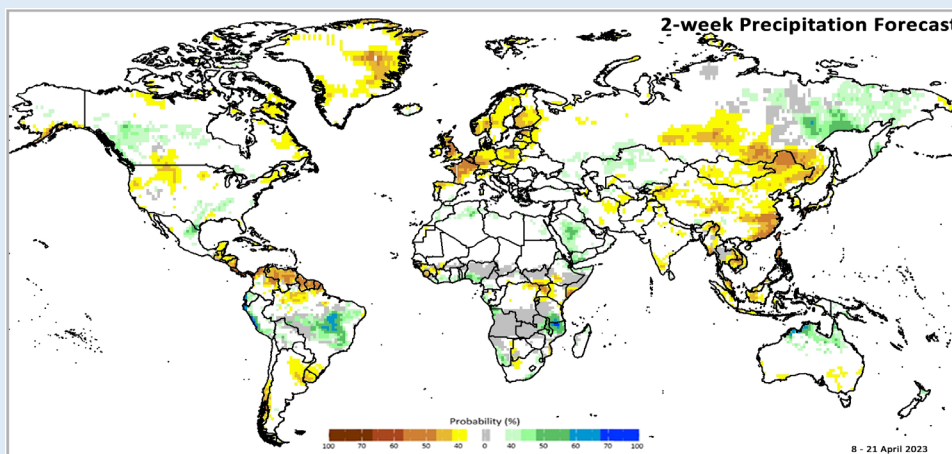


Figure 1: IRI SubX Precipitation Biweekly Probability Forecast for 8 – 21 April 2023, issued on 31 March 2023. The forecast is based on statistically calibrated tercile category forecasts from three SubX models. Source: [IRI Subseasonal Forecasts Maproom](#)

Climate Influences: ENSO currently in neutral state with a likelihood of El Niño conditions developing during late 2023

The El Niño-Southern Oscillation (ENSO) is currently in a neutral state. ENSO neutral conditions are expected through July. El Niño conditions may develop during the latter half of 2023, with a 61% chance of El Niño during August-September-October, according to the IRI/CPC forecast. While long-range forecasts made at this time of year can be unreliable, El Niño events can have widespread, global impacts. Should El Niño materialize, average to above-average rains could occur in Central Asia, southern North America, southeastern South America, southern Europe, eastern East Africa, and southern and eastern China. Average to drier than average conditions could occur in Central America, the Caribbean, northern South America, Southern Africa, the Maritime Continent, and Australia. Source: UCSB Climate Hazards Center

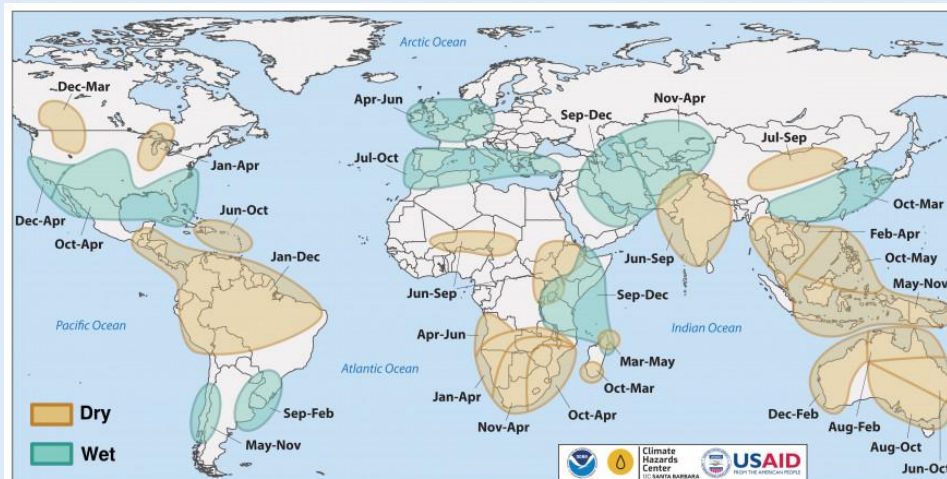
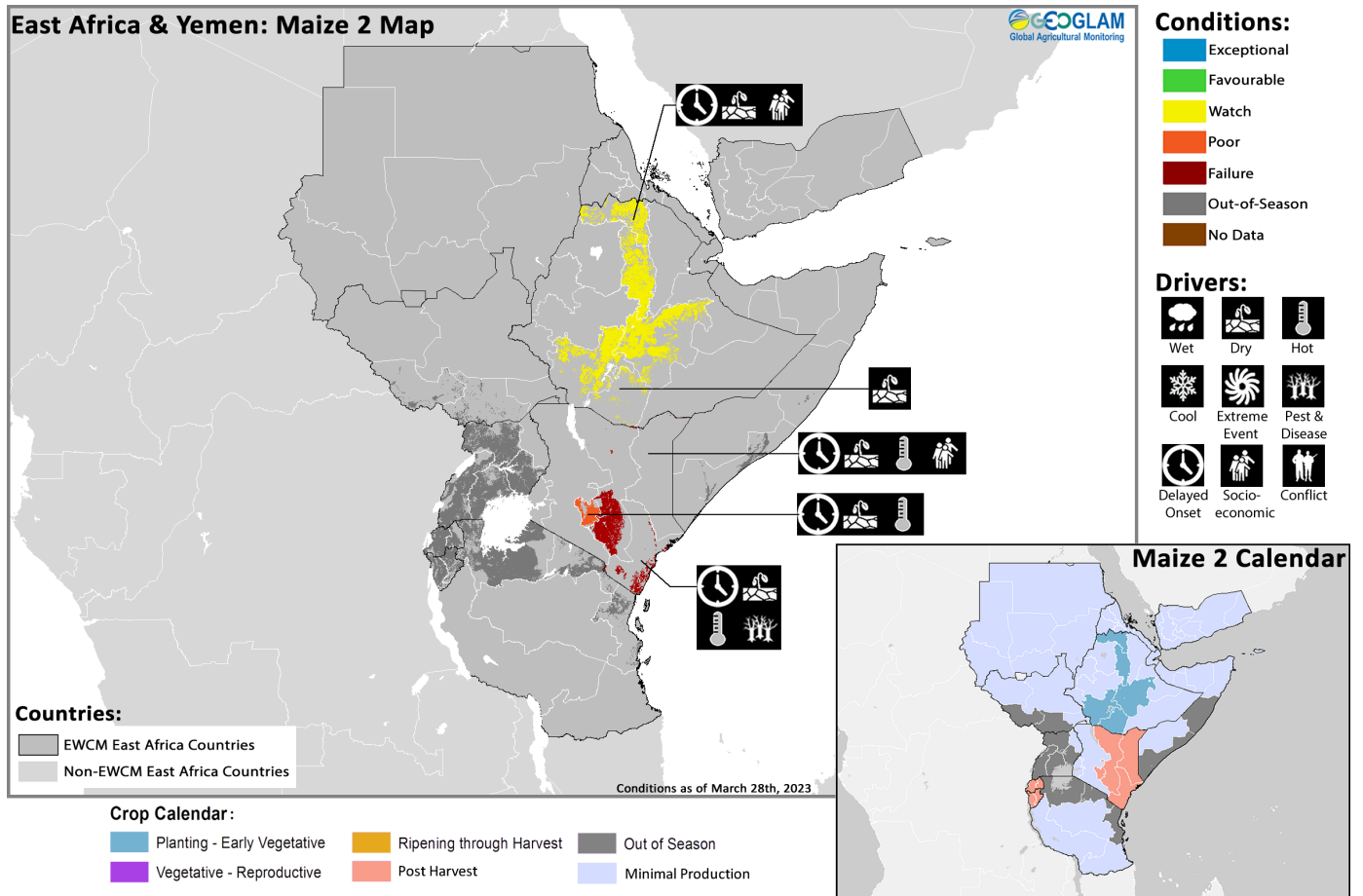


Figure 1. Areas of dry and wet conditions during El Niño phase of ENSO. Source: NOAA & CHC & FEWS NET

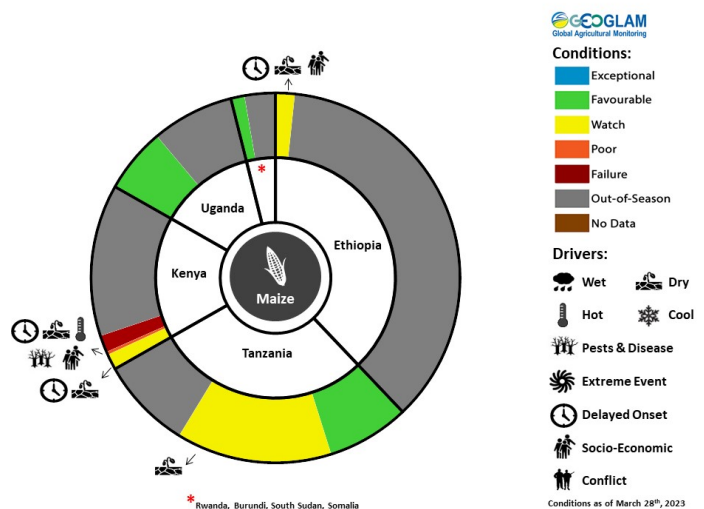
East Africa



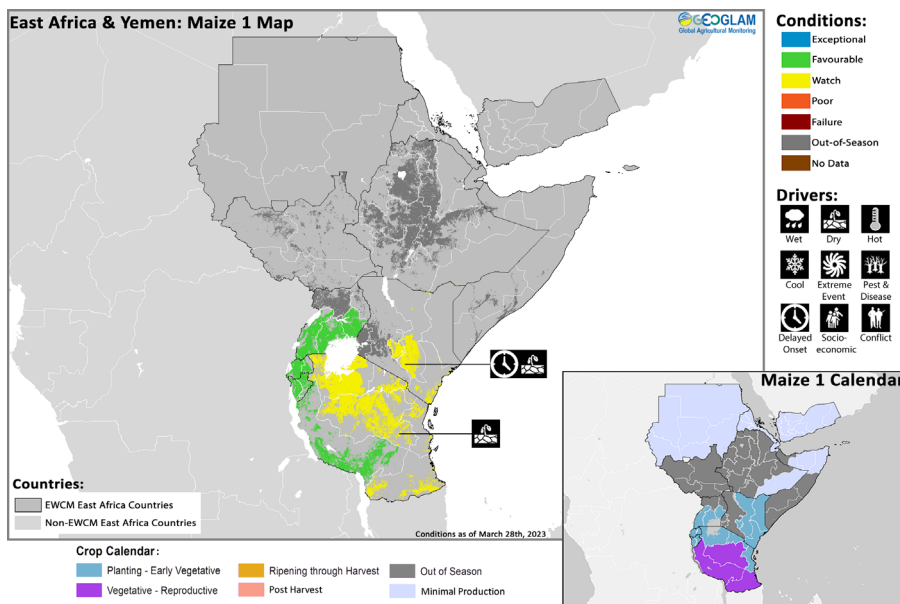
Crop condition map synthesizing Maize 2 crop conditions as of March 28th. Crop conditions over the main growing areas are based on a combination of inputs including remotely sensed data, ground observations, field reports, national, and regional experts. **Conditions that are other than favourable are labeled on the map with their driver.**

Across the north of the subregion, harvesting of wheat crops continues in **Sudan** with below-average yields expected due to reduced plantings in favour of other crops. Planting of *Belg* season cereals continues in **Ethiopia** for harvest from June, and there is continuing concern due to dry conditions at the start of the season as well as residual socio-economic challenges relating to the conflict in the north. Planting of main season sorghum has begun in **Yemen**, and there is concern as socio-economic challenges related to the conflict situation are likely to impact the agricultural growing season.

Across the south of the subregion, harvesting of Short Rains maize crops finalized in **Kenya** with below to well below-average yields due to the impacts of several consecutive poor rainfall seasons since late 2020. Planting of main season cereals is now underway in **Kenya, Rwanda, Burundi, Uganda,** and the **United Republic of Tanzania** with concern in south and coastal areas of **Kenya** and the **United Republic of Tanzania** due to continuing dry conditions. Conversely, conditions remain favourable in **Burundi** and the southwest of the **United Republic of Tanzania** and have improved in **Rwanda** and **Uganda** as March rainfall was above-average in many parts of the subregion, bringing unexpected and much needed relief to many deficit areas. However, the recent rainfall has resulted in overflows of the Jubba River as of late March, impacting parts of **Ethiopia** and **Somalia**. Heavy rains in the Ethiopian Highlands have further increased river levels in **Somalia**. The above-average rainfall is expected to continue through mid-April across much of **Ethiopia**, northern **Somalia**, central and northern **Kenya**, **Rwanda**, and central and southern **United Republic of Tanzania** (See Regional Outlook Pg. 6).



For detailed description of the pie chart please see description box on Pg. 15.



Crop condition map synthesizing Maize 1 conditions as of March 28th. Crop conditions over the main growing areas are based on a combination of inputs including remotely sensed data, ground observations, field reports, national, and regional experts. **Conditions that are other than favourable are labeled on the map with their driver.**

economic effects of the conflict continue to impact agricultural activities. However, the recent ceasefire has generally improved the security situation and field access. In **Sudan**, harvesting of wheat is now underway and will be completed by April. While agro-climatic conditions are generally favourable, wheat production is forecast to be about 476,000 tonnes, about 30 percent below the previous year's average level due to reduced plantings in favour of legumes and spices, according to the March 20 CFSAM report. In **South Sudan**, land preparation and early planting is underway for first season cereals due to above-average rains received in March. The rainy season typically begins in April in southern bimodal rainfall areas of the Greater Equatoria region and in May in central and northern unimodal rainfall areas. This season, the rains started early in March, bringing above-average rainfall to bimodal areas. However, rainfall is expected to return to below-average levels across the south through June (See Regional Outlook Pg. 6). The security situation has shown signs of improvement since the ceasefire agreement was signed in 2018, and many displaced individuals have returned to their homes. However, the situation is still unstable, and there have been instances of organised violence in the Greater Upper Nile Region since August 2022. In **Yemen**, planting of sorghum crops is now underway, and while agro-climatic conditions are generally favourable, socio-economic challenges relating to conflict continue to impact agricultural activities.

Southern East Africa

In **Uganda**, planting of first season maize and millet crops continues in bimodal rainfall areas, and conditions have improved from the previous month due to beneficial rains received in March. However, the seasonal forecast indicates a likelihood of below-average rains through June (See Regional Outlook Pg. 6). Land preparation is underway for first season cereals in the unimodal north, and planting will begin in April. In bimodal minor agricultural areas of **Kenya** as well as in the centre, harvesting of Short Rains maize crops finalized under poor to failure conditions due to the compounding impacts of several consecutive dry seasons since late 2020 in combination with damage from Fall Armyworms in the southeast and socio-economic challenges relating to natural resource-based conflict in the north and northeast. Planting of Long Rains cereal crops is underway with concern as the seasonal rains have been delayed and below-average in the east. Conversely, rains in the west have been well above-average, resulting in flood damage across multiple unimodal rainfall areas in the west and centre as well as in parts of the east and north (See Regional Outlook Pg. 6). In unimodal major agricultural areas, land preparation is underway for Long Rains maize and rice crops, and planting will begin in April. In **Rwanda**, planting of Season B maize crops is ongoing, and conditions have improved from the previous month as much of the country received good rainfall in March, with the exception of parts of the east. In **Burundi**, planting of Season B maize and rice crops began in March under generally favourable conditions due to good rains received in the last month. However, a delayed start to the rains in the east may impact planting activities, and the delayed and below-average harvest of Season A crops has reduced both the amount of available land and seeds for Season B plantings. In **Somalia**, land preparation is underway for *Gu* season maize and sorghum crops, and planting will begin in April. Several areas received moderate rainfall from March 12, particularly in Gedo and Bay regions located in the southwest of the country (See Regional Outlook Pg. 6), signalling an early start of the *Gu* rains which typically last from April to June. In northern bimodal areas of the **United Republic of Tanzania**, planting and development of *Masika* season cereals and *Vuli* season sorghum crops continues for harvest from May, and concern remains due to ongoing dry conditions. In central and southern unimodal areas, *Masika* season cereals are in vegetative to reproductive stage, and conditions have been downgraded in the central and southeastern regions due to expanding dry areas. Below-average rains are forecast to continue through mid-April in parts of the north while rainfall improvement is expected in most of the recent deficit areas of the centre and south (See Regional Outlook Pg. 6).

Northern East Africa & Yemen

In **Ethiopia**, planting of *Belg* season maize continues for harvest from June with ongoing concern as the country continues to be impacted by several consecutive below-average rainfall seasons from late 2020, particularly in the south and northeast. This season's rainfall onset was delayed, and precipitation in February was below-average for most of the southwest and central areas. However, there has been some improvement in March in central, northeast, and eastern *Belg* regions as well as in pastoral and agro-pastoral regions of Somali, southern Oromia, Sidama, and SNNPR due to above-average rains. However, mid-March vegetation conditions were poor based on satellite observations, suggesting that little to no crops have been successfully established. The situation is further complicated by socio-economic challenges in the north, particularly in East Amhara and Tigray, where lingering socio-

Regional Outlook: Unexpected above-average rainfall received across parts of the region during March due to an active MJO with additional rainfall forecast in April

During recent weeks, above-average rainfall occurred in many equatorial and northern areas, while conditions in southeastern Kenya and eastern Tanzania were drier than average (Figure 1-left). Prominent rainfall surpluses, ranging from 50 to 100+ mm during the first 25 days of March, are estimated in central Ethiopia, Uganda, western and central Kenya, Rwanda, Burundi, and northwestern Tanzania. The enhanced rainfall received corresponds to 150-200% of average for this period. In eastern Tanzania, many areas received only 50-to-75% of typical rainfall amounts.

Intensification of rainfall during mid-March ushered the onset of seasonal rains across many western areas, after drier conditions had delayed onset by 1 to 3 dekads in western and southern Kenya, southern Uganda, northern Tanzania, and Rwanda. Atypically early rainfall onset occurred in southwestern South Sudan, northern Uganda, central-western Kenya, and some southern coastal areas in Kenya. In Ethiopia, the March rains benefitted central and southwestern cropping areas that had developed rainfall deficits during February, and also led to early rainfall onset in some southern and eastern Belg cropping areas.

The unexpected wet beginning to the 2023 March-to-May season was associated with a period during mid-to-late March when the Madden Julian oscillation (MJO) was active, strong, and in a phase conducive to ample rainfall in equatorial areas. The MJO can significantly impact weather in the tropics and extratropics as it circles the globe. The very wet MAM 2018 season is one good example. MJO-related impacts, however, are not predicted well beyond a lead time of several weeks.

During the next two weeks, wetter-than-average conditions are forecast to continue in southwestern, central, and northern Ethiopia, in portions of northern Somalia and in upstream areas of the Juba River, in Rwanda, and in portions of central and northern Kenya, according to the unbiased GEFS for March 28-April 11th (Figure 1-middle left). Above-average rainfall is predicted in most of central and southern Tanzania's recent deficit areas. Below-average rainfall is forecast in portions of southeastern Kenya and northeastern Tanzania, where late rains were observed as of March 20th, as well as in southern Somalia, central-western Ethiopia, and South Sudan through April 11th.

Seasonal climate model forecasts leading up to the MAM 2023 season showed elevated chances of below-normal rainfall across many equatorial areas, including in drought-affected areas of Kenya and southern Somalia. The latest forecasts are much less pessimistic. This includes a Western V Gradient (WVG)-based outlook based on NMME-forecast sea surface temperatures. From late 2022, such forecasts supported pessimistic long-range outlooks for MAM 2023 due to the expectation of strong negative WVG conditions. Between February and March, however, a transition from La Niña to ENSO-neutral conditions was observed, and the latest WVG forecast update also indicated a weaker WVG and a wider range of historical MAM rainfall outcomes.

At present, forecasts indicate the possibility of wide-ranging seasonal rainfall outcomes across the region, with elevated risks of both flooding and rainfall deficits. [Flooding in Kenya in March](#) already caused fatalities, loss of homes and livestock, and damaged infrastructure in multiple regions including Nairobi, Kisumu, Narok, and Garissa counties. Flooding has also occurred in the North, near Moyale, and in Marsabit and Mandera counties. The March WMO and ICPAC forecasts (Figure 1 middle-right and right) indicate elevated chances of above-normal rainfall in northern areas of the region that have already accumulated sizable surpluses, and below-normal April-May-June (AMJ) 2023 rainfall in some equatorial areas. Other model systems (NMME, C3S, ECMWF) also forecast elevated chances of above-normal AMJ rainfall, in Tanzania, in northern Ethiopia, northwestern Somalia, and in eastern Kenya. The latest CFSv2 forecast, from March 29th, indicates below-average April rainfall in coastal areas of Kenya and southwestern Somalia. Due to the mixed dry and wet conditions observed during March, close monitoring of observed rainfall and short-range forecasts is recommended.

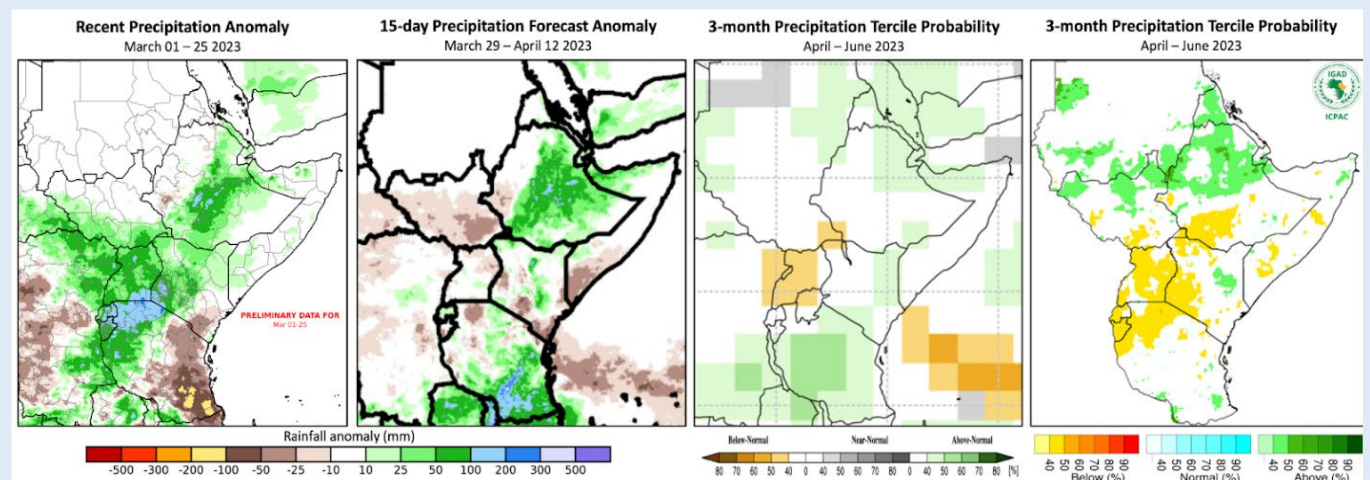
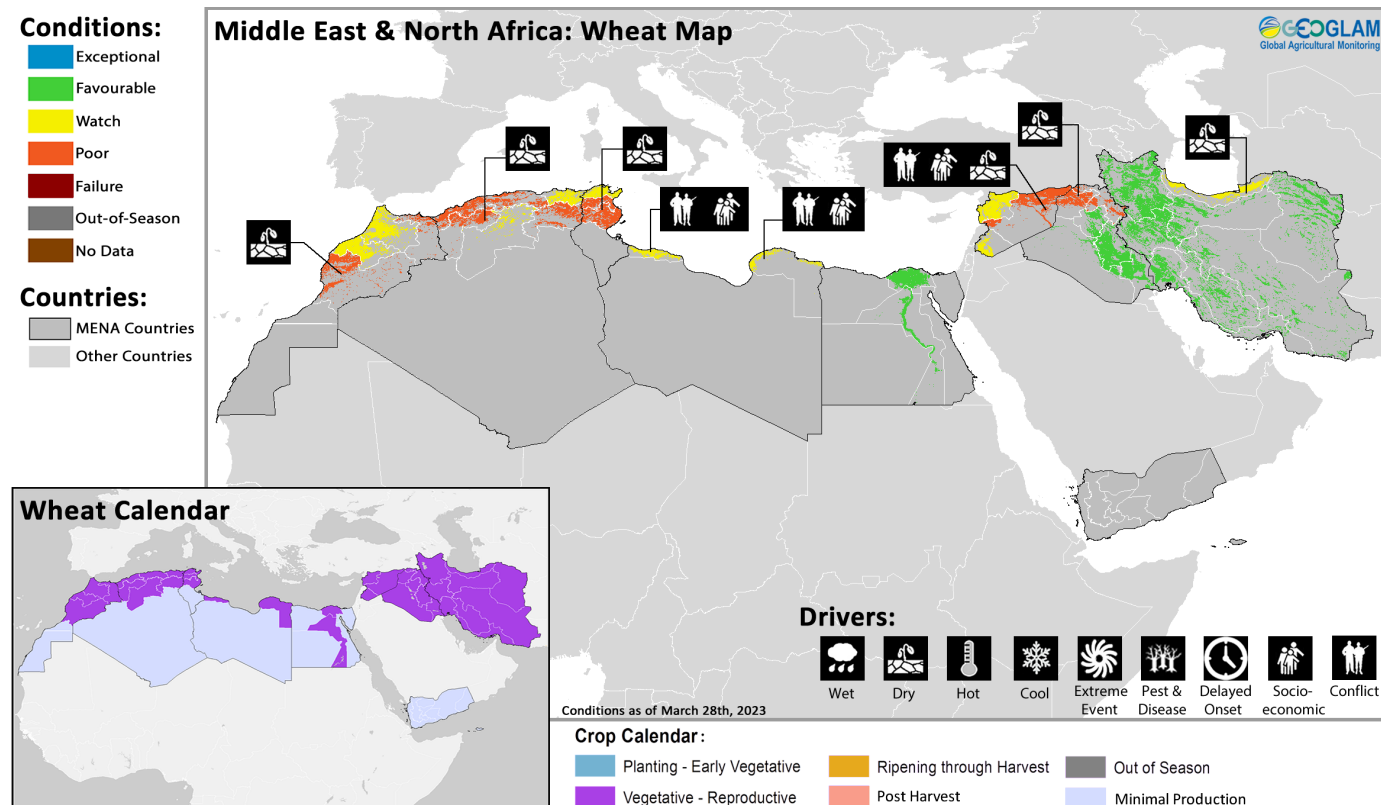


Figure 1. March 1st-25th rainfall anomaly, a 15-day rainfall anomaly forecast, and 3-month WMO and ICPAC rainfall probability forecasts. The far-left panel shows preliminary CHIRPS rainfall for March 1st to 25th, 2023, compared to the 1981-2022 CHIRPS average. The left-middle panel shows a 15-day CHIRPS-GEFS (unbiased GEFS) forecast from March 29th, with values indicating how the forecast compares to the CHIRPS average for this period. The right-middle panel is a WMO probabilistic forecast for April-to-June 2023 precipitation, based on models initialized in March. From the [WMO Lead Centre Long-Range Forecast Multi-Model Ensemble](#). The far-right panel is an [IGAD Climate Prediction and Applications Centre \(ICPAC\)](#) probabilistic forecast for April-to-June 2023 precipitation. Source: UCSB Climate Hazards Center

West Africa

In the south of the subregion, planting of main season maize and rice is now underway in **Liberia, Cote d'Ivoire, Ghana, Togo, Benin**, southern **Nigeria**, and the **Central African Republic**. Planting of second season maize crops is also underway in southern **Cameroon**. While agro-climatic conditions are generally favourable for the start of the season, conflict continues to impact agricultural activities in the **Central African Republic** and southwestern **Cameroon**. Elsewhere in the south, land preparation is underway for main season cereals, and planting will begin in April. Additionally, according to the CHIRPS preliminary totals from March 1 to 25, the southern part of the subregion from **Liberia** to the **Central African Republic** has received good precipitation amounts ranging from 50mm to more than 200mm. In the north of the subregion, harvesting of second season rice crops is nearing completion in **Mali** and **Mauritania**, and conditions are favourable except in central **Mali** where ongoing conflict resulted in below-average yields.

Middle East & North Africa

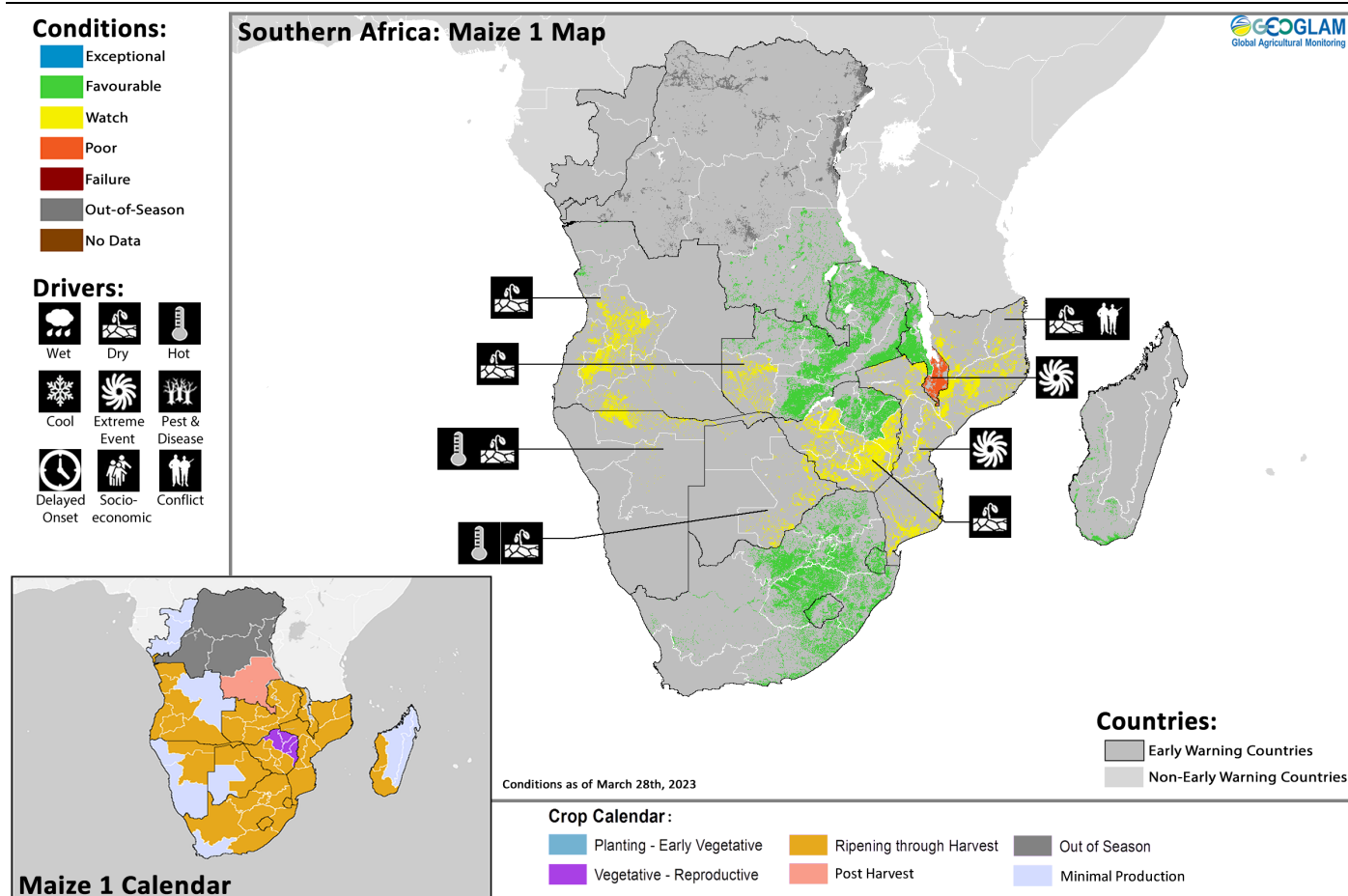


Crop condition map synthesizing wheat conditions as of March 28th. Crop conditions over the main growing areas are based on a combination of inputs including remotely sensed data, ground observations, field reports, national, and regional experts. **Crops that are in other than favourable conditions are labeled on the map with their driver.**

In the **Middle East and North Africa**, wheat crops for harvest from late April continue to develop under mixed conditions. Crops are unlikely to recover from persistent dryness in southwest and northeastern **Morocco**, parts of **Algeria**, central-northern **Tunisia**, northeastern **Syria**, and northern **Iraq**. However, forecast above-average rainfall for April and May in **Syria** and northern **Iraq** may lead to some crop improvement. In **Morocco**, large portions of the country have experienced below-average rainfall during the early part of the season, particularly in January. While February brought some relief in the northwestern region, rainfall was significantly below-average again in March. The generally low and sporadically distributed rainfall combined with above-average winter temperatures are expected to result in below-average yields, with the exception of some west and central areas such as Gharb, Tanger-Tetouan, Chaouia, and parts of Doukkala-Abda. In **Algeria**, conditions were mostly dry in March throughout the country, following irregular and below-average rainfall earlier in the season. Consequently, winter cereal growth has been delayed since the start of the season, and crop biomass is considerably below-average in most regions, with the exception of parts of the northeastern coast. In **Tunisia**, the current season's rainfall deficit since October has resulted in most regions experiencing their lowest total rainfall since 2001-2002. The dry conditions combined with above-average temperatures in the last month have severely impacted crop conditions, especially in the central-northern regions of the country, except for Bizerte. The national level crop yield is expected to be significantly below the five-year average. While agro-climatic conditions remain favourable in **Libya**, persistent socio-economic challenges continue to impact agricultural activities. In **Egypt**, conditions remain favourable for irrigated crops. In **Syria**, despite good rainfall in the north and south of the country in March, biomass of winter cereals is below-average in most of Hassakeh in the northeast, parts of Aleppo, Idleb, and Hama in the northwest, and in the south, particularly in Dara and As Suweida. However, winter cereals may benefit from the above-average rainfall forecast for April and May. Furthermore, following the February 6 earthquake, among other

infrastructure damages, a dam collapsed in the northwest, leading to the Orontes River overflow. Then on March 16, heavy rainstorms led to severe flooding in the northwest, causing damage to infrastructure, livelihoods, and agricultural land. In **Iraq**, conditions are favourable in the centre and south of the country as good rainfall resulted in average to above-average biomass. However, in the north, particularly in the main cereal-producing governorate of Ninewa in the northwest as well as parts of Dahuk and Erbil in the northeast, crop biomass is below-average due to generally poor rainfall performance despite some improvement in March. Only 50 to 60 percent of the average rainfall amount was received from December to February. However, forecast above-average rainfall for April and May could lead to some recovery in the north. In **Iran**, crops in the centre-west have improved from previous dry concerns due to improved rainfall in March. Additionally, while conditions were colder than average in January and February, temperature increases in March led to snowmelt in the northern provinces of Zanjan, Kordestan, Kermanshah, and Hamedan, benefitting crops. Biomass is near-average in most areas, except in Golestan in the northeast due to dry conditions since the start of the season.

Southern Africa



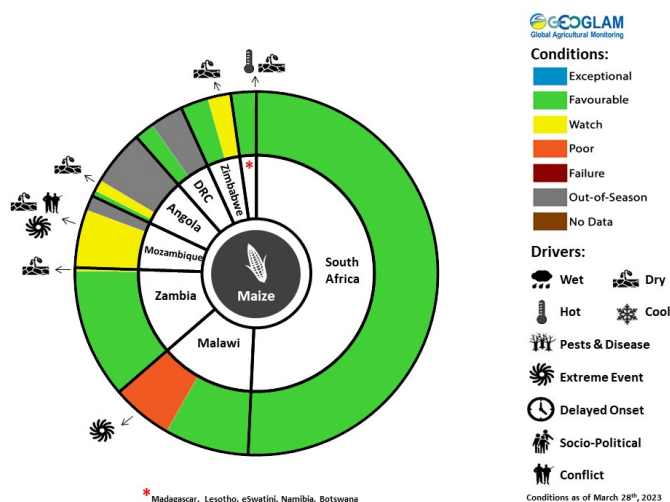
Crop condition map synthesizing Maize 1 conditions as of March 28th. Crop conditions over the main growing areas are based on a combination of inputs including remotely sensed data, ground observations, field reports, national, and regional experts. **Crops that are in other than favourable conditions are labeled on the map with their driver.**

In Southern Africa, harvesting of main season cereals is now underway in all regions, including **Angola, Namibia, Botswana, Zambia, Zimbabwe, Malawi, Mozambique, Madagascar, South Africa, Lesotho, and eSwatini**. Overall conditions are mixed due to persisting dry conditions in **Angola, Namibia, Botswana**, western **Zambia**, southern **Zimbabwe**, and northeastern **Mozambique**. Additionally, the passage of Tropical Cyclone Freddy, which is likely the longest-lived tropical cyclone and most energetic storm on record, in February and March impacted crops in **Madagascar, Mozambique**, and southern **Malawi** (See Special Highlight Pg. 9). In some areas, this season has been one of the driest in 40 years, with deficits exacerbated by a five-week-long dry spell as the passage of Tropical Cyclone Freddy drew moisture away from central and western areas of the subregion, including **Botswana** and **Zimbabwe**. According to the March SADC Agromet Update, cumulative rainfall during the 2022/23 rainy season has been below-average in central and western parts of the subregion as well as in northern **Madagascar** and northeastern **Mozambique**. Additionally, the current rainy season has been one of the driest since 1981 in southern **Angola**, northern **Botswana**, northern **Namibia**, and southwestern **Zambia**.

In **Angola**, significant rainfall deficits and above-average temperatures have persisted throughout February and March, leading to below-average vegetation conditions across most of the country, especially in Cuando-Cubango located in the southeast. The extended dry and hot conditions from February may significantly impact final production, despite earlier reports of near-average production due to favourable rainfall and increased plantings. While there was some improvement in rainfall in the first and second

dekad of March, the overall seasonal totals remain below-average. Cumulative rainfall has been below 40 percent of normal in Namibe, located in the southwest, and between 40 percent and 75 percent in Benguela, located in the centre-west. In **Namibia**, persistent dry and hot conditions continue to impact crop development. In **Botswana**, despite below-average cumulative rainfall, soil moisture levels are currently average to above-average in most areas due to good rainfall received in February. However, the poor rainfall distribution may still negatively affect crop production as the early-season dryness may have already caused irreversible damage. In northern **Zimbabwe**, favourable rainfall during the second half of the 2022/23 rainy season has benefitted crop development but also resulted in issues such as limited field access, soil leaching, weed infestations, and low application of agrochemicals in some waterlogged areas. In the south, heavy rainfall in February helped with moisture replenishment, although it may have also caused waterlogging in some areas. However, cumulative rainfall amounts remain below-average. In **Zambia**, conditions remain

generally favourable despite erratic rainfall received in February and March. However, persistent dry conditions may have affected the grain-filling stage of crops, particularly in western areas. In **Malawi**, conditions are mixed due to impacts of rainfall deficits in localized parts of the Northern region and flooding in the Southern region. While crops are generally in good condition in the Central region, particularly in central and northern districts, significant rainfall deficits in January and February negatively impacted crops. Conversely, Tropical Cyclone Freddy brought heavy rainfall to the Southern region in mid-March, resulting in flooding and crop damage. Access to inputs like commercial fertilizers is lower than normal due to high prices and reduced government subsidies. The government has reduced the number of beneficiaries in the subsidy program, and only 30 percent of beneficiaries had accessed inputs as of mid-January 2023, which is expected to result in reduced yields and production totals for maize. In **Mozambique**, there is concern across the country due to the passage of Tropical Cyclone Freddy in February and March (See Special Highlight Pg. 9) as well as ongoing dryness and conflict in the northeast. In **Madagascar**, rainfall has improved in the past month due to the passage of Tropical Cyclone Freddy, especially over the country's southern half, and seasonal rainfall totals are currently above-average, except in the northeast where seasonal totals are below-average. Heavy rainfall and flooding caused minor damage as the storm passed by the southwest coast in early March (See Special Highlight Pg. 9). In **South Africa**, conditions remain favourable due to above-normal rainfall since the beginning of summer, despite drier conditions during much of January and March. In **Lesotho**, generally good rains since the start of the season have led to favourable conditions. However, production is expected to be below-average as high prices of seeds and fertilizers resulted in reduced planted area. In the **Democratic Republic of the Congo**, harvesting of main and second season cereals is underway in the centre and southeast of the country while planting continues in the north and central-east, and agro-climatic conditions are favourable despite irregular rainfall distribution in the southeast. However, excessive rainfall in the South Kivu highlands, located in the central-east, and flooding in central areas have caused landslides and localized crop loss, particularly around Minembwe. Additionally, the displacement of populations has resulted in low household participation in the agricultural Season A, leading to less efficient harvests in the northeast and central-east regions of the country.



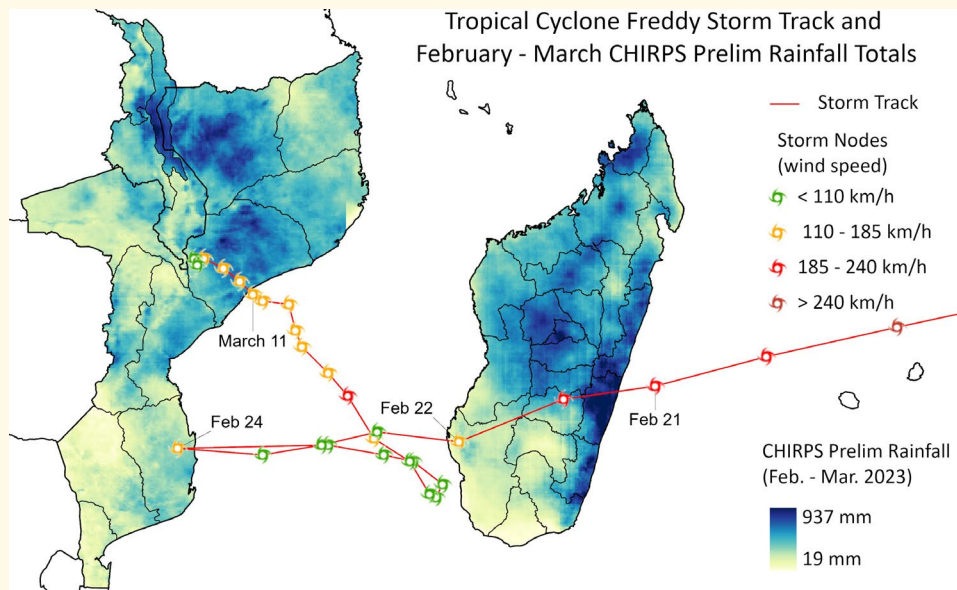
For detailed description of the pie chart please see description box on Pg. 15.

Special Highlight: Tropical Cyclones Cheneso and Freddy cause widespread damage and loss to main season crops in Madagascar, Mozambique, and Malawi

On January 19, Tropical Cyclone Cheneso made landfall in the Sava region along **Madagascar's** northeastern coast before moving southwestwards across the country. The storm then briefly entered the Mozambique Channel, peaking on January 26 before making landfall for a second time along the central-western coast of **Madagascar**. According to the [February 21 FAO rapid geospatial impact assessment](#), Cheneso impacted around 141,000 hectares of agricultural land, representing 4 percent of the country's total agricultural land, primarily in Boeny, Diana, Menabe, and Sofia regions. The floodwater and landslides caused by the cyclone destroyed crops that were just emerging and germinating, leading to the loss of around 1,400 rice fields, according to the [National Bureau of Risk and Disaster Management](#). Moreover, the flooding damaged or destroyed stored food, including rice, and inputs such as seeds and fertilizer meant for the lean season.

Then on February 21, Tropical Cyclone Freddy first made landfall on **Madagascar's** eastern coast. The storm weakened overland as it made its way southwestwards before entering the Mozambique Channel on February 22 where it restrengthened. According to the [March 14 OCHA Flash Update](#), the storm's impact was less than expected in **Madagascar**, and less than 5 percent damage has been reported in the agricultural sector following rapid water removal from crop fields. In total, 60,798 hectares of crops were affected by Freddy during February and early March.

Special Highlight continued



On February 24, Tropical Cyclone Freddy made landfall in Vilankulo district of Inhambane province of **Mozambique**, bringing significant rainfall and causing river levels to rise. The storm then returned once again to the Mozambique channel, passing near southwestern **Madagascar** before making a second landfall in southeastern Zambesia province of central **Mozambique** on March 11 as a severe tropical cyclone. In the most impacted areas of **Mozambique**, the storm brought four times greater precipitation than the average monthly amount, and Zambesia and Nampula received some of the highest rainfall in 40 years between March 11 to 15.

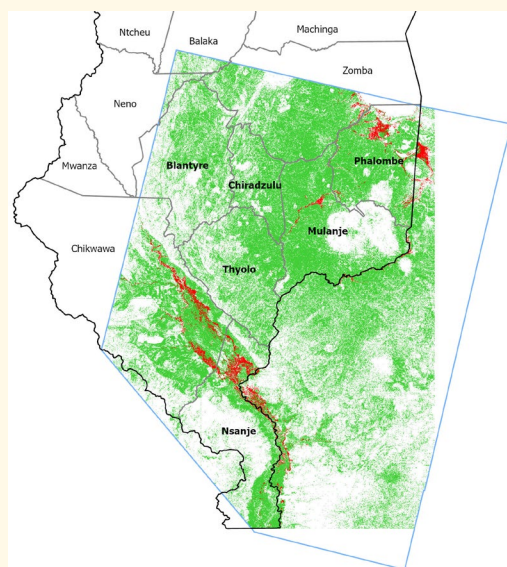
Figure 1. Tropical Cyclone Freddy storm track and CHIRPS February to March preliminary precipitation totals over Malawi, Mozambique and Madagascar. Source: GEOGLAM/ NASA Harvest

An estimated 144,000 hectares of crops were affected in Gaza, Inhambane, and Maputo, including 30,000 hectares in Inhambane alone, and an estimated 70,000 hectares were affected in Sofala.

Freddy then continued overland as a tropical depression and moved towards the Southern region of **Malawi** on March 12. The President declared a State of Disaster on March 13 following torrential rainfall, flooding, and mudslides. The storm then weakened to a low-pressure area before it dispersed completely on March 15. According to the [March 17 OCHA Flash Update](#), the storm brought the equivalent of six months of precipitation in six days, impacting the country at the end of the rainy season when water bodies were already at high levels. Tropical Cyclone Freddy caused significant damage to crops in several districts, including Blantyre, Chikwawa, Chiradzulu, Mulanje, Mwanza, Neno, Nsanje, Phalombe, Thyolo, and Zomba, affecting over 200,000 hectares of crops. Early reports suggest that up to 35,000 hectares of crops were completely destroyed, with ground reports indicating up to a 50 percent loss in many areas. However, the storm also brought much-needed relief to the southern areas, with over 400mm of rainfall received. Ground information indicates that many households have taken advantage of the inundated soils and planted rice, while others in southern areas plan to plant a second maize crop in the moisture-rich soils once waters have receded. Heavy rainfall continued in the week after the storm, leading to concerns about inundation, landslides, and river overflows. The ongoing heavy rainfall has also caused significant damage to infrastructure, including the complete destruction of a major bridge connecting to Nsanje, which has left the district entirely cut off. A total of 40 bridges across the Southern region have been reported as damaged.

The passage of Tropical Cyclone Freddy lasted for at least 35 days in total and is [likely the longest-lived tropical cyclone and most energetic storm ever recorded](#) after undergoing several periods of restrengthening events. According to the March SADC Agromet Update, over 385,000 hectares of croplands were potentially affected by flooding due to the passage of tropical cyclones and torrential rains in **Madagascar, Malawi, Mozambique, and Zambia**.

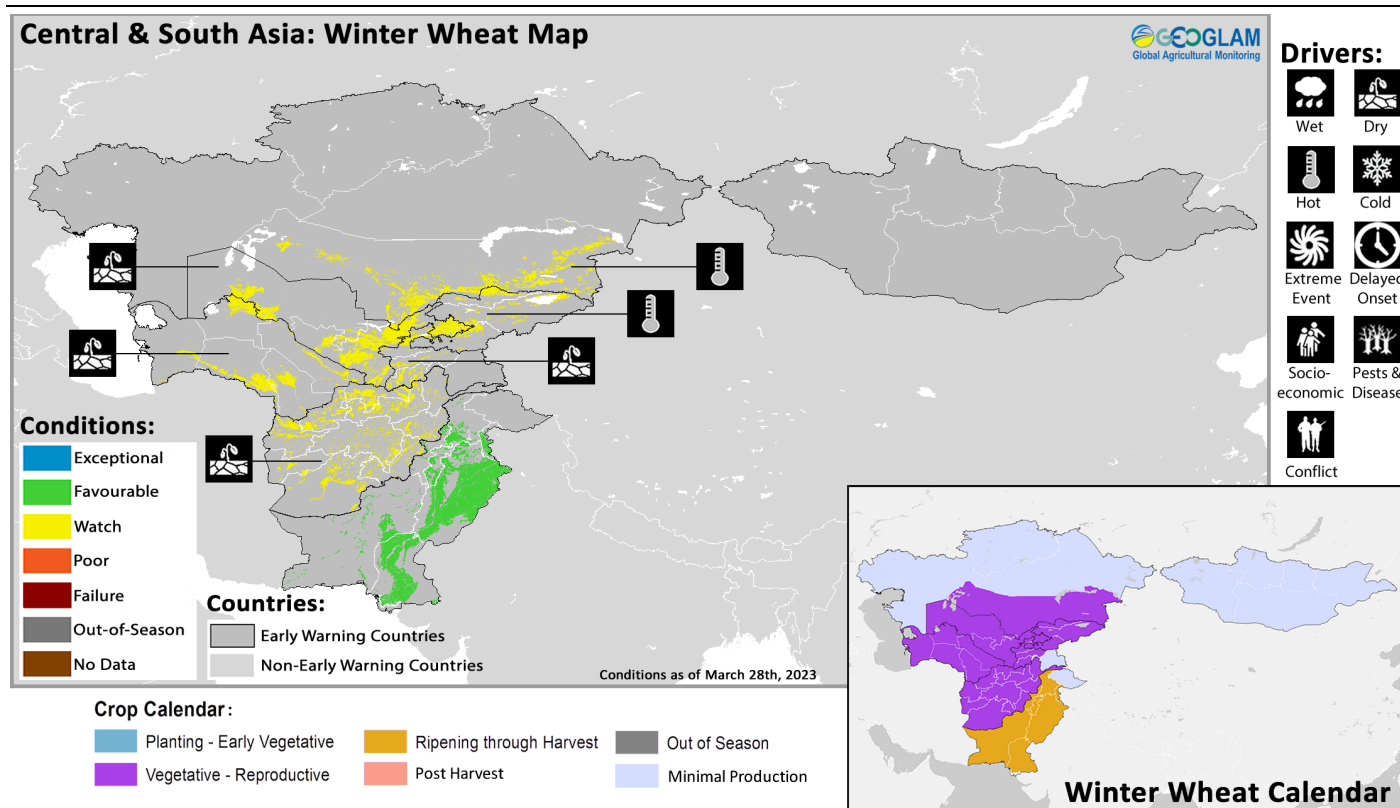
Figure 2. (Left) Flooded area extent over cropland in southern Malawi using satellite detected surface water from RCM from 3/14/2023 over the NASA Harvest cropland mask. Source: NASA Harvest. (Right- top, middle, bottom) Field photos of crop damage from Cyclone Freddy in southern region, Malawi. Source: FAO/NASA Harvest; FEWSNET



Legend for Figure 2:
 ■ RCM Capture Extent (2023.03.14)
 ■ Flooded Cropland Area (NASA Harvest cropland mask)
 ■ Non Flooded Cropland Area (NASA Harvest cropland mask)



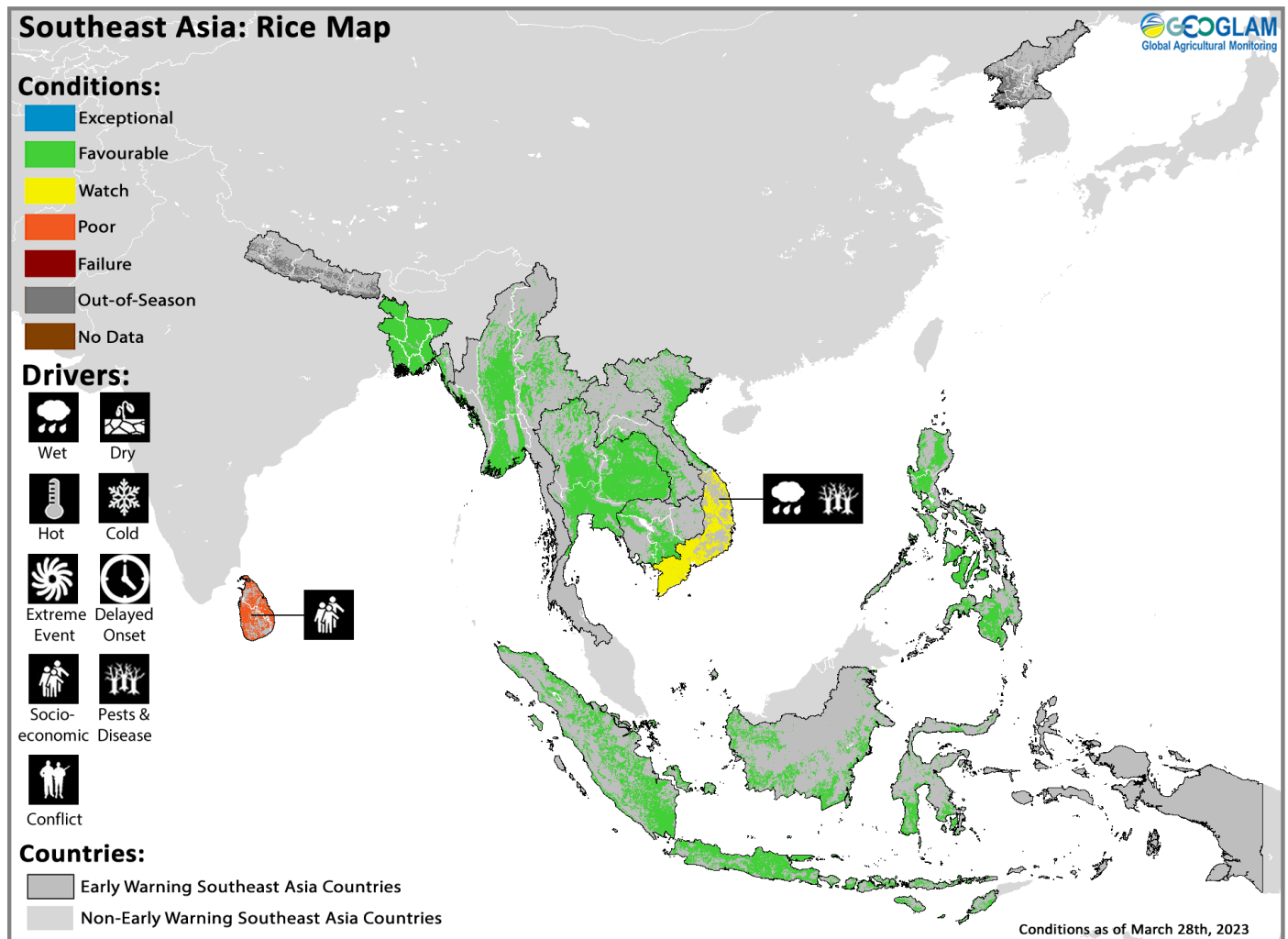
Central & South Asia



Crop condition map synthesizing Winter Wheat conditions as of March 28th. Crop conditions over the main growing areas are based on a combination of inputs including remotely sensed data, ground observations, field reports, national, and regional experts. **Crops that are in other than favourable conditions are labeled on the map with their driver.**

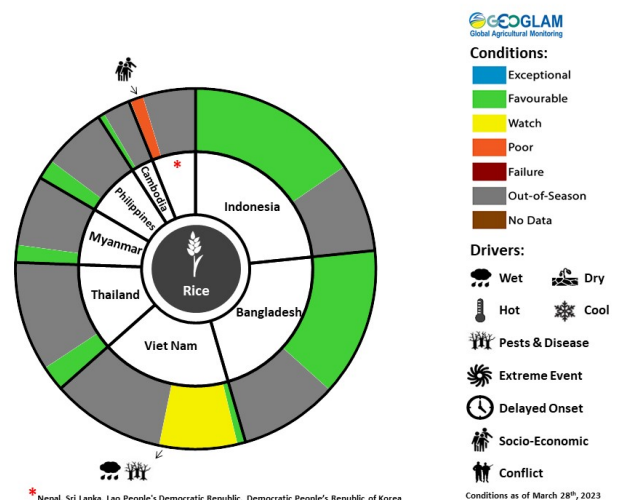
In Central and South Asia, harvesting of winter wheat is just beginning in **Pakistan** under favourable conditions, and the planted area is officially estimated at a near-average level. Elsewhere, crops continue to develop in southern **Kazakhstan**, **Uzbekistan**, **Turkmenistan**, **Kyrgyzstan**, **Tajikistan**, and **Afghanistan** with concern due to ongoing dry conditions in most areas as well as high temperatures in **Kyrgyzstan** and southern **Kazakhstan**. In **Afghanistan**, most parts of the country experienced below-average precipitation and snow depth conditions. Above-average temperatures caused snow to melt rapidly in some regions, resulting in record minimum levels of snow water volumes. However, forecast above-average precipitation through early April may help farmers to complete spring wheat planting. Land preparation is underway for spring wheat, and planting will begin next month in southern **Kazakhstan**, **Kyrgyzstan**, and **Mongolia**.

Southeast Asia



Crop condition map synthesizing rice conditions as of March 28th. Crop conditions over the main growing areas are based on a combination of inputs including remotely sensed data, ground observations, field reports, national, and regional experts. **Crops that are in other than favourable conditions are labeled on the map with their driver.**

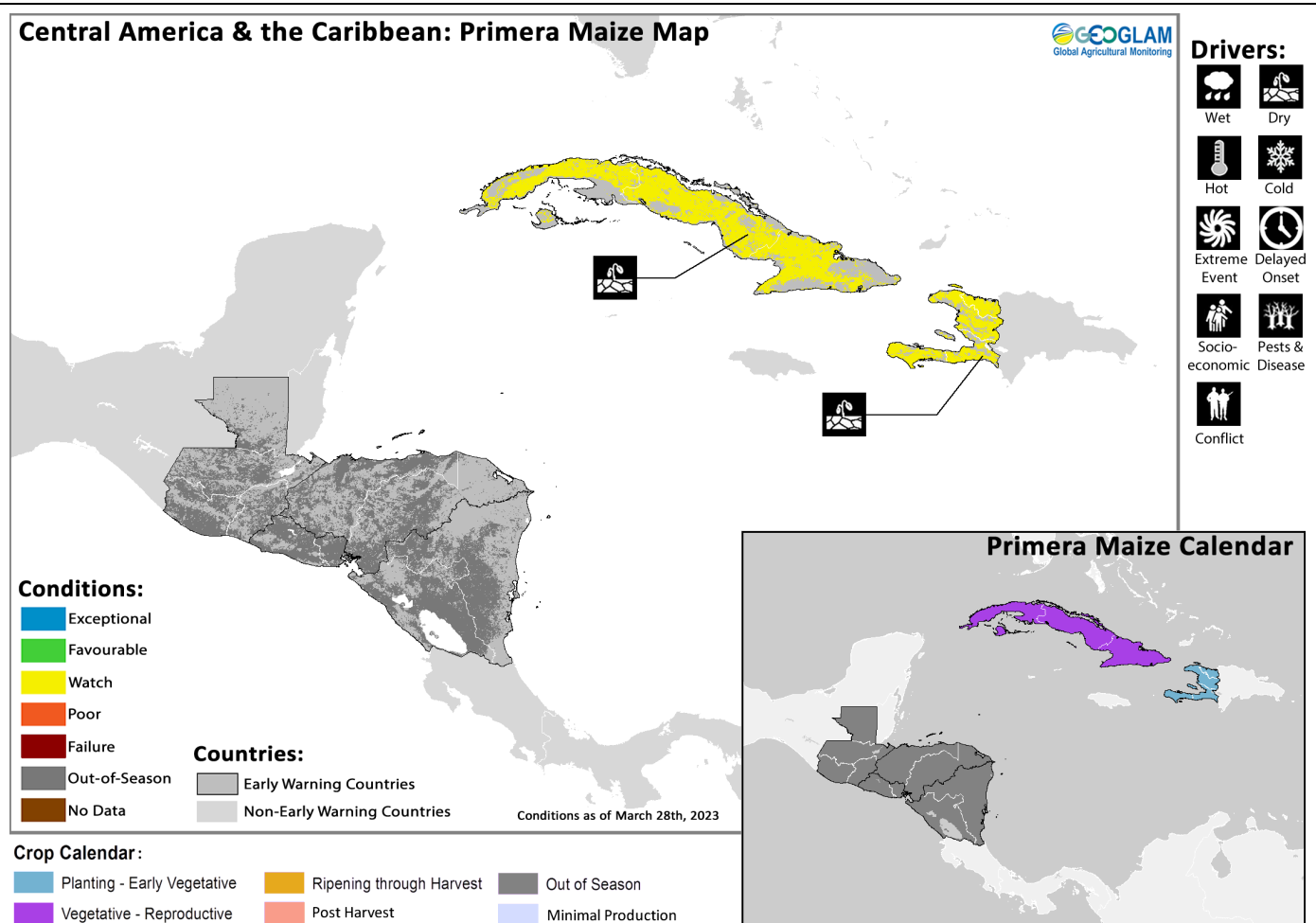
In northern Southeast Asia, the total planted area of dry-season rice is higher than the previous year due to sufficient irrigation water supply. Crops are now in the vegetative to harvesting stage under generally favourable conditions as crops in **Laos** and North **Viet Nam** have recovered from previous concerns regarding prolonged cold weather. However, there is now concern in South **Viet Nam** due to slowly receding flood waters that have resulted in pests and diseases. In **Indonesia**, sowing of wet-season rice is wrapping up with a total sown area increase of 6.5 million hectares, which is 3.2 percent higher than the previous year. Growing conditions are favourable due to sufficient irrigation water supply, particularly in the north. Harvesting of earlier sown wet-season rice is progressing much faster than last year with good yields due to sufficient sunlight during the growing period. Harvested area has reached 3.4 million hectares, which is 12 percent higher than the last wet season. In the **Philippines**, dry-season rice sown from November to December is beginning to be harvested under favourable conditions owing to average to above-average rainfall during the second half of February. In **Thailand**, dry-season rice is in the grain filling to harvesting stage with a total planted area of 1.7 million hectares, which is 35 percent higher than the national plan due to enough irrigation water. About 43 percent of the planted area has been harvested with generally good yields. However, some areas in the Northern and North Eastern regions have faced several periods of cold weather causing the delay in the panicle stage, uneven length of rice ears, and withered seeds. In **Viet Nam**, dry-season rice (winter-spring rice) is harvesting in the South under mixed



For detailed description of the pie chart please see description box on Pg.15.

conditions due to slow receding flood waters and reduced solar inputs from foggy weather. The harvested area has reached 0.29 million hectares out of 1.87 million hectares planted with an estimated yield of 6.5 tons per hectare. In the North, dry-season rice (winter-spring rice) is under favourable conditions due to good irrigation preparation. In **Laos**, planting of dry-season rice is nearing completion, and planted area has reached 96 thousand hectares accounting for 101 percent of the national production plan. The planted area has increased compared to the previous year due to sufficient irrigation water supply and farmers' expectations of a high market price. Crops are now in the young panicle forming stage, and growing conditions are favourable with a wide area of rainfall received in late February and sufficient sunlight for rice growth. In **Myanmar**, planted area of dry-season rice has reached 870 thousand hectares accounting for 81 percent of the national plan of 1.06 million hectares, and planting activities will be completed next month. Growing conditions are favourable, and harvesting of early-planted crops has started mainly in the delta region with a yield of 4.24 tons per hectare, similar to last year's level. In **Cambodia**, the final planted area of dry-season rice reached 682 thousand hectares, an increase of about 6.7 percent compared to the previous year. Growing conditions are generally favourable, and about 65 percent of the planted area has been harvested with average yield estimates at 4.6 tons per hectare, which is slightly higher than the previous year. In **Sri Lanka**, harvesting of *Maha* season maize and rice crops finalized in March under poor conditions due to limited access to agrochemicals during the growing season. The 2023 main *Maha* harvest is expected to increase from the previous year's low level but may remain below-average, according to the March 10 FAO Food Price Monitoring Analysis. Land preparation is underway for *Yala* season rice and maize crops, and planting will begin in April. In **Nepal**, harvesting of winter wheat is now underway while planting of maize crops continues for harvest from August, and overall conditions are favourable. In **Bangladesh**, both *Boro* and *Aus* season rice crops continue to develop under favourable conditions for harvest from mid-April. In the **Democratic People's Republic of Korea**, land preparation is underway for main season maize crops, and planting will begin in April.

Central America & Caribbean

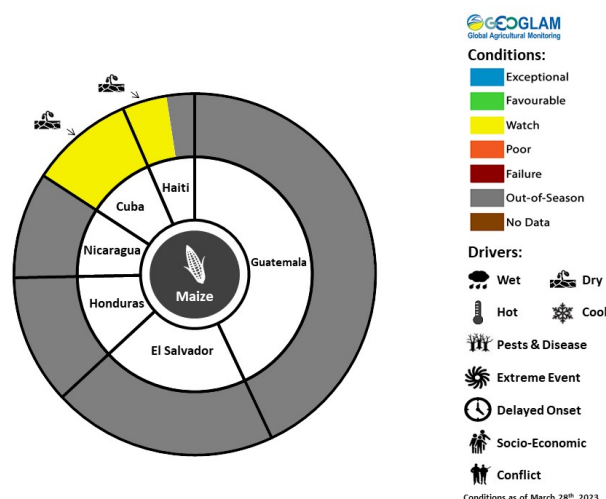


Crop condition map synthesizing Primera Maize conditions as of March 28th. Crop conditions over the main growing areas are based on a combination of inputs including remotely sensed data, ground observations, field reports, national, and regional experts. **Conditions that are other than favourable are labeled on the map with their driver.**

In Central America, harvesting of *Segunda/Postrema* season cereals mostly finalized in February under generally favourable conditions. Despite erratic rainfall distribution throughout the season in **Nicaragua**, production for the *Apante* season, accounting for 35 percent of annual bean production, is forecast to increase 5 percent compared to the previous year, according to the March 10 FAO Food Price Monitoring Analysis. In northern **Honduras**, harvesting of second season rice crops is still underway and will be completed in April. Despite recent below-average rains, crop conditions are favourable in Colón, the major producing department of the current season. Land preparation for main season rice crops is now underway throughout **Honduras**, and planting will begin in April.

Throughout the subregion, dry and hot conditions are expected to persist through July, which is likely to result in a delayed start of the *Primera* season (See Regional Outlook Pg. 14).

In **Haiti**, harvesting of second season rice and *Hiver* season bean crops finalized in March with below-average yields due to persistent dry conditions and above-average temperatures throughout the season. Planting of *Printemps* season cereals, which typically begins in late February, is delayed due to below-average rainfall and vegetation conditions across the country. In the centre, 10-50mm rainfall deficits are present in and around the Gulf of Gonâve. Additionally, many central, south, and western areas recorded below-average seasonal conditions, with the highest deficits in the south. Forecast above-normal temperatures through July are expected to negatively impact soil moisture and crop development (See Regional Outlook Pg. 14). In **Cuba**, main season maize and rice crops are in vegetative to reproductive stage for harvest from April, and concern remains due to continuing dry conditions. Land preparation is now underway for second season rice crops, and planting will begin in April.



For detailed description of the pie chart please see description box on Pg.15.

Regional Outlook: Drier and warmer than normal conditions are forecast across the region through July 2023

During April to July 2023, drier and warmer-than-normal conditions are anticipated across the region (Figure 1-left and right). This pattern is a continuation of observed conditions since December 2022 and is consistent with several closer-range forecasts. The unbiased GEFS and CFSv2 forecasts from March 29th predict below-average rainfall during the next 15 days and for April as a whole, respectively. Regarding the seasonal forecasts, there is relatively good agreement across WMO, C3S, and NMME ensembles, though probabilities vary across these systems. The WMO ensemble predicts there are 40-60% chances of April-to-July rainfall being below-normal across most of Central America and in southern Haiti, and 70-80% chances of above-normal temperatures across the region. Low rainfall and high temperatures may continue into September, based on long-range WMO and NMME forecasts.

An irregular start to the *Primera* season appears likely, with high probabilities of delayed sowing activities due to dry soil conditions. Negative impacts during moisture and/or heat-sensitive periods of crop development and from pests and disease are also a concern. In Haiti, above-normal temperatures could increase the chances of heat stress and accelerate soil moisture losses under average or below-average rainfall conditions.

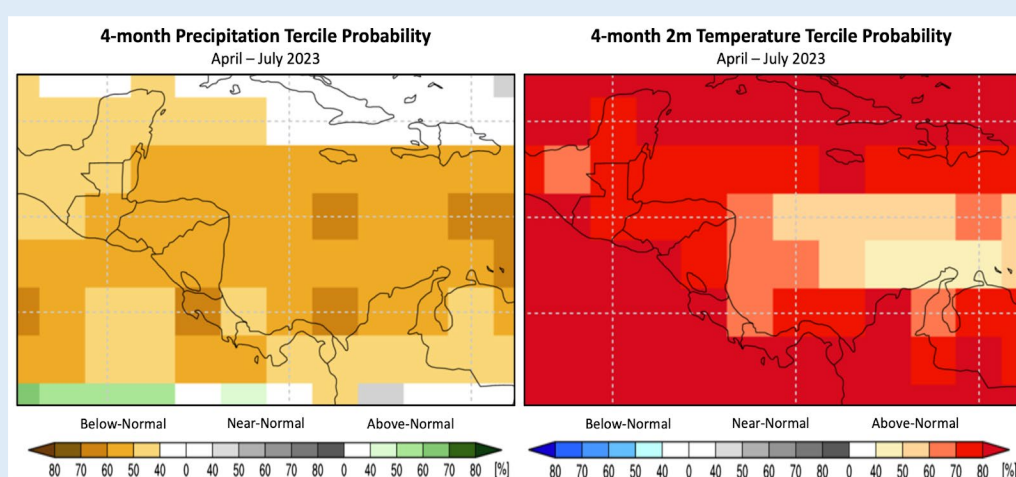


Figure 1. WMO probabilistic forecasts for April to July (AMJJ) 2023. Left: AMJJ 2023 precipitation. Right: AMJJ 2023 2m temperatures. Forecasts are based on models initialized in March. Images are from the [WMO Lead Centre Long-Range Forecast Multi-Model Ensemble](#). Source: UCSB Climate Hazards Center

i Sources and Disclaimers:

The Crop Monitor assessment is conducted by GEOGLAM with inputs from the following partners FEWS NET, JRC, WFP, ARC, AFSIS, MESA, ICPAC, FAO GIEWS, Applied Geosolutions and UMD. The findings and conclusions in this joint multi-agency report are consensual statements from the GEOGLAM experts, and do not necessarily reflect those of the individual agencies represented by these experts. More detailed information on the GEOGLAM crop assessments is available at www.cropmonitor.org

Pie Chart Description: Each slice represents a country's share of total regional production. The proportion within each national slice is colored according to the crop conditions within a specific growing area; grey indicates that the respective area is out of season. Sections within each slice are weighted by the sub-national production statistics (5-year average) of the respective country. The section within each national slice also accounts for multiple cropping seasons (i.e. spring and winter wheat) and are a result of combining totals from multiple seasons to represent the total yearly national production. When conditions are other than favourable icons are added that provide information on the key climatic drivers affecting conditions.

Information on crop conditions in the main production and export countries can be found in the Crop Monitor for AMIS, published April 6th, 2023.

Appendix

Crop Conditions:

Exceptional: Conditions are much better than average* at time of reporting. This label is only used during the grain-filling through harvest stages.

Favourable: Conditions range from slightly lower to slightly better than average* at reporting time.

Watch: Conditions are not far from average* but there is a potential risk to final production. The crop can still recover to average or near-average conditions if the ground situation improves. This label is only used during the planting-early vegetative and the vegetative-reproductive stages.

Poor: Crop conditions are well below-average. Crop yields are likely to be 10-25% below-average. This is used when crops are stunted and are not likely to recover, and impact on production is likely.

Failure: Crop conditions are extremely poor. Crop yields are likely to be 25% or more below-average.

Out of Season: Crops are not currently planted or in development during this time.

No Data: No reliable source of data is available at this time.

"Average" refers to the average conditions over the past 5 years.

Note: In areas where conflict is a driver of crop condition, crop conditions are compared to the pre-conflict average rather than the average conditions over the past 5 years. In areas where conflict is protracted and based on expert analysis on a case by case basis, crop conditions will be compared to the average conditions over the past five years.

Drivers:

These represent the key climatic drivers that are having an impact on crop condition status. They result in production impacts and can act as either positive or negative drivers of crop conditions.

Wet: Higher than average wetness.

Dry: Drier than average.

Hot: Hotter than average.

Cool: Cooler than average or risk of frost damage.

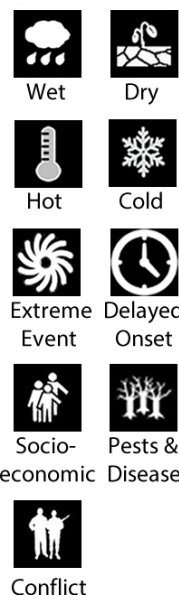
Extreme Events: This is a catch-all for all other climate risks (i.e. hurricane, typhoon, frost, hail, winterkill, wind damage, etc.)

Delayed-Onset: Late start of the season.

Pest & Disease: Destructive insects, birds, animals, or plant disease.

Socio-economic: Social or economic factors that impact crop conditions (i.e. policy changes, agricultural subsidies, government intervention, etc.)

Conflict: Armed conflict or civil unrest that is preventing the planting, working, or harvesting of the fields by the farmers.



Crop Season Nomenclature:

In countries that contain multiple cropping seasons for the same crop, the following charts identifies the national season name associated with each crop season within the Crop Monitor for Early Warning.

MENA				
Country	Crop	Season 1 Name	Season 2 Name	Season 3 Name
Egypt	Rice	Summer-planted	Nili season (Nile Flood)	

East Africa				
Country	Crop	Season 1 Name	Season 2 Name	Season 3 Name
Burundi	Maize	Season B	Season A	
Ethiopia	Maize	Meher Season (long rains)	Belg Season (short rains)	
Kenya	Maize	Long Rains	Short Rains	
Somalia	Maize	Gu Season	Deyr Season	
Somalia	Sorghum	Gu Season	Deyr Season	
Uganda	Maize	First Season	Second Season	
United Republic of Tanzania	Maize	Long Rains	Short Rains	
United Republic of Tanzania	Sorghum	Long Rains	Short Rains	

West Africa				
Country	Crop	Season 1 Name	Season 2 Name	Season 3 Name
Benin	Maize	Main season	Second season	
Cameroon	Maize	Main season	Second season	
Cote d'Ivoire	Maize	Main season	Second season	
Ghana	Maize	Main season	Second season	
Mauritania	Rice	Main season	Off-season	
Nigeria	Maize	Main season	Short-season	
Nigeria	Rice	Main season	Off-season	
Togo	Maize	Main season	Second season	

Southern Africa				
Country	Crop	Season 1 Name	Season 2 Name	Season 3 Name
Democratic Republic of the Congo	Maize	Main season	Second season	
Mozambique	Maize	Main season	Second season	

Southeast Asia				
Country	Crop	Season 1 Name	Season 2 Name	Season 3 Name
Bangladesh	Rice	Boro	Aman	
Cambodia	Rice	Wet season	Dry season	
Indonesia	Rice	Main season	Second season	
Lao People's Democratic Republic	Rice	Wet season	Dry season	
Myanmar	Rice	Wet season	Dry season	
Philippines	Rice	Wet season	Dry season	
Sri Lanka	Rice	Maha	Yala	
Thailand	Rice	Wet season	Dry season	
Viet Nam	Rice	Wet season (Autumn)	Dry season (Winter/Spring)	

Central & South Asia				
Country	Crop	Season 1 Name	Season 2 Name	Season 3 Name
Afghanistan	Wheat	Winter-planted	Spring-planted	
Kazakhstan	Wheat	Winter-planted	Spring-planted	
Kyrgyzstan	Wheat	Winter-planted	Spring-planted	
Tajikistan	Wheat	Winter-planted	Spring-planted	

Crop Season Nomenclature:

In countries that contain multiple cropping seasons for the same crop, the following charts identifies the national season name associated with each crop season within the Crop Monitor for Early Warning.

Central America & Caribbean				
Country	Crop	Season 1 Name	Season 2 Name	Season 3 Name
Cuba	Rice	Main season	Second season	
El Salvador	Beans	Primera	Postrera	
El Salvador	Maize	Primera	Segunda	
Guatemala	Beans	Primera	Postrera	Apante
Guatemala	Maize	Primera	Segunda	
Haiti	Maize	Main season	Second season	
Honduras	Beans	Primera	Postrera	
Honduras	Maize	Primera	Segunda	
Nicaragua	Beans	Primera	Postrera	Apante



GEOGLAM

Global Agricultural Monitoring

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The Crop Monitor is a part of GEOGLAM, a GEO global initiative.

Cover Photo by: Nick Fewings

Contributing partners



*EC contribution is provided by the Joint Research Centre of the European Commission