

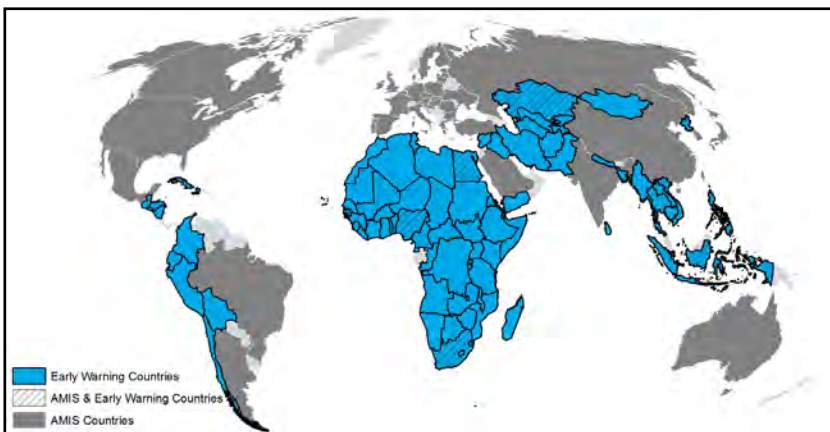


Crop Monitor

EARLY WARNING

Overview:

In **East Africa**, planting began in March for long rains cereals across the south of the region and *Belg* cropping is underway in Ethiopia. Rainfall has been above-average, benefitting early planting operations; however, there is continuing concern due to the threat of desert locusts in the region. In **West Africa**, main season maize planting started in March across the south and harvest has begun for secondary rice crops in Mali and Mauritania and conditions are generally favourable. In **North Africa**, there is concern for winter wheat crops in parts of Morocco, Algeria, and Tunisia due to dry conditions. In the **Middle East**, while rainfall has been generally favourable, conflict continues to impact agricultural activities in Syria and Iraq. In **Southern Africa**, harvest of main season crops began in March in parts of the region and there is continuing concern for final yields due to extended dry spells and erratic rainfall across parts of Madagascar, Mozambique, Zimbabwe, Zambia, Namibia, Angola, and Botswana. In **Central and South Asia**, planting began in March for spring wheat while winter cereals are exiting dormancy phase and conditions are generally favourable. In **Southeast Asia**, there is concern for dry season rice across the north of the region where below-average rainfall and insufficient irrigation water has reduced planted area and yield prospects are below-average. In **Central America and the Caribbean**, harvest of *Apante* season beans and winter rice is complete and yield prospects are favourable.



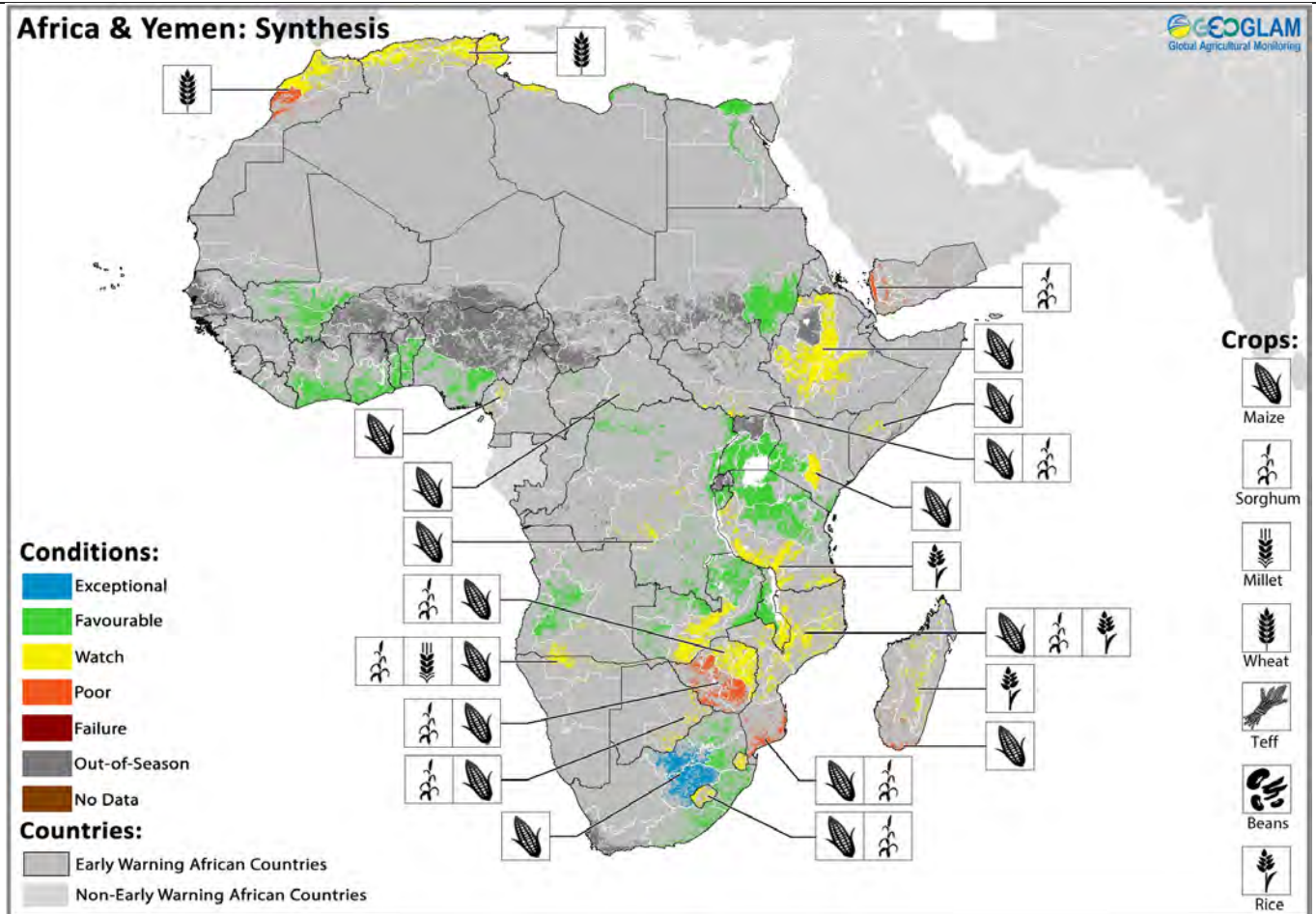
Contents:

Conditions at a Glance.....	2
Global Climate Outlook.....	3
East Africa & Yemen; Alert; Regional Climate Outlook.....	3
West Africa.....	7
Middle East & North Africa; Regional Climate Outlook	8
Southern Africa;	10
Central & South Asia	12
Southeast Asia; Regional Climate Outlook	13
Central America & Caribbean.....	15
Appendix – Terminology & Definitions.....	16

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: Planting is underway for the main March April May (MAM) rainy season across eastern Kenya, Rwanda, Burundi, central and southern Somalia, Uganda, and bimodal rainfall areas of the United Republic of Tanzania and metrological conditions are generally favourable due to above-average rainfall, which is expected to continue into the start of April (See Regional Outlook Pg. 6). In Ethiopia, the *Belg* cropping season is underway and benefitting from recent rains. However, there is continuing concern across the region due to the presence and threat of desert locusts (See Alert Pg. 5).

WEST AFRICA: Main season maize planting started in March across the south of the region and conditions are favourable due to the timely onset of rains, except in conflict-affected areas. Harvest has begun for second season rice crops in Mali and Mauritania and yield prospects are favourable.

MIDDLE EAST & NORTH AFRICA: Wheat crops are in vegetative to reproductive stages and there is concern in parts of Morocco, Algeria and Tunisia due to high temperatures and below-average rainfall; however, forecasts indicate improved rainfall through the start of April (See Regional Outlook Pg. 9). In the Middle East, while rainfall has been generally favourable, conflict continues to impact agricultural activities in Syria and Iraq.

SOUTHERN AFRICA: Harvest of main season crops started in March and while conditions improved across much of the region following good rains in January and February, significant concern remains for southern Mozambique and Zimbabwe, which have received below-average rainfall for the past three months.

CENTRAL & SOUTH ASIA: Planting of spring wheat is underway and conditions are favourable due to average rainfall since January. Conditions remain favourable for 2019/2020 winter cereals despite recent above-average temperatures.

SOUTHEAST ASIA: In northern Southeast Asia, planted area for dry season rice is below-average due to inadequate irrigation water and below-average precipitation, which is forecast to continue into April (See Regional Outlook Pg. 14). In Indonesia, there is concern for wet-season rice due to early season dryness; however, recent rains have been above-average and are expected to continue into April.

CENTRAL AMERICA & CARIBBEAN: Harvest is complete for *Apante* season bean and rice crops across Nicaragua and Haiti and yields are generally favourable except in parts of northern Haiti where below-average rains reduced yields. In some parts of the region, farmers have begun early sowing activities for *Primera* season crops due to the recent rainfall.

Alert: COVID-19 pandemic expected to impact global agricultural production

The COVID-19 pandemic poses a credible threat to food security at the local level. The COVID-19 pandemic could exacerbate already existing food crises and drive worsening food insecurity among vulnerable populations. In countries dependent on humanitarian and development aid, the sudden diversion of funds to address the COVID-19 crisis will impact food aid distribution and likely reduce small-scale farmers' ability to plant.

Agricultural production will be impacted as transport restrictions and quarantine measures are expected to impede farmers' access to inputs and markets and cause widespread labor shortages. In labor intensive agricultural production systems, a decrease in the labor supply could lead to reduced planted areas and limited crop management, ultimately resulting in reduced harvests. In countries where farm inputs are subsidized by the government, the crisis may create a reduction or delay in the distribution of resources. Blockages in transport routes will adversely impact regional and cross-border trade, creating problems for import-dependent countries.

The GEOGLAM Crop Monitor community will be monitoring crop conditions with a view to provide sufficient early warning to allow for appropriate actions in case of any major production shortfalls that could further exasperate the prevailing difficult situations in many countries.

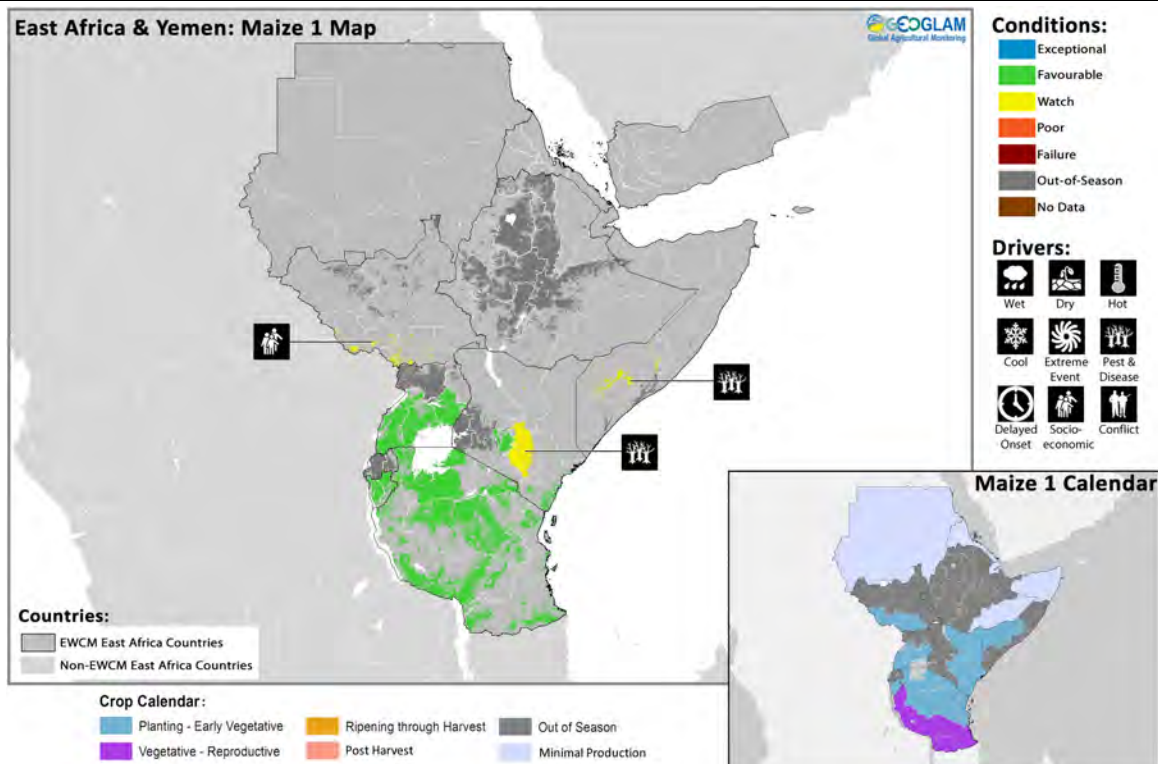
Resources: <https://fscluster.org/coronavirus/>; <http://www.fao.org/2019-ncov/q-and-a/en/>; <http://www.fao.org/2019-ncov/en/>

Global Climate Outlook: ENSO neutral conditions likely to continue through Spring 2020

El Niño-Southern Oscillation (ENSO) conditions are currently neutral and are most likely to remain neutral through the northern hemisphere spring (65 percent likelihood) and summer (55 percent likelihood). Indian Ocean Dipole (IOD) is currently neutral and is forecast to remain near-neutral for the next few months. However, sea surface temperatures in the western Indian Ocean are above normal at present, supporting enhanced April-June precipitation over eastern Africa. Two-week weather forecasts indicate above normal rains in northern Tanzania, Kenya, Somalia, and southeastern Ethiopia.

Source: UCSB Climate Hazards Center

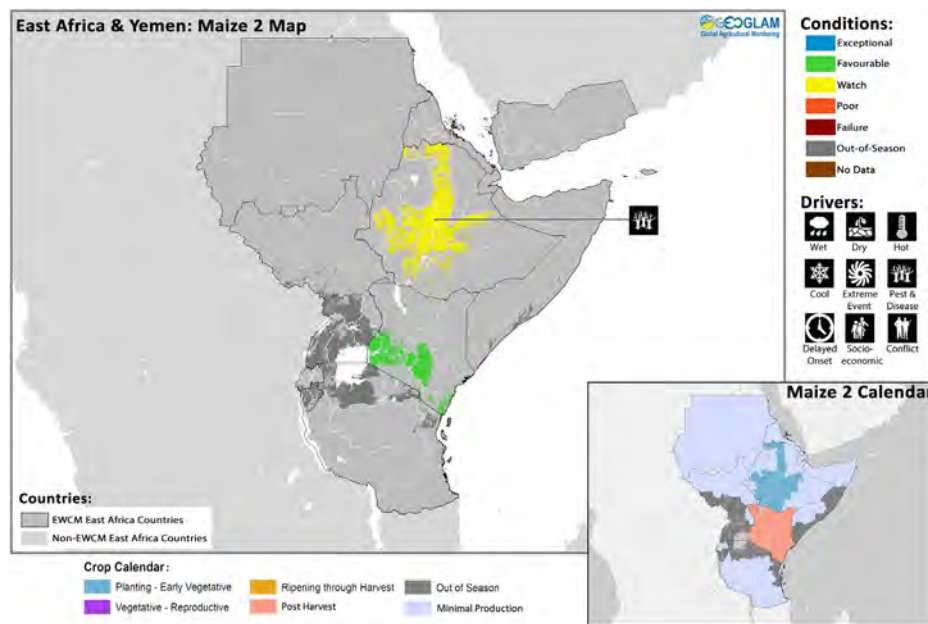
East Africa & Yemen



Crop condition map synthesizing Maize 1 conditions for the current March April May (MAM) rainy season, 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.

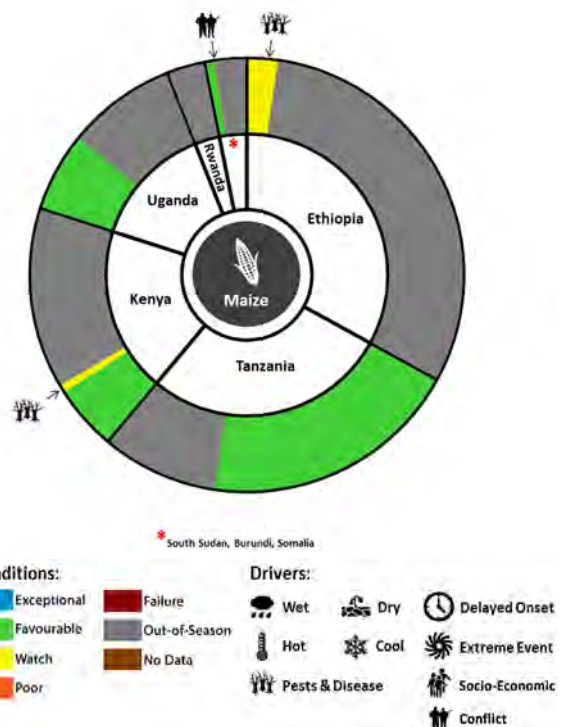
Conditions that are other than favourable are labeled on the map with their driver.

In central and southern parts of the subregion, planting is underway for the main March April May (MAM) rainy season across eastern Kenya, Burundi, Rwanda, central and southern Somalia, Uganda, and bimodal rainfall areas of the United Republic of Tanzania and conditions are generally favourable due to above-average rainfall. While above-average rains in March across much of the subregion



Crop condition map synthesizing Maize 2 information as of March 28th. In Ethiopia conditions are for the current Belg cropping areas. In Kenya, post-harvest conditions are shown for the recently completed OND cropping season. 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.**

producing north and central rift regions, earlier threats from mature swarms migrating from Baringo county have been lessened by ongoing control operations. However, input shortages may constrain planting operations. In bimodal areas of **Uganda**, irregular off-season rainfall encouraged early field preparation activities and planting for the MAM rainy season. However, there is continuing concern due to the desert locust outbreak as nine mature desert locust swarms, which crossed over from adjacent areas of western Kenya five weeks ago, have been recorded in the northeast of Uganda. These swarms have not caused significant damage to vegetation cover; however, younger generations could hatch in the coming month and consume high levels of vegetation. Control operations and the use of aerial spraying is underway. This, along with the current forecasts of wind direction, are expected to reduce the locust presence in Uganda prior to crop development, limiting damage and significant economic loss. In southern bimodal areas of **South Sudan**, planting of main season maize and sorghum crops is underway and while weather conditions have been favourable, there is continued concern due to conflict and the potential impacts of desert locusts, which entered the country across the border with Uganda in February. In **Somalia**, the April to June *Gu* season is expected to begin with the above-average and timely onset of rains in April (See Regional Outlook Pg. 6). However, desert locust breeding is underway in the northeast of Somalia and there is concern that swarms will impact *Gu* season yields. In the **United Republic of Tanzania's** southern highlands, *Msimu* maize and rice crops, to be harvested in May, are in vegetative to reproductive stages and there is concern in the southwest and southeast regions due to heavy rains and flooding since late January. There is particular concern in main producing regions of Mwanza, Morogoro, Mbeya, and Manyara. Morogoro and Mbeya regions together account for more than one third of the national rice output. Across the north of the subregion, *Belg* cropping is underway in Ethiopia and in Sudan, winter wheat harvest started in March. In **Ethiopia**, planting of secondary *Belg* season cereal crops began in February and weather conditions have been favourable. Localized damage to crops from desert locusts is expected in some areas; however, national *Belg* harvest is expected to be average due to favorable weather conditions. Areas worst-affected by locusts include Somali, Oromia, and SNNPR regions and localized yields are expected to be below-average. New mature and immature swarms are forming and further invasion from neighboring countries is likely to occur in southern, southeastern, and northeastern Amhara and Tigray regions. In **Sudan**, harvest of winter wheat began in March and prospects are favourable. According to the FAO Crop and Food Supply Assessment Report released in March, wheat production is forecast at 727,000 tonnes or more than 30 percent above the previous five-year average, reflecting increased plantings.



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

However, national cereal production for the 2019/2020 season is estimated at 18 percent below the five-year average and 57 percent below 2018/2019's bumper harvest due to increases in area planted in cash crops at the expense of area planted in cereals. Additionally, sorghum and millet harvests, which concluded in December, were well below-average due to an erratic temporal distribution of the June-September seasonal rains. In **Yemen**, the conflict continues to debilitate agricultural activities and livelihoods by limiting the availability of inputs and constraining access to fields.

Alert: Desert locust swarms continue to form across East Africa

Significant concern from the presence and potential impact of desert locusts continues in Kenya, Ethiopia and Somalia, where widespread breeding is in progress and new swarms are starting to form. Breeding area has increased due to suitable conditions in northern Kenya, Oromia and SNNPR regions of Ethiopia, Somaliland region in Somalia, the Buri Peninsula of Eritrea, and Agig and Alibai in Sudan. The current desert locust outbreak poses a high threat to food security and livelihoods. The season for locust breeding is now changing from summer to winter breeding areas in Sudan, Eritrea, and Somalia. The Intertropical Convergence Zone (ITCZ) is moving northwards and desert locusts are also heading into northern areas of the region. Hoppers are present in Northern Kenya and Somaliland that have not been controlled due to inaccessibility.

In **Kenya**, following widespread breeding last month, first generation immature swarms are forming throughout the northern and central counties and some will lay eggs, which is expected to continue the outbreak into the coming months. Control operations are underway to mitigate the spread. In **Ethiopia**, new hopper bands are present in Oromia and SNNPR where the November and December 2019 cycle of mature desert locusts laid their eggs. Swarms are present in Somali and Dire Dawa and new generations of mature and immature swarms are forming. Mature swarms from neighboring countries crossed into Borena and lowlands of Bale and Arsi zones in Oromia region, creating concern for the secondary *Belg* season crop and pasturelands. Further invasion is likely to occur from neighboring countries into southern, southeastern, and northeastern Amhara and Tigray regions. While breeding has been mainly over pastoral areas of Ethiopia, wind direction is changing towards Ethiopia *Belg* cropping areas and is likely to facilitate desert locust movements in this direction. Aerial and ground control operations continue. In **Somalia**, breeding continues in the central areas and there is concern for the start of the main cropping season in April. In **South Sudan**, mature swarms have been reported in the southeast near Torit. In **Uganda**, swarms entered the northeast from the northwest areas of Kenya at the end of February and nine mature swarms have been reported since the first entry. No significant damage to vegetation has been reported. However, there is concern posed by younger generations of desert locusts that will hatch in breeding grounds in Kenya and could move into Uganda in the coming weeks. Joint control operations are underway to control the spread of newly hatched hoppers.

The seasonal March April May rains have been above-average in March, which has supported desert locust breeding and spread. Forecasts indicate above-average rains may continue across much of the region through the start of April, which may protract the outbreak. Damage is likely to occur for main season crops if the outbreak continues into the coming months.

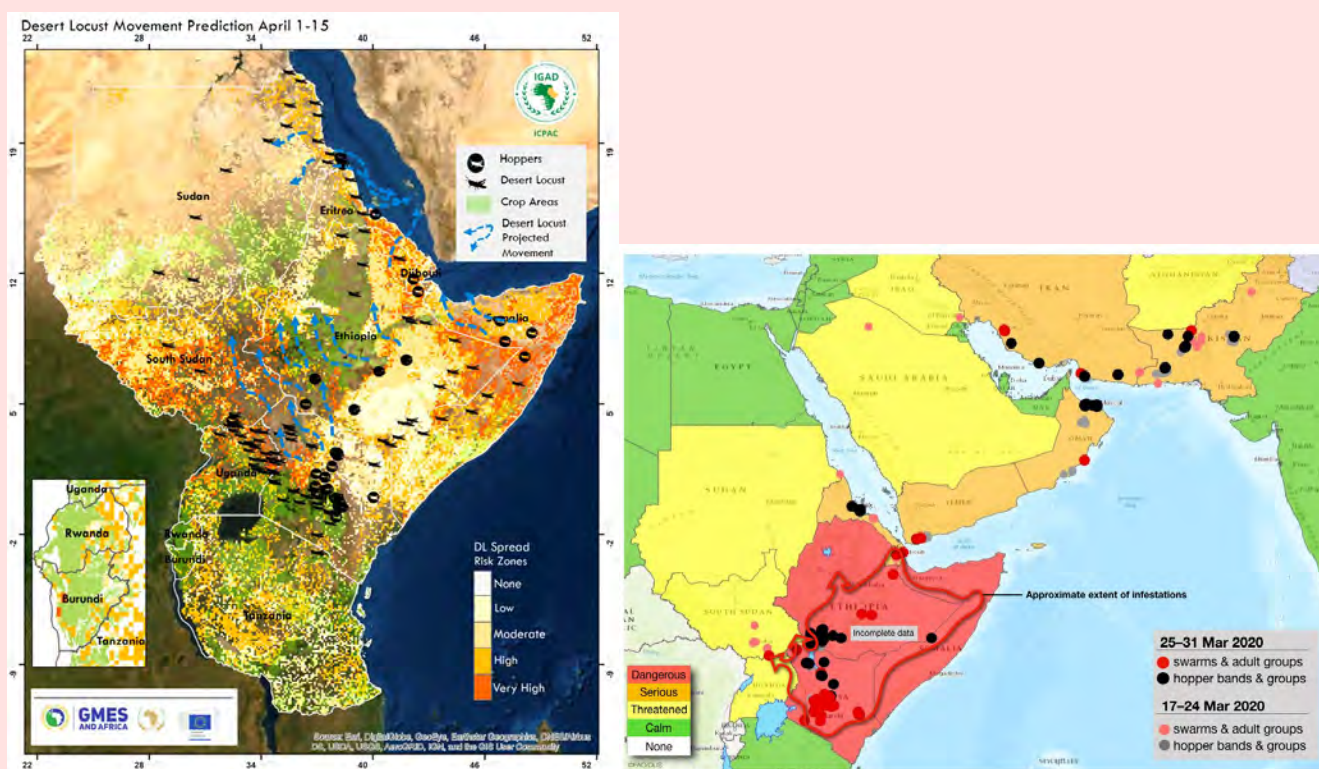


Figure 1. Desert locust risk and movement prediction for April 1-15. Source: IGAD ICPAC (left). Desert locust current presence and threat. Source: FAO/DLIS (right)

Regional Outlook: Above-average rainfall expected to continue across much of the region through April.

The above-average rainfall conditions reported in January and February continued through March, further contributing to wetter-than-average conditions in southwestern Ethiopia, Uganda, western Kenya, Rwanda, Burundi, and throughout Tanzania (Figure 1-left). While this rain provided favorable growing conditions for the majority of these areas, sustained heavy rainfall resulted in flooding in parts of Burundi, Rwanda, and the Pwani region of Tanzania (southeast).

The 16-day forecast shows continued above-average rainfall over the previously mentioned areas, as well as a northeastern migration of rains into eastern Kenya, eastern Ethiopia, and Somalia. If these forecasts materialize, February 21st to April 5th rainfall totals could be at least 50mm above-average over the southeastern half of the region, and between 100 and 300 mm above average in Tanzania, southern Kenya, and southern Somalia. Meanwhile, rainfall deficits could prevail in northern Ethiopia. The 30-day forecast indicates this rainfall pattern is likely to continue through April, with additional precipitation expected across northern Tanzania, Kenya, and southern Somalia.

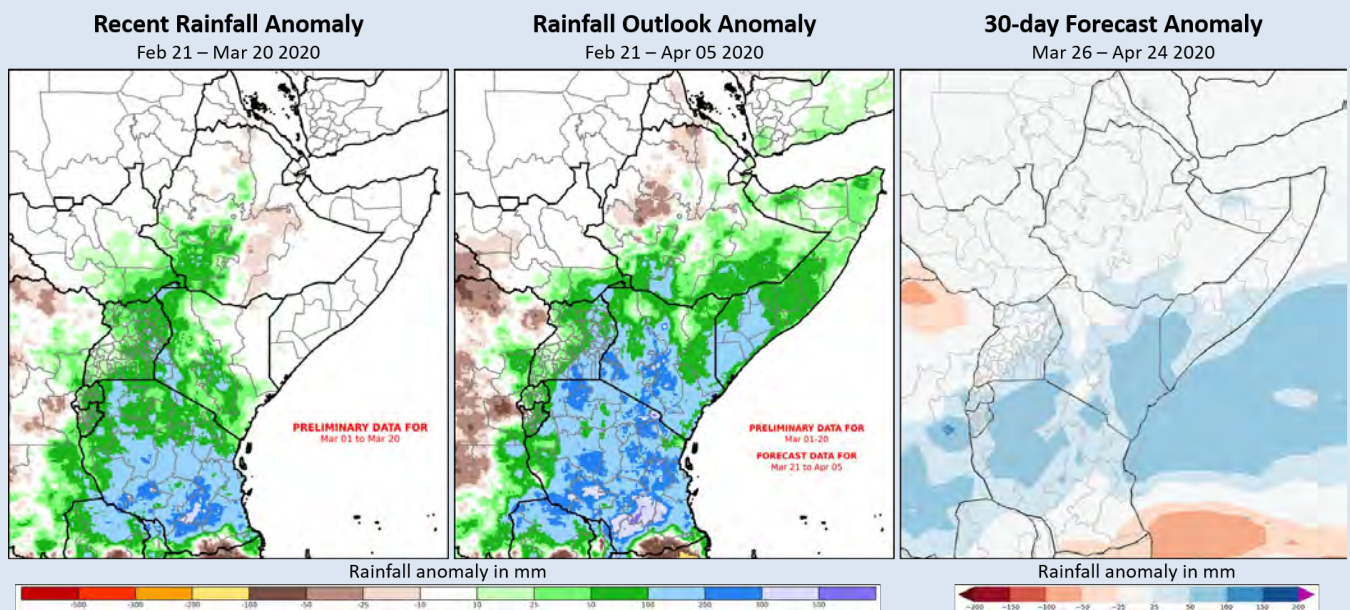
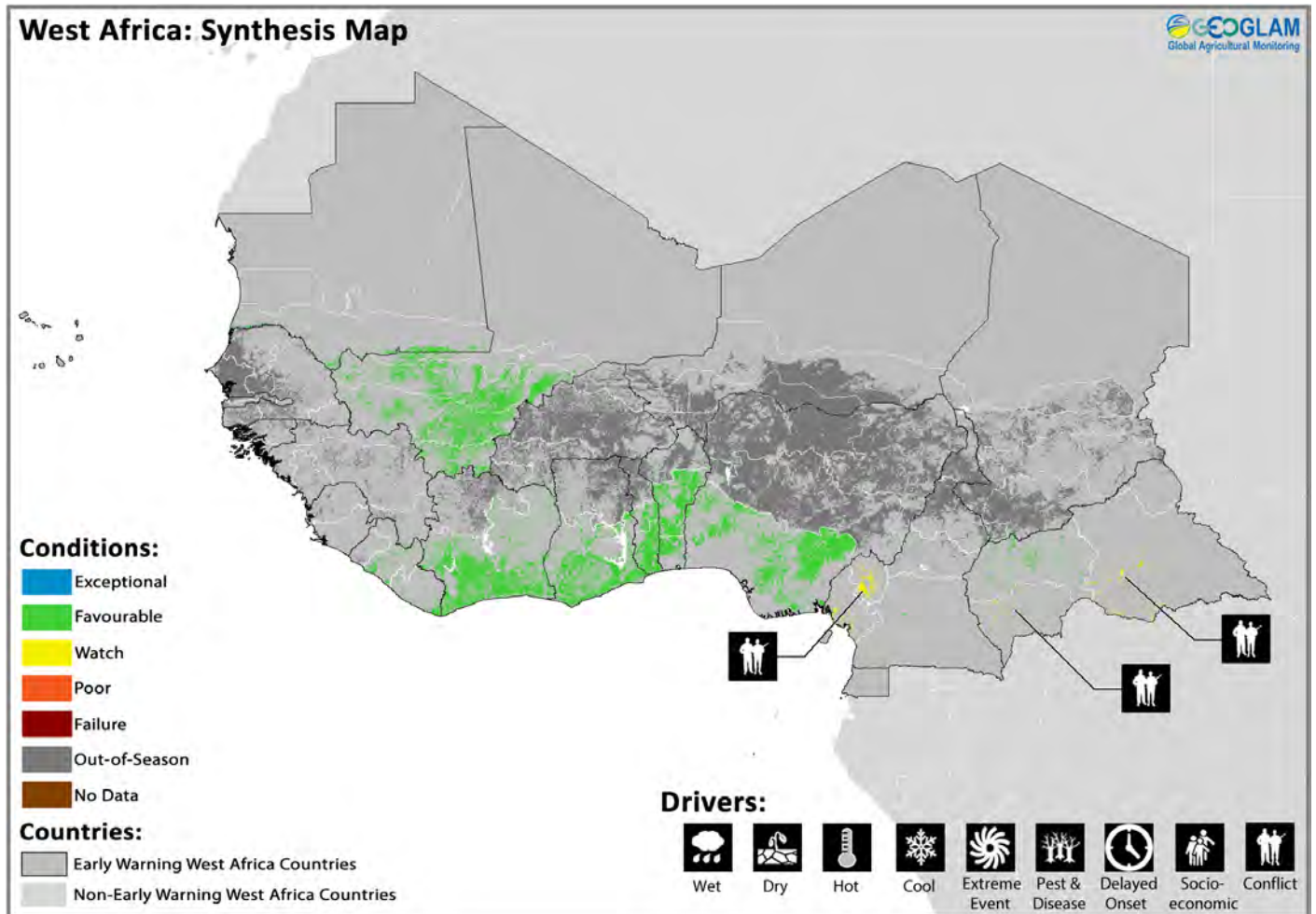


Figure 1. Estimated and forecast rainfall since February 21st and a 30-day forecast. All three maps depict rainfall in terms of the difference from average. The left panel is the UCSB Climate Hazards Center Early Estimate for February 21st to March 20th, based on final CHIRPS for February and preliminary CHIRPS for March 1st to 20th. The middle panel is an extended outlook. It shows how the post-February 21st anomaly will change if the 16-day unbiased GEFS forecast from March 26th materializes. These compare 2020 rainfall amounts to the 1981–2019 CHIRPS average. On the right is a 30-day forecast from March 26th. The image shows the average of four Subseasonal Experiment (SubX) model forecasts from that day. The anomaly is based on the 1999 to 2016 model average. Skill assessments of SubX can be accessed at <http://cola.gmu.edu/kpeqion/subx/index.html>. Source: UCSB Climate Hazards Center

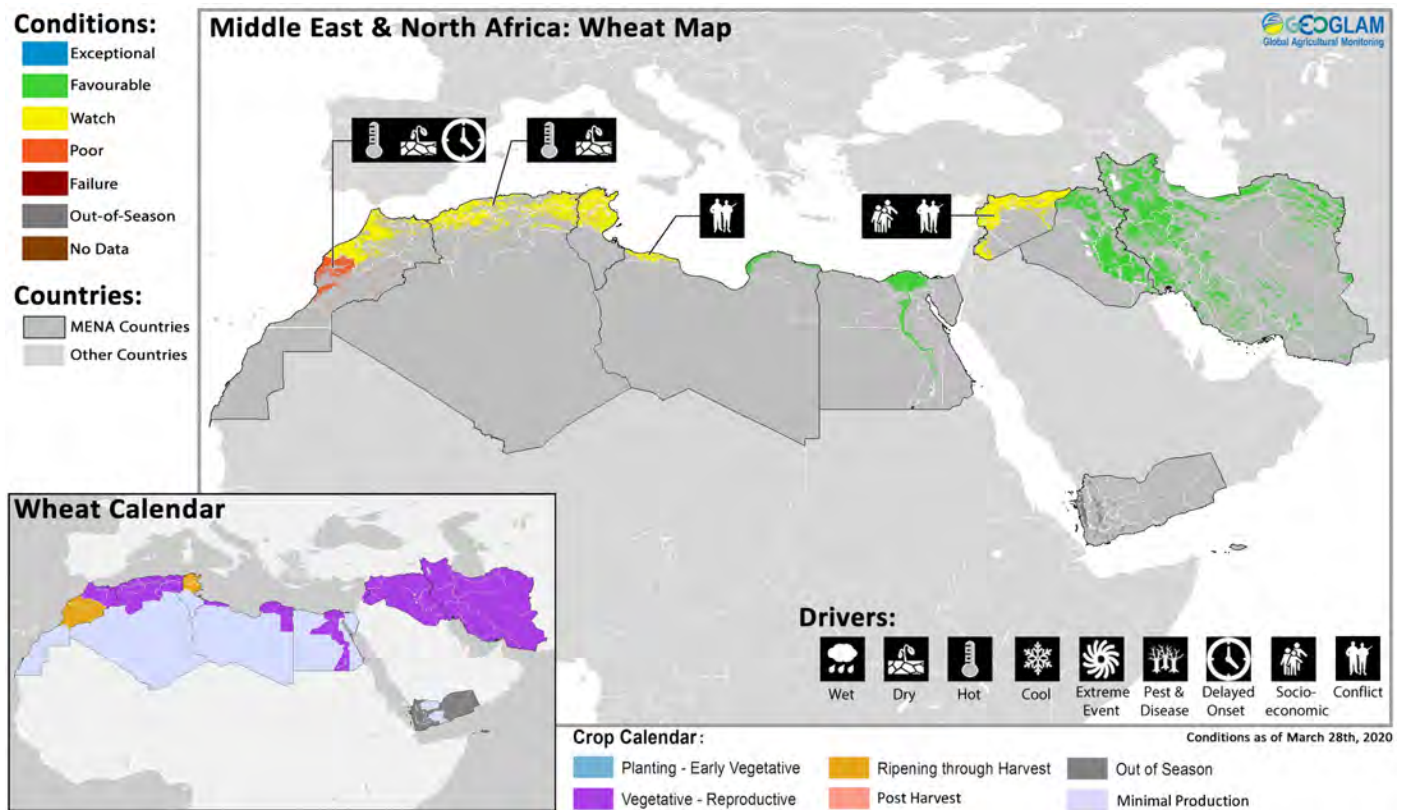
West Africa



Crop condition map synthesizing information 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 West Africa, harvest started in March for second season rice crops in **Mali** and **Mauritania** and production prospects are favourable due to sufficient irrigation water availability that resulted from last season's rainfall. Across the south of the region, including central and southern **Benin**, central and southern **Togo**, southern **Cote d'Ivoire**, southern **Ghana**, central and eastern **Liberia**, southern **Nigeria**, southern **Cameroon**, and the **Central African Republic**, planting started in March for main season maize and conditions are favourable. However, in southern **Cameroon** and the **Central African Republic**, conflict continues to impact agricultural activities. Pastoral areas of **Mali**, **Niger**, **Burkina Faso**, and **Chad** may experience an early onset of pastoralist lean season due to low availability of pasture, perpetuated by conflict-related insecurity. Below-average pasture levels remain a concern in western **Mauritania** and northern **Senegal** for the third consecutive year. Pasture resources are expected to be depleted earlier than usual until the May to June rainy season, resulting in an early onset of pastoralist lean season in areas with low seasonal rains.

Middle East & North Africa



Crop condition map synthesizing information 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.**

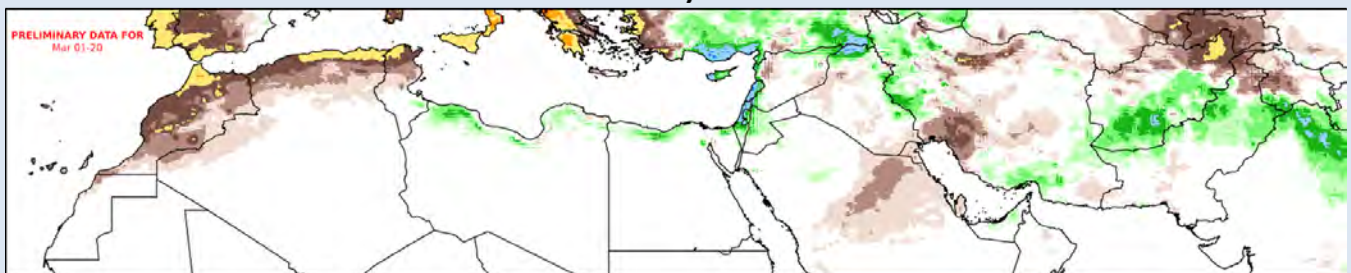
In the Middle East and North Africa, winter wheat crops are in vegetative to reproductive stages. While precipitation and temperatures have been generally favourable to crop development in the Middle East, ongoing conflict and socioeconomic factors continue to impact agricultural activities in **Syria** and **Iraq**. In **Iran**, dry conditions are present in the northeast Golestan province, while along the southwest coast, desert locust swarms are present and more hatching is expected to continue along the southern coast, although ground control operations are underway. Likewise, control operations are underway in **Iraq** to mitigate desert locusts in the southeast. In North Africa, persistent dry conditions since December have led to drought concerns across Morocco, Algeria, and Tunisia, although the current situation is not uniform across the subregion. Crop conditions in the southwestern parts of **Morocco**, including Marrakech-Safi and Casablanca-Settat regions, are poor due to continued drought and high temperatures from the beginning of the season and below-average yields are expected. There is also concern in northern **Morocco** and Oriental region, where dry conditions and high temperatures from January to March, including an extended period of no rainfall in February, have caused poor crop development. In **Algeria**, cumulative winter rainfall is below-average and especially reduced in western regions of the country where the majority of cereal crops are produced. For the moment, vegetation indices remain favourable thanks to very good rains at the start of the season; however, some crop damage may still emerge in the next one to two weeks. In **Tunisia**, following a good start to the season, rainfall in February was up to 70 percent below-average leading to a deterioration in crop conditions across the northern regions. In **Libya**, crop conditions remain favourable with good rains throughout the season. However, conflict and military operations in Tripoli continue to have a negative impact on agricultural activities. In **Egypt**, conditions for irrigated cereal crops are favourable and preliminary production forecast is estimated at 9 million tonnes, similar to last year's average level. Heavy rains in mid-March caused flooding in New Valley, Suez, and Cairo governorates where the drainage system was overwhelmed and water supply cut off.

Regional Outlook: Above-average rainfall expected for much of the MENA region through the start of April.

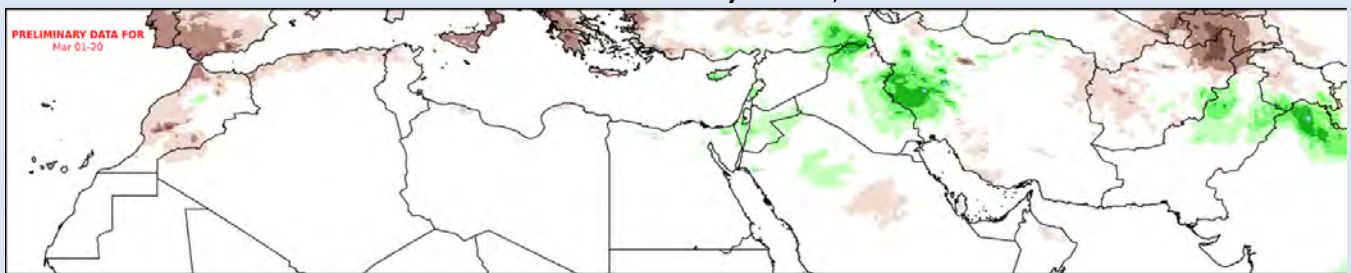
The winter wheat growing season has been of concern in several MENA countries after experiencing consistently below-average rainfall since December (Figure 3-top) and exceptionally high temperatures in February. The rainfall deficits are greatest across Morocco, northern Algeria, northern Tunisia, southwest and northern Iran, with 3-month totals ranging from 50-170mm below average (30-70 percent of average). Late February through mid-March rainfall continued to be average to below-average across the aforementioned areas (Figure 3-middle). Although not seen in the graphic, heavy rainfall in late-March resulted in deadly flash floods throughout Iran.

The 16-day forecast for the end of March through the first dekad of April indicates above-average conditions could be expected for much of the region, which may provide soil moisture towards the end of the winter wheat season (Figure 3-bottom). In the Middle East, the expected continued rainfall could increase the risk of flash flooding in Iran. In southwest Morocco, rainfall is expected to remain below-average through the start of April. With harvest expected to commence in May, crop condition improvement is unlikely. Longer-term forecasts for the remainder of April and beyond are inconclusive.

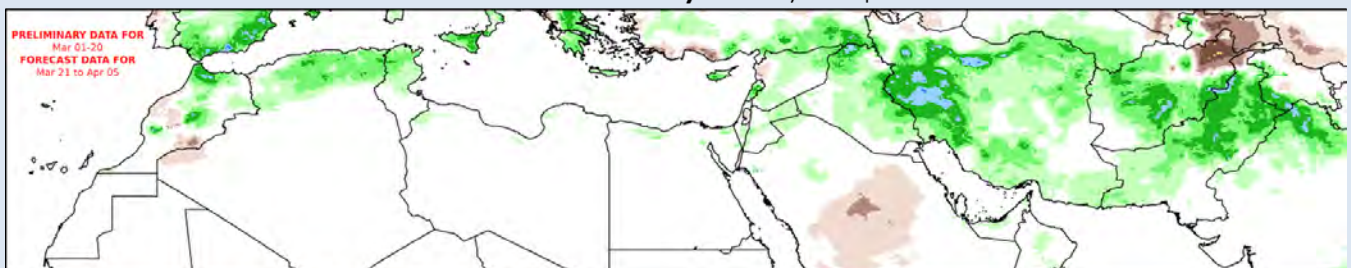
3-Month Rainfall Anomaly: December 21 – Mar 20 2020



1-Month Recent Rainfall Anomaly: February 21 – March 20 2020



Rainfall Outlook Anomaly: February 21 – April 10 2020



Rainfall anomaly in mm

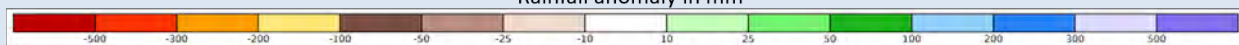
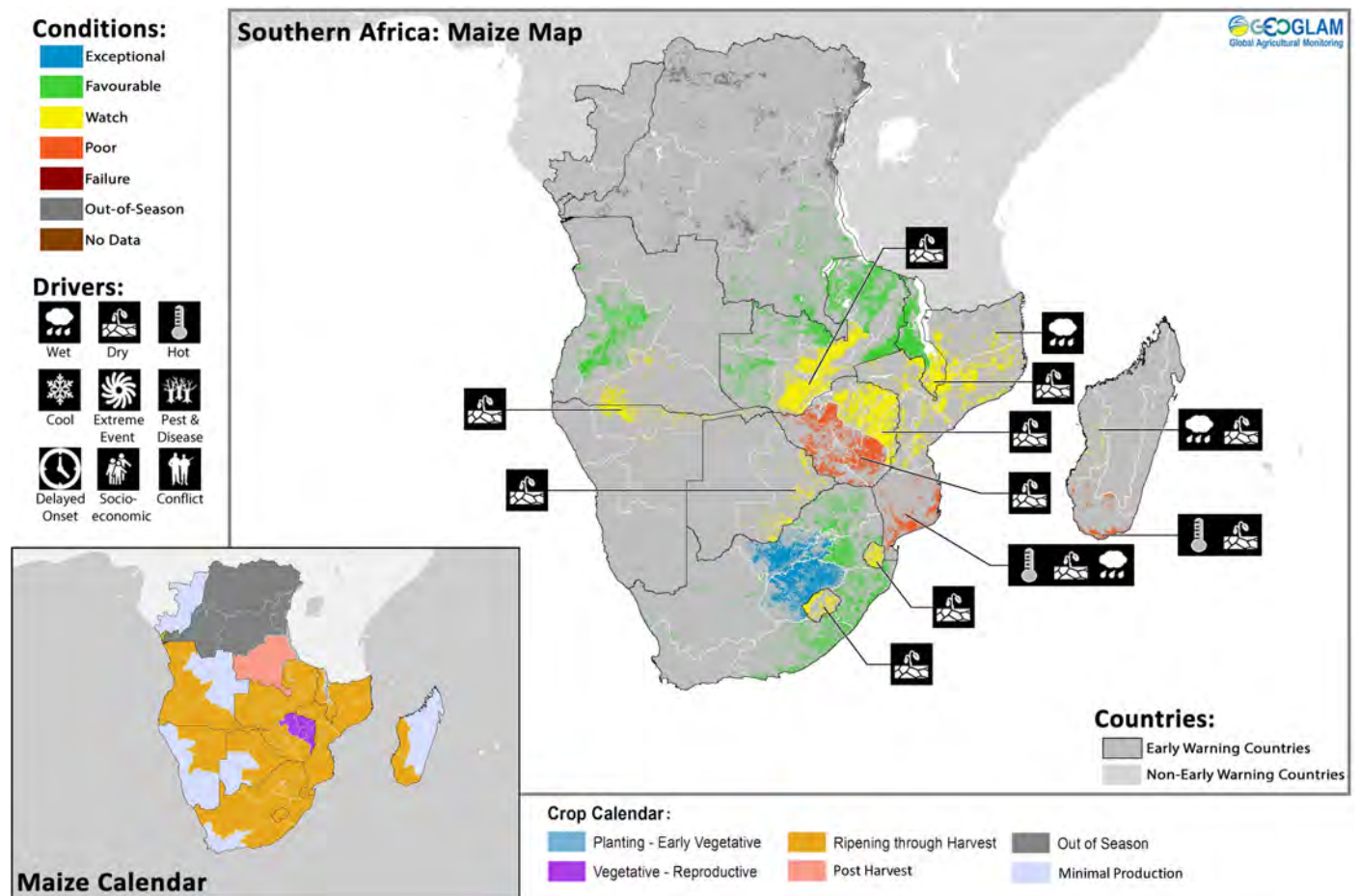


Figure 1. Estimated and forecast rainfall since December 21st. All three maps are Climate Hazards Center Early Estimates depicting recent rainfall as a difference from the 1981-2019 CHIRPS average. The top panel is the estimated rainfall from December 21st to March 20th, based on final CHIRPS for December 21st through February, and preliminary CHIRPS for March 1st to 20th. The middle panel is the estimated rainfall from February 21st to March 20th, based on final CHIRPS for February 21st to 29th, and preliminary CHIRPS for March 1st to 20th. The bottom panel is an extended outlook. It shows how the post-February 21st rainfall anomaly will change if the 16-day GEFS forecast from March 26th materializes.

Source: UCSB Climate Hazards Center

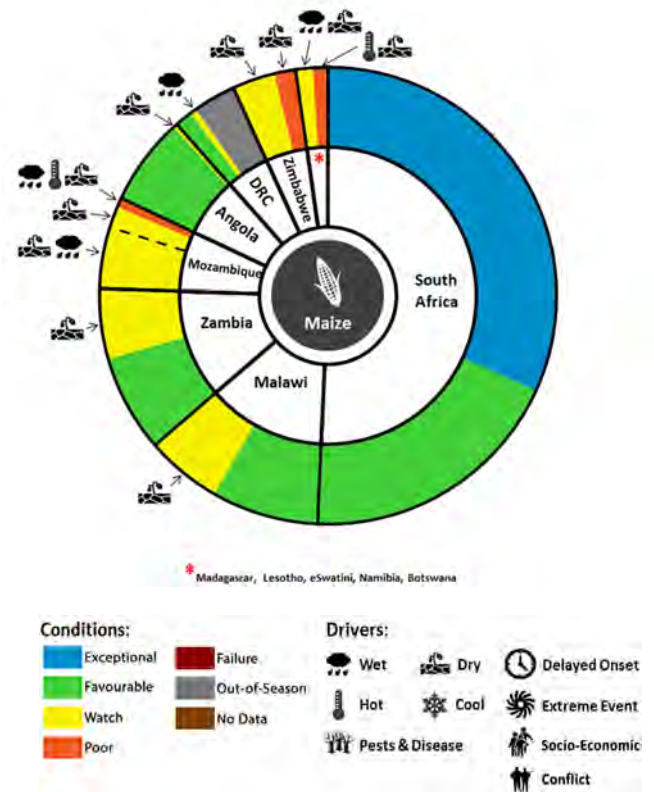
Southern Africa



Crop condition map synthesizing information 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.**

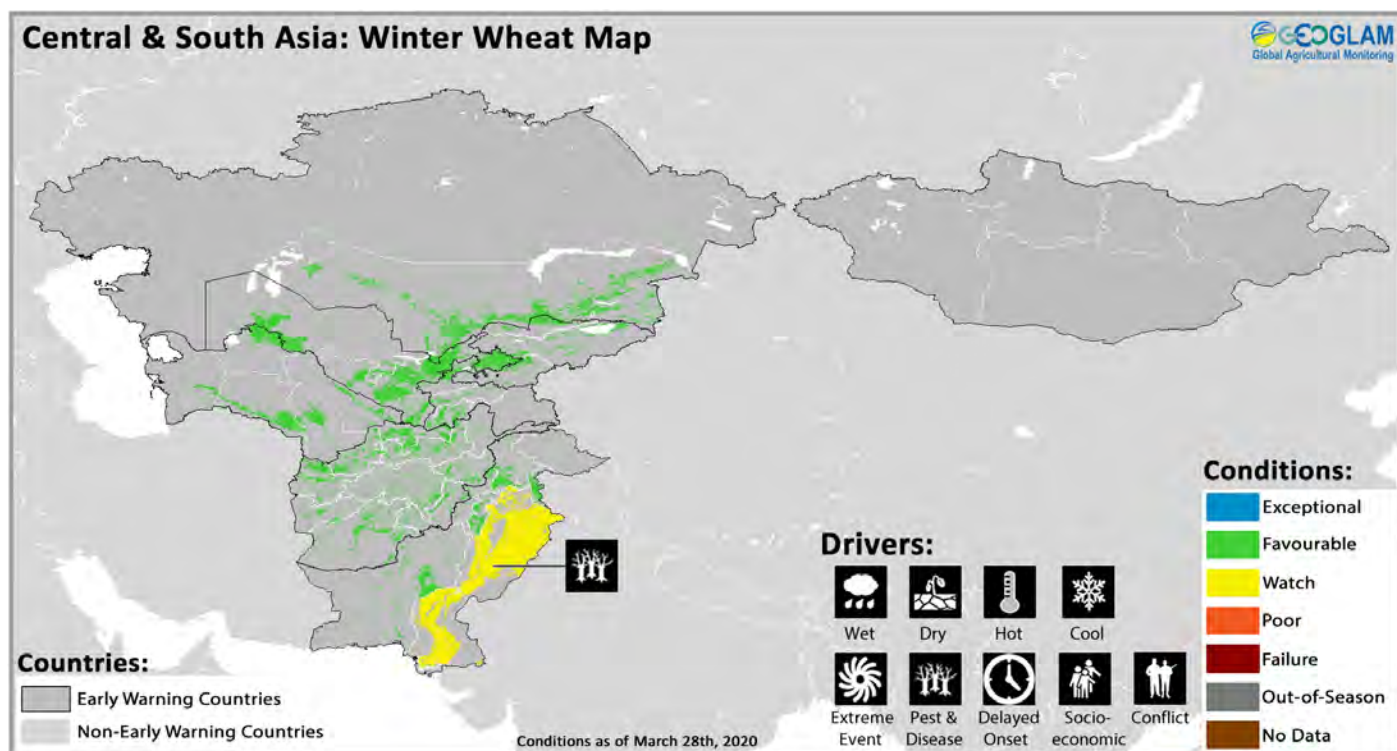
In Southern Africa, harvest of main season cereals started in March and while conditions improved across much of the region following good rains in January and February, significant concern remains for southern Mozambique and Zimbabwe which received below-average rainfall for the past three months. Throughout central and eastern parts of the region, the season has been characterized by erratic and late onset rains, followed by extended periods of drought and an early end of the season. While rainfall improved in January and February, this was followed by a four-week period with little or no rainfall in parts of Zimbabwe, central and southern Mozambique, southern Malawi, southern Madagascar, and eastern Botswana, triggering an early end to the season by as much as a month in some areas. While some earlier planted crops were reaching maturity at the onset of the four-week dry spell and are able to be harvested, crop losses are expected for late-planted crops. Additionally, there is concern in western areas including southwestern Angola, northern Namibia, and parts of Botswana due to dry conditions resulting from below-average and inconsistent rainfall throughout the season. In northeastern parts of the region including the Democratic Republic of Congo and Malawi, rainfall totals have been above the long-term average, triggering floods over the past several weeks. Last week, heavy rains caused flooding in Zambia, and parts of northern Namibia and southern Angola. Meanwhile, 30-day rainfall deficits persist in southwestern Angola, western Namibia, and parts of Botswana and Zimbabwe, eastern South Africa, Eswatini, northern Mozambique, and southern Madagascar. In **Zimbabwe**, dry conditions throughout the season and erratic rainfall resulted in reduced planted area and poor crop development across Matabeleland North, Matabeleland South, and Midlands provinces. In Manicaland province, conditions remain under watch as early and mid-season dryness resulted in reduced planted area and poor crop development and crop production and yields are expected to be below-average for main season maize. Improved rainfall in February was beneficial in many areas but resulted in flash flooding in Chimanimani and Chipinge. Vegetation indices show improved crop conditions despite a return of dry conditions in March. In Mashonaland provinces, February rainfall was beneficial to some crops, but conditions remain under watch due to early season dryness resulting in reduced planted area and crop damage. In Masvingo province, while vegetation indices show significant improvement with recent rainfall in March, conditions remain poor due to earlier impacts from dry and hot conditions. Additionally, Masvingo province experienced notable below-average temperatures in the first dekad of March. In southern **Mozambique**, concern remains for maize and rice crops due to below-average rainfall for the past three months and above-average temperatures. Additional rainfall was received in late February; however, the last two dekads have seen below-average rainfall. In Manica province, heavy rains in mid-January and then again in February caused localized flooding and crop losses in lowland areas. In Tete, rainfall received in January and February was beneficial to crop development but resulted in flooding and crop damage in

some areas. Dry conditions followed in the second dekad of March. In central areas, irregular rainfall and dry conditions resulted in flooding and waterlogging in low lying areas, but was beneficial to areas with moisture deficits. In the south, poor rainfall and above-average temperatures resulted in moisture stress and damage to early planted crops, except for in Maputo and Gaza provinces where heavy February rainfall resulted in partial or total crop damage. In Sofala province, January floods resulted in over 20,000 hectares of crop damage. More flooding occurred in February, followed by average to below-average rains in March. Cumulative seasonal rainfall is below-average. In **Angola**, maize and sorghum crop conditions are favourable due to average to above-average rainfall, except in the south where erratic rainfall has caused moisture deficits in the south and west, resulting in plant stress and wilting. In the highlands and eastern areas vegetation indices show average conditions and rainfall has been average to above-average with some flooding. In the north and north-west, cumulative rainfall is average to above-average; however, dry conditions were present in March. In southern **Zambia**, concern remains for main season maize crops due to dry spells in December and despite good rains in January, cumulative rainfall is below-average. In the central area, rainfall was average to above-average for January and February, followed by dry conditions from February to mid-March. In Lusaka province, there is concern due to erratic rainfall and December dry spells, which may impact final production. For other areas of the country, crop prospects are favourable due to improved and timely rainfall in January. However, due to the recent rainfall, flood events have impacted the north and east of the country since January, causing damage to farmland and crops along with population displacement. Among the areas worst hit by recent floods is Luapula district in the north where 28 districts were affected and need relief support. In **Botswana**, conditions are favourable for sorghum crops in the east and cumulative rainfall is mostly average with some areas experiencing below-average rainfall. However, there is some concern for late planted maize crops due to a dry spell from the last dekad of February to the second dekad of March. In the north, millet and maize crops remain under watch due to poor rainfall and high temperatures for much of the season, and dry conditions continuing in March. In **eSwatini**, there is some concern due to abnormal dryness and below-average March rainfall; however, vegetation indices show near-average conditions. In the **Democratic Republic of Congo**, conditions are generally favourable for main season maize, sorghum, and for secondary season maize, except in the central parts of the country where conditions remain under watch due to heavy seasonal rainfall and flooding, which has caused significant damage to infrastructure, loss of life, and crop loss, particularly in Maniema and Kasai. In the east and north, heavy rainfall and flooding continued through March and many areas are waterlogged. In Katanga, cumulative rainfall is below-average due to irregular seasonal rain. Fall armyworm and conflict are likely to impact final harvests. In **Lesotho**, while a late onset and irregular rainfall early in the season resulted in late planting of main season maize crops, conditions remain generally favourable. In **Malawi**, crop prospects are favourable in the north and central areas as rains throughout the season were beneficial to crop development. However, heavy rainfall and flooding in February has affected parts of north and central areas and caused damage to roads, houses, and infrastructure. Fall armyworm is present in the central areas of the country but expected to have minimal impact. In the south, there is concern due to continuing below-average rainfall, particularly in the Nsanje district. In **Madagascar**, there is concern for main season maize and rice crops in the south where below-average rainfall since early January and high temperatures have caused significant moisture stress and fall armyworm impacts have been reported. Final yields are expected to be below-average. In the north, above-average rainfall in January and February, while beneficial to some areas, caused flood damage in Melaky. In central and eastern areas, a tropical storm in January resulted in flooding in Boeny, Sofia, and Diana and caused significant damage to rice fields in Alaotra-Mangoro. Additionally, tropical cyclone Herold brought heavy rains to Analanjirifo and Sava regions in mid-March. Below-average production is expected as many fields were damaged during the floods. In **Namibia**, despite improvements from recent rains in February, concern remains for maize and millet crops due to early season dryness. In the central areas, good rains were received in February; however, below-average cumulative rainfall and high temperatures throughout critical growth stages resulted in moisture deficits and decreased water availability for agriculture. Additionally, notable below-average temperatures occurred during the first dekad of March. In the north, poor and erratic rainfall throughout the season following consecutive seasons of poor rainfall have resulted in significantly decreased water availability in dams and reduced irrigation supply. In Kunene, there are extreme moisture deficits due to persistent dryness and above-average temperatures. In **South Africa**, following a delayed onset, rains improved and were favourable throughout the season and production prospects are above the five-year average.



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

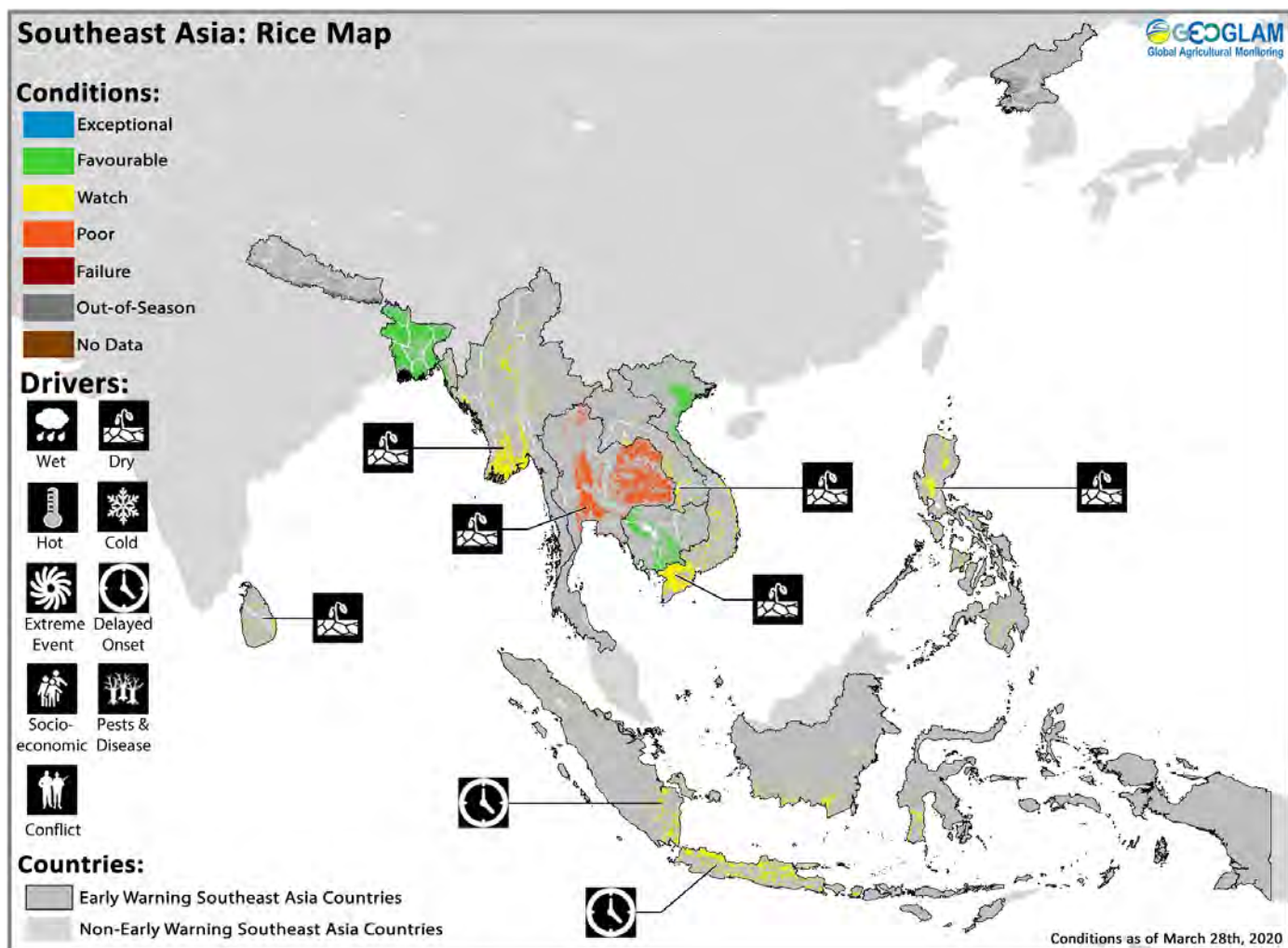
Central & South Asia



Crop condition map synthesizing information 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.**

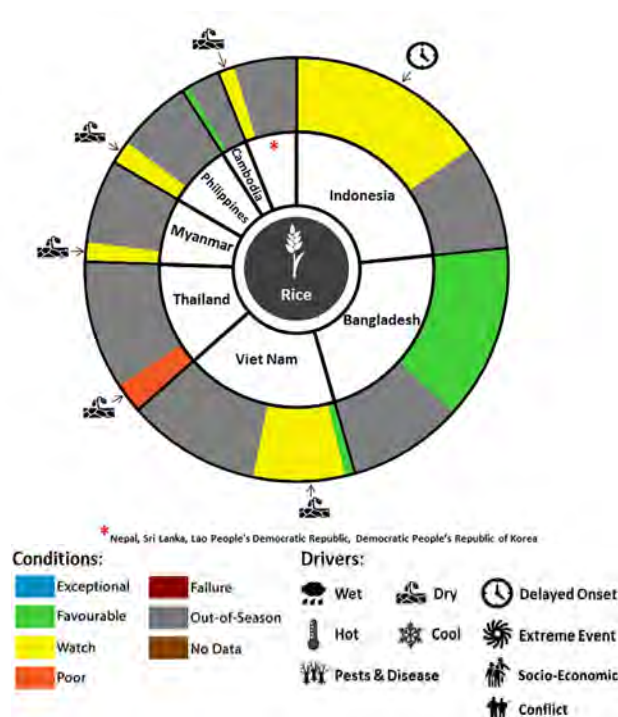
In Central Asia, planting of spring wheat began in March under favourable conditions and average precipitation levels since January have been beneficial for soil moisture. Winter cereals, to be harvested between June and August, are in vegetative to reproductive stages under overall favourable weather conditions. Recent temperatures have been above-average; however, vegetation conditions remain near-average. Temperatures in early March averaged between three and nine degrees Celsius above normal, reaching as high as 20 degrees Celsius in southern **Kazakhstan** and 27 degrees in southern **Turkmenistan** and northwestern **Afghanistan**. **Afghanistan** and **Tajikistan** received widespread rain and high-elevation snow in early March, which helped to relieve some abnormal dryness in the region, although moisture deficits persist across parts of northeastern Afghanistan and eastern Tajikistan. In **Afghanistan**, above-average rainfall conditions across most of the country in recent weeks has allowed for early planting of spring crops to begin. Cumulative precipitation from October to March was above-average across most of the country except the northernmost region where precipitation conditions have been about 70 percent below normal. However, reports indicate that dryness in the northern provinces will not affect first crop growth from April-June as above-average rains are forecast for April. In March, the snow depth anomalies continued to be below-average at higher elevations in the north and northeast but above-average in the middle and lower elevations in central and southern Afghanistan. Further, the snow water volumes in most basins across the country have remained below-average except in Arghandab and Helmand basins in the south. Heavy precipitation is expected across the country in the first week of April, which will not only improve the snow water volumes but also increase the storage in various reservoirs across the country. In addition, the above-average precipitation will be beneficial to the ongoing land preparation and planting of spring wheat and will establish favourable soil moisture conditions for crop growth and pastures with good rains during April through June. The combination of above-average temperatures and anticipated heavy precipitation during the last week of March and early April may lead to flooding in the downstream areas in the central, eastern, and southern parts of the country. In **Pakistan**, growing conditions for the soon to be harvested 2020 wheat crop are generally good following favourable weather conditions and good availability of agricultural inputs. Concern remains in parts of the main producing provinces of Punjab and Sindh due to the outbreak of desert locusts, particularly as warm weather in April could support locust breeding. The government undertook control measures to keep the threat under control. However, if favourable weather conditions for locust breeding in April prevail, this could create a deterioration of the food security situation in the most affected areas.

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, dry season rice is in the grain filling to harvest stage and there is concern due to dry conditions and insufficient water supply for irrigation following below-average rainfall during the 2019 wet-season and continuing below-average precipitation. Final planted area of dry-season rice is below-average across much of the region with the most significant reductions in **Thailand** and **Myanmar** and yields are expected to be below-average due to water shortages. Additionally, in the Mekong Delta of **Vietnam**, lower water levels of the Mekong river have caused increased levels of saline intrusion. Forecasts indicate below-average rainfall patterns may continue across the north of the region through April while Indonesia may experience above-average rains (See Regional Outlook Pg. 14). In **Indonesia**, continuing rainfall in March supported wet-season rice sowing which continued much later into the season than normal. Harvesting area of earlier sown crops decreased 35.9 percent compared to last year under watch conditions due to the prolonged drought. According to the UN Office for the Coordination of Humanitarian Affairs, heavy rainfall in the first week of March resulted in flooding in North Bolaang Mongondow district of North Sulawesi, affecting homes, infrastructure, and 2,000 hectares of cropland. In the **Philippines**, conditions have deteriorated for dry-season rice sown in November to December as insufficient soil moisture during the main development phases has reduced expected yields. In Thailand, harvesting of dry-season rice has begun under poor conditions due to



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

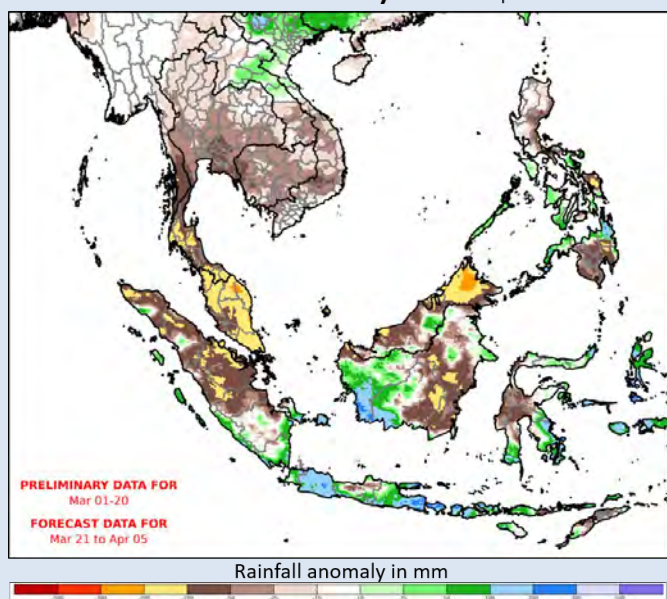
the season-long shortage of available water for irrigation, and some pest damage in the northern region. Total sown area is estimated to be down by about one third compared to last year due to dry conditions. In **Vietnam**, harvesting of dry-season rice (winter-spring) is beginning under watch conditions in the south due to damaging saltwater intrusion, which has also reduced total sown area by 3.9 percent. In the north, sowing continues under favourable conditions due to warm weather and ample irrigation preparation and sown area is comparable to last year. In **Laos**, dry-season rice planting has reached 101 percent of the total national plan of 90 thousand hectares, and crops are in tillering to young panicle forming stage. While irrigation supplies remain sufficient, concern remains due to continuing dry conditions. In **Myanmar**, dry-season rice planting has reached 78 percent of the total national plan of 1.1 million and there is concern the remaining field may not be planted due to limited water supply for irrigation. Early planted crops are in the vegetative to reproductive stage and 60 thousand hectares in the delta region have been harvested and yields are favourable. In **Cambodia**, harvest of dry-season rice is nearing completion and final planted area reached 597 thousand hectares, similar to last year. The average yield is reported at 4.4 tonnes per hectare, slightly lower than last year due to impacts from drought. In **Sri Lanka**, growing conditions for the 2020 main paddy and maize crops are near normal, reflecting average to above-average precipitation between October and January, which is a critical period for crop development. However, rains were below-average from late January and there are some concerns due to dry spells in the eastern parts of the country including Tincomalee, Anuradhapura, Polonnaruwa Matala, Kandy, Badulla, Monaragala, Batticaloa and Ampara. In **Bangladesh**, harvest will start at the end of April for wheat and *Boro* rice crops and conditions are generally favourable. In **Nepal**, planting of the 2020 maize crop is progressing under favourable conditions.

Regional Outlook: Below-average rains are forecast to continue in northern Southeast Asia through April while above-average rains are expected in Indonesia.

Rainfall for the end of February through mid-March was below-average across most of southeast Asia, with the exception of southeast Indonesia (west Kalimantan, Java, and the Lesser Sunda Islands).

Short-term and long-term forecasts predict below-average rainfall will continue in the northern half of the region through April. If the 16-day forecast indicating below-average rainfall materializes, negative anomalies for February 21st to April 5th could exceed 50 mm across much of the region, and up to 100mm in Malaysia, Sumatra, and eastern Kalimantan (Figure 2-left). The 30-day SubX forecast also indicates dry conditions may continue through April over the northern half of the region, including Malaysia, Thailand, Cambodia, Vietnam, and the Philippines (Figure 2-right). Over southern Indonesia, the 30-day rainfall forecasts indicate above average precipitation for April, the first month of planting for the second season rice.

Rainfall Outlook Anomaly: Feb 21 – Apr 05 2020



30-day Forecast Anomaly: Mar 26 – Apr 24

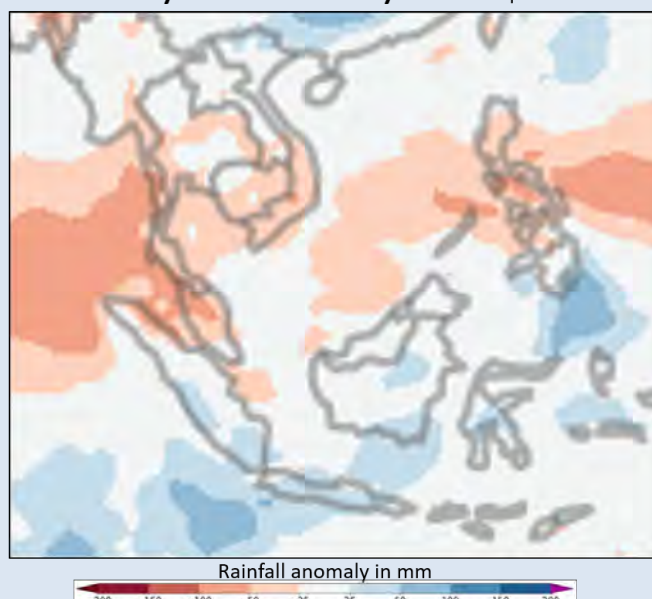
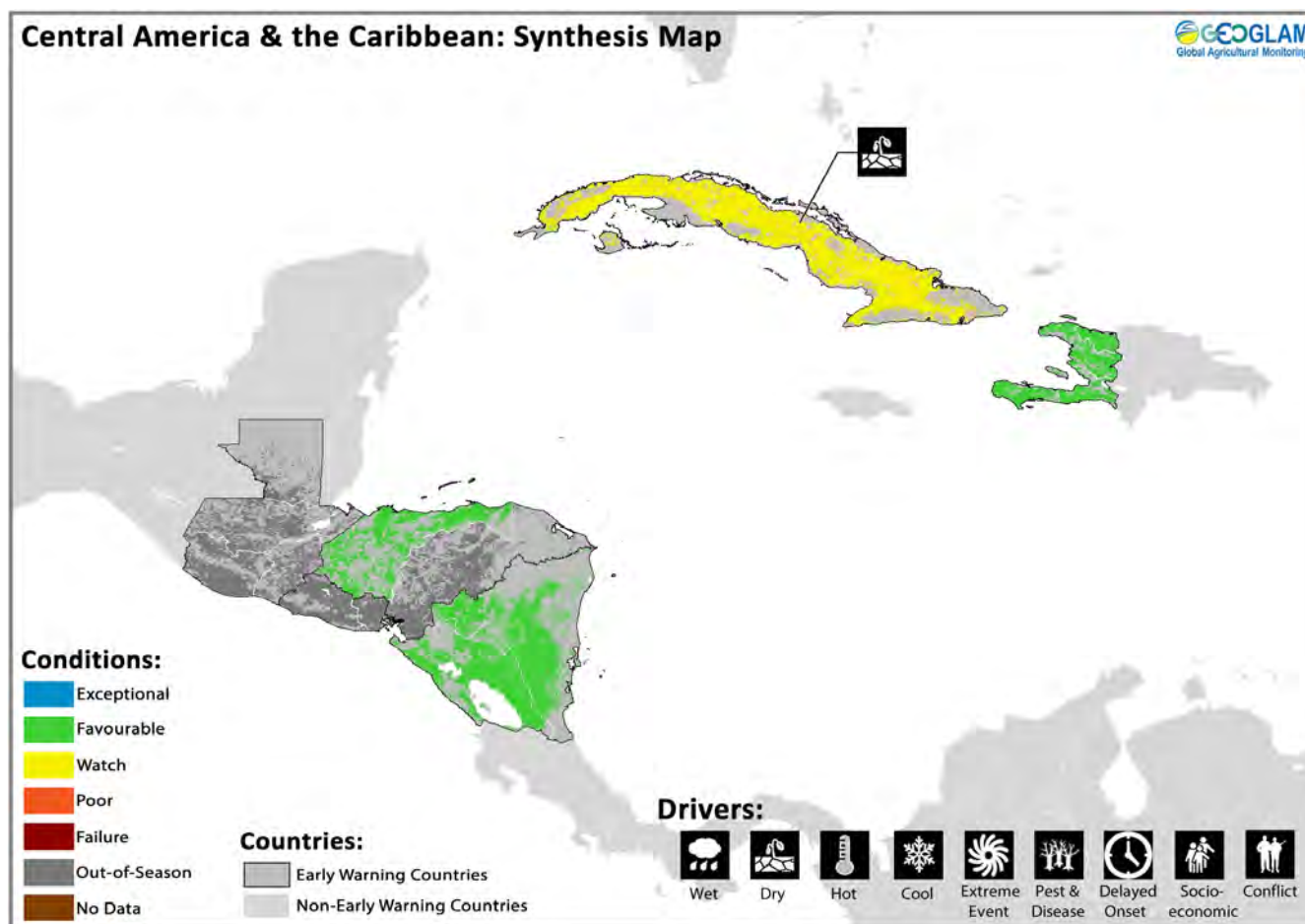


Figure 1. Estimated and forecast rainfall since February 21st and a 30-day forecast. Both maps depict rainfall in terms of the difference from average. The left panel is an extended outlook for February 21st to April 5th. This UCSB Climate Hazards Center Early Estimate is based on final CHIRPS for February, preliminary CHIRPS for March 1st to 20th, and the 16-day unbiased GEFS forecast from March 26th. The anomaly is based on the 1981-2019 CHIRPS average. On the right is a 30-day forecast from March 26th. The image shows the average of four Subseasonal Experiment (SubX) model forecasts available on that day. The anomaly is based on the 1999 to 2016 model average. Skill assessments of SubX can be accessed at <http://cola.gmu.edu/kpegion/subx/index.html>.
Source: UCSB Climate Hazards Center

Central America & Caribbean



Crop condition map synthesizing information 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 and the Caribbean, harvest is complete for *Apante* season beans and winter rice crops and final yields were favourable. In **Nicaragua**, the *Apante* bean harvest is complete and average yields resulted due to favourable distribution of rain in December and above-average rains through the start of 2020. In **Honduras**, rice crops are favourable in the northern producing region, aided by good rainfall since mid-December and harvest will begin in May. In **Cuba**, rice crops are in the flowering and grain-filling stages and conditions are favourable, despite the seasonally low precipitation from November to February, due to sufficient irrigation supply. In **Haiti**, the winter harvest has concluded and average yields resulted except in some northern regions. In the Nord-Ouest department, below-average rainfall from October to early January affected the winter bean crops and resulted in localized yield reductions for subsistence farmers. Harvest is complete for rice paddy crop and production is forecast at average levels. Due to the recent moisture, some farmers have begun sowing activities for *Primera* season crops. In **Guatemala**, early sowing activities have begun for *Primera* season crops in Huehuetenango.

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 2nd 2020.

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.

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

www.cropmonitor.org
 @GeoCropMonitor



Prepared by members of the GEOGLAM Community of Practice, coordinated by the University of Maryland Center for Global Agricultural Research and funded through NASA Harvest.



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

Cover Photo by Chris Shitote

Contributing partners



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