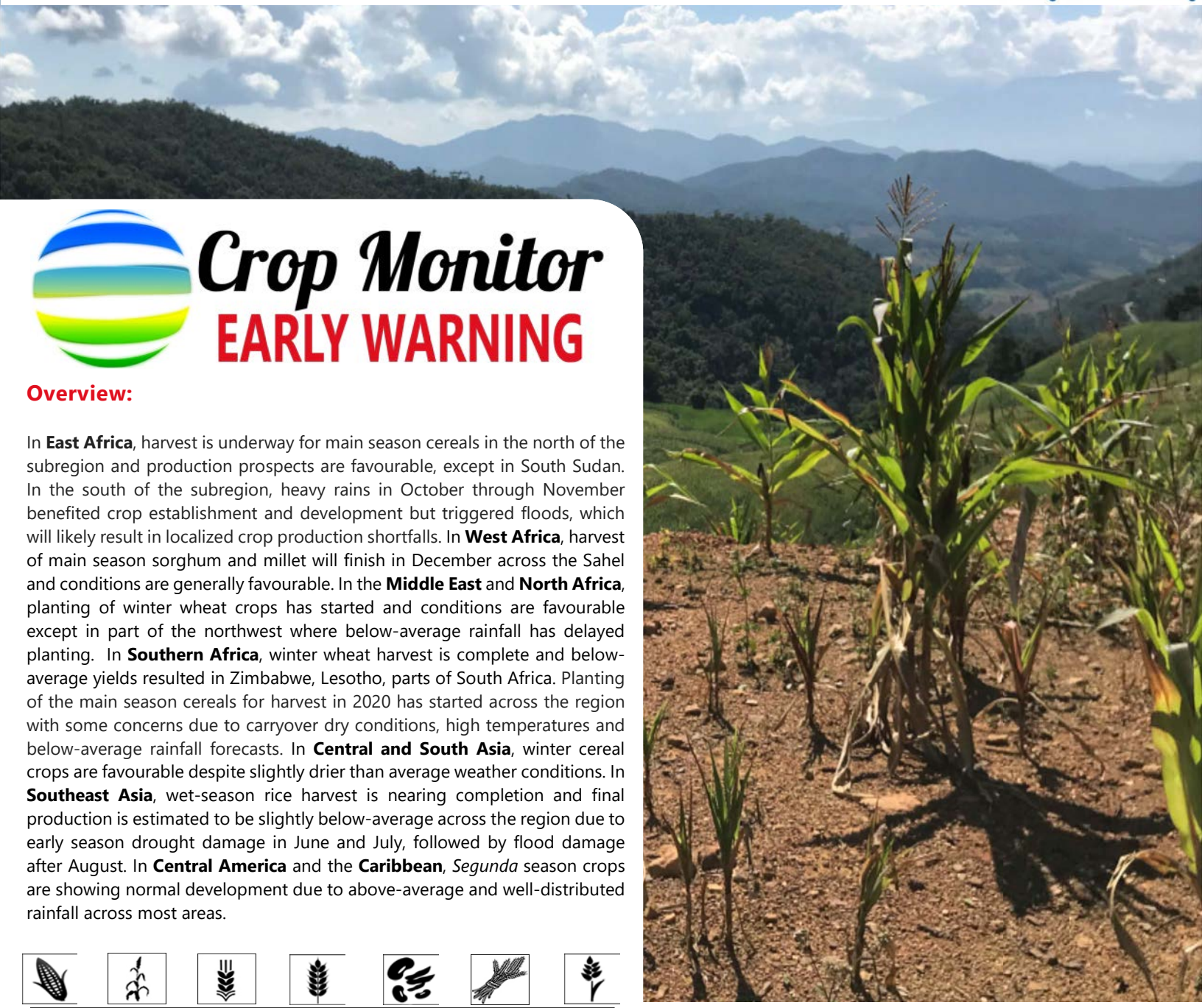
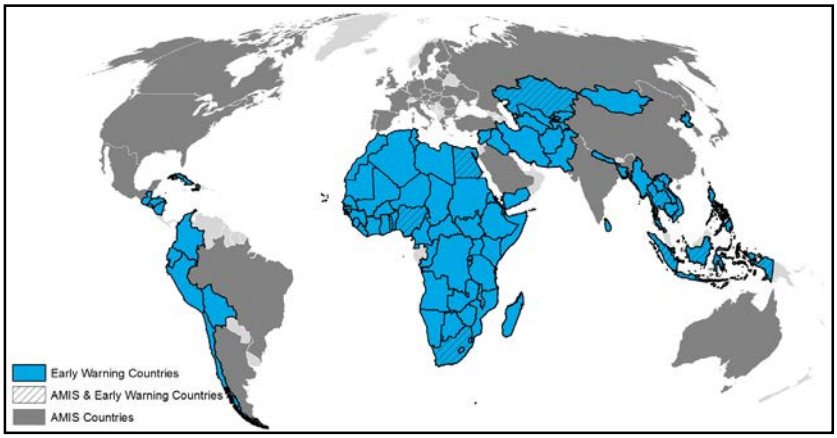
GEOGLAM Global Agricultural Monitoring



Crop Monitor EARLY WARNING

Overview:

In **East Africa**, harvest is underway for main season cereals in the north of the subregion and production prospects are favourable, except in South Sudan. In the south of the subregion, heavy rains in October through November benefited crop establishment and development but triggered floods, which will likely result in localized crop production shortfalls. In **West Africa**, harvest of main season sorghum and millet will finish in December across the Sahel and conditions are generally favourable. In the **Middle East** and **North Africa**, planting of winter wheat crops has started and conditions are favourable except in part of the northwest where below-average rainfall has delayed planting. In **Southern Africa**, winter wheat harvest is complete and below-average yields resulted in Zimbabwe, Lesotho, parts of South Africa. Planting of the main season cereals for harvest in 2020 has started across the region with some concerns due to carryover dry conditions, high temperatures and below-average rainfall forecasts. In **Central and South Asia**, winter cereal crops are favourable despite slightly drier than average weather conditions. In **Southeast Asia**, wet-season rice harvest is nearing completion and final production is estimated to be slightly below-average across the region due to early season drought damage in June and July, followed by flood damage after August. In **Central America** and the **Caribbean**, *Segunda* season crops are showing normal development due to above-average and well-distributed rainfall across most areas.



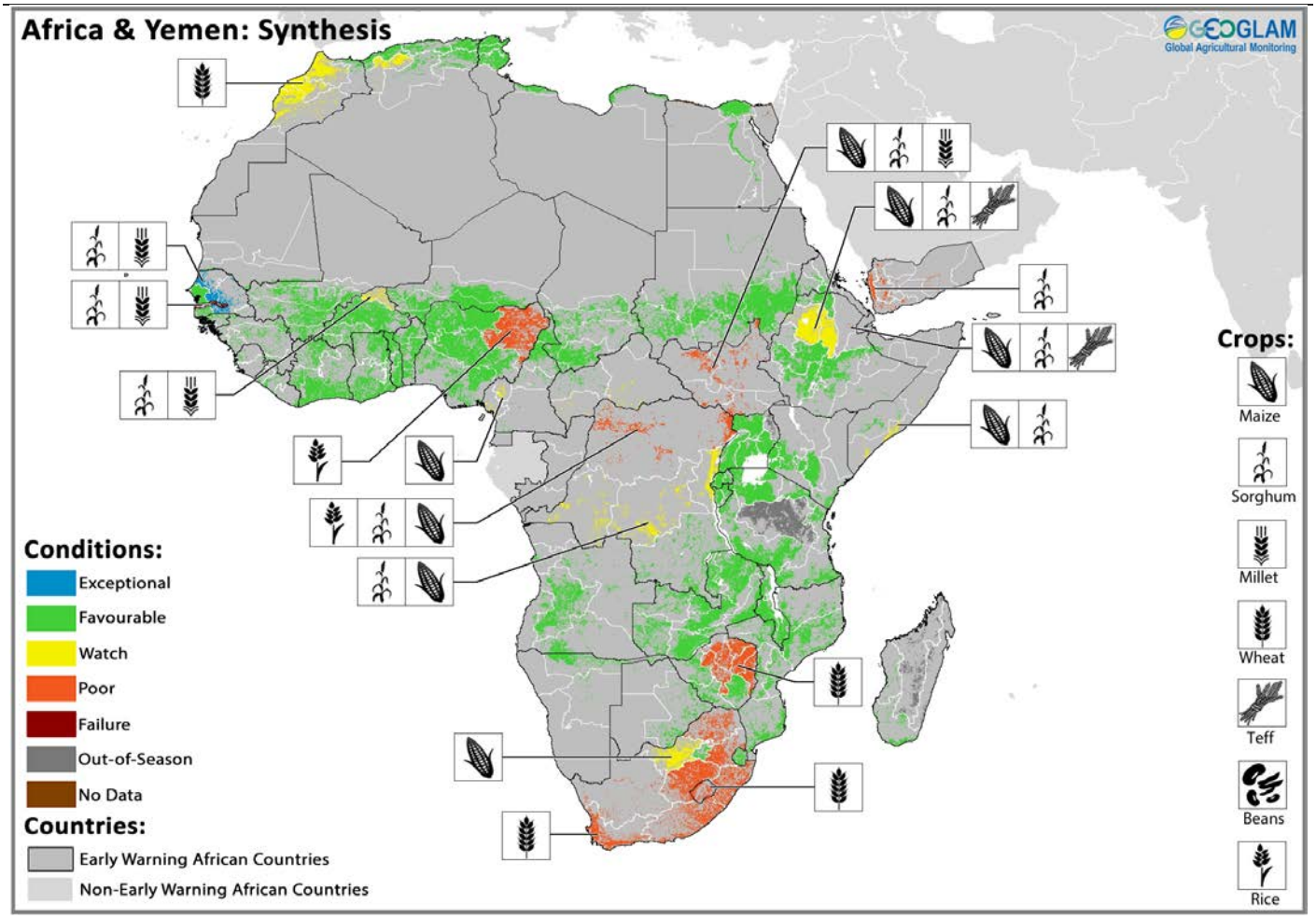
Contents:

GEO GROUP ON EARTH OBSERVATIONS

GEOGLAM Crop Monitor for Early Warning

Crop Conditions at a Glance

based on best available information as of November 28th



Crop condition map synthesizing information for all Crop Monitor for Early Warning crops as of November 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: In northern areas of the subregion, harvest of main season cereals is underway and production prospects are favourable except in parts of Ethiopia due to dry weather and desert locust impacts and in South Sudan due to ongoing conflict. In central and southern areas of the subregion, planting of second season crops, for harvest in early 2020, was recently completed. Abundant rains in October and November benefited crop establishment but triggered floods in several areas of Somalia, Kenya, Ethiopia, and South Sudan. Above-average rainfall is expected to continue through December in most of the region (See Regional Outlook Pg. 5).

WEST AFRICA: Across the Sahel, harvesting of main season sorghum and millet crops is expected to complete in December and conditions are favourable except in Gambia where dry conditions have affected crops.

MIDDLE EAST & NORTH AFRICA: Planting is underway for the 2020 winter wheat season and conditions are favourable albeit with a slight delay in onset rains in the northwest of North Africa.

SOUTHERN AFRICA: Harvest of the 2019 winter wheat crop is complete and poor conditions have resulted in Zimbabwe, Lesotho, and parts of South Africa. Planting of main season cereals is underway with normal onset of rains. However, there is some concern due to high temperatures, carryover dry conditions from the previous season, low reservoir levels and below-average rainfall forecasts in the central and southeast areas (See Regional Outlook Pg. 10).

CENTRAL & SOUTH ASIA: Planting of the winter cereal crops, to be harvested from May 2020, took place between September and November 2019 under slightly drier than average weather conditions, however, crop conditions remain favourable.

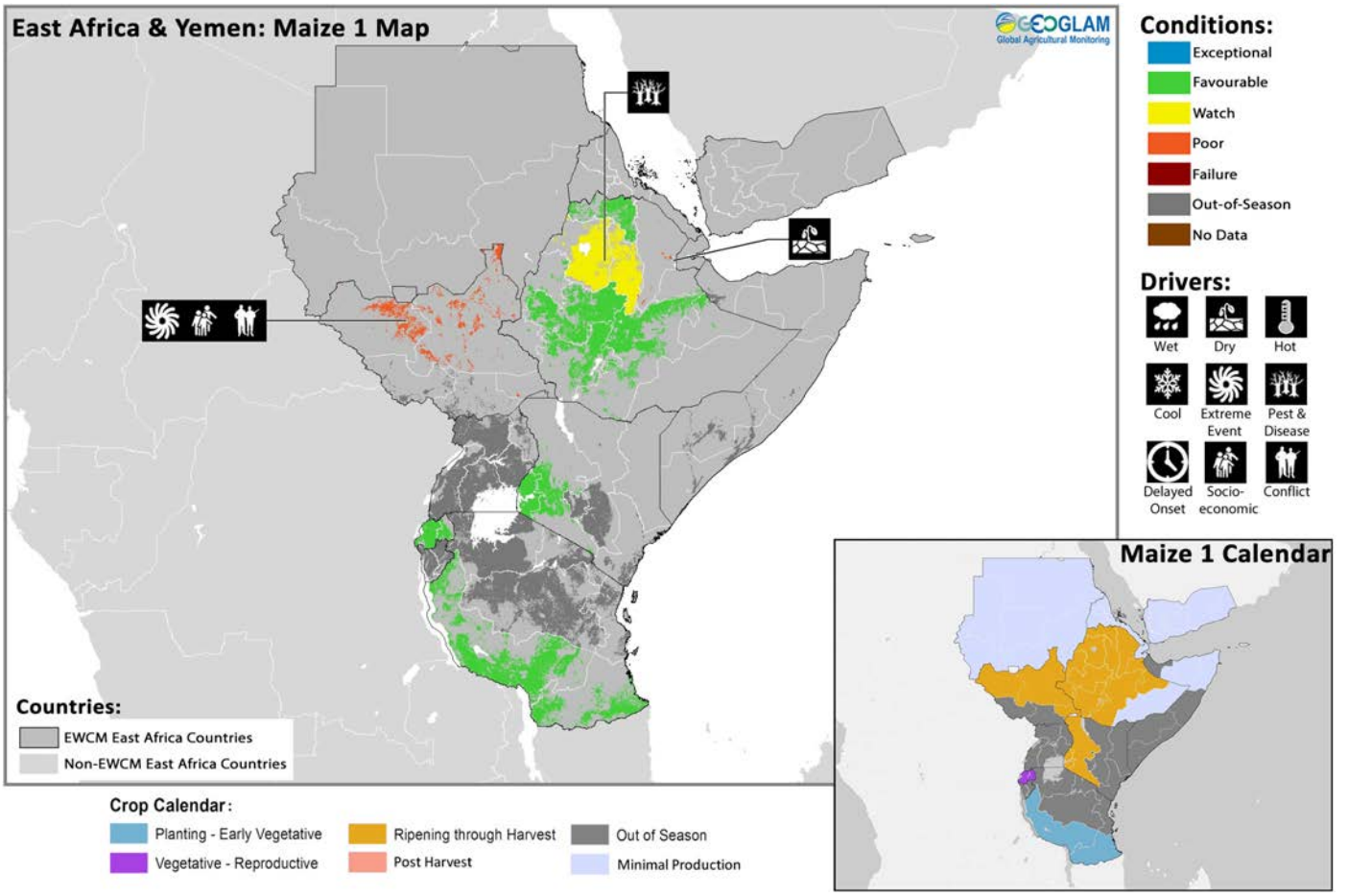
SOUTHEAST ASIA: Harvest is underway for wet-season rice crops and production is estimated to be slightly below-average across the region due to early-season drought damage in June and July followed by flood damage after August. In Indonesia, planting is ongoing for wet-season rice with concerns due to rainfall deficits, which are expected to continue through December across the south and east (See Regional Outlook Pg. 13).

CENTRAL AMERICA & CARIBBEAN: *Segunda* (*Postrera)* season bean and maize crops are in vegetative to reproductive stages and crops are showing normal development due to sufficient and well-distributed rainfall across most areas.

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

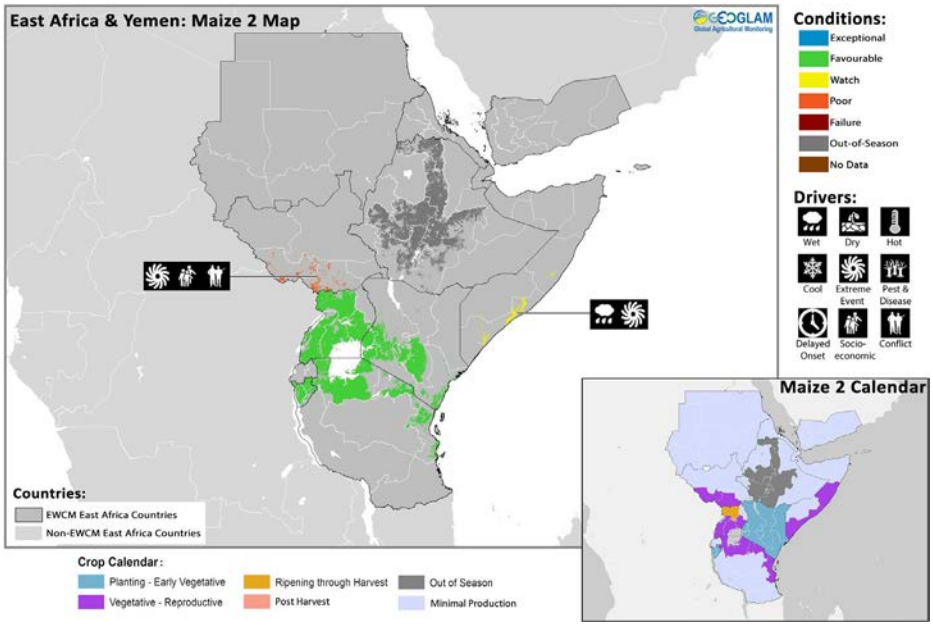
El Niño-Southern Oscillation (ENSO) conditions are neutral and are likely to remain neutral through June 2020. The Indian Ocean Dipole (IOD) is in a strong positive state and is forecast to remain positive through the rest of 2019 and potentially into January 2020. A positive IOD tends to enhance rainfall in parts of East Africa and suppress rainfall in Australia.
Source: UCSB Climate Hazards Center

East Africa & Yemen



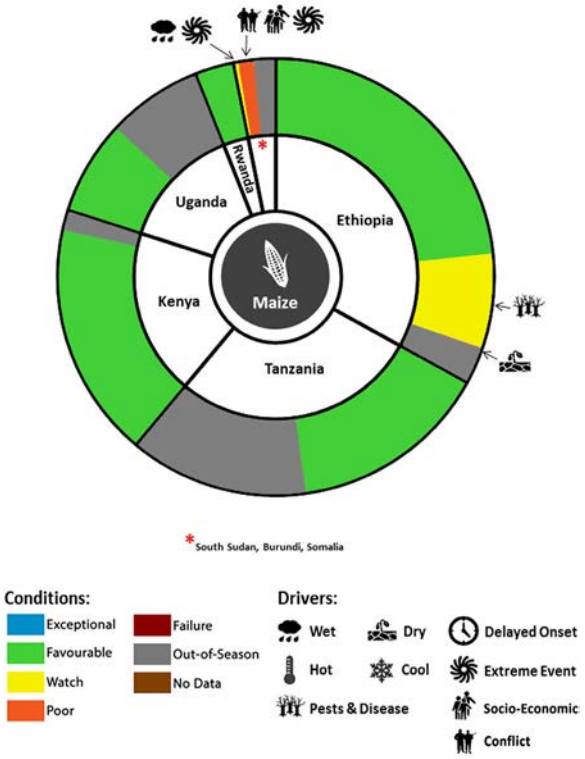
Crop condition map synthesizing conditions as of November 28th. Crop conditions over the main growing areas are based on a combination of inputs including remotely sensed data, ground observations, field reports, national, and regional experts. ***Conditions that are other than favourable are labeled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

Across the north of the region, including in Ethiopia, Eritrea, Sudan, western Kenya, and central and northern South Sudan, harvest is underway for main season cereals and conditions are generally favourable except in parts of Ethiopia due to unseasonal rains at harvest time and desert locust infestations, and in South Sudan due to widespread floods and the impact of ongoing conflict. In **Ethiopia**, overall production prospects for the main *Meher* season crops are favourable in key growing areas of western Amhara, western Oromia and Benishangul Gumuz regions as above-average June to September *Kiremt* rains resulted in above-average vegetation conditions. However, unseasonal heavy rains at harvest time in October and November, coupled with desert locust infestations in eastern Amhara, eastern Oromiya and Tigray regions, are likely to result in localized crop losses. Notably, in Amhara, locusts invaded nearly 75,000 hectares of both crop and rangeland according to the Regional Bureau of Agriculture. Some localized areas are reporting crop losses due to locusts and households are harvesting early to avoid large-scale losses. The government is implementing control measures to contain the locust outbreak. In agropastoral areas of the northern Afar region, poor mid-July to mid-September 2019 *Karan/Karma* rains resulted in poor cereal production prospects. In agropastoral areas of southern and southeastern **Ethiopia**, *Deyr* rains were significantly above-average, resulting in one of the wettest Octobers on the historical record. While localized flooding occurred in Oromia, SNNPR and Somali regions, the above-average rains were beneficial to crop development. In **Eritrea** and **Djibouti**, rains have been above-average through most of the season, leading to favourable harvest conditions. In **Sudan**, precipitation has been consistently well-above-average throughout the rainy season, benefiting crops but also triggering floods and waterlogging in parts of Khartoum, Kassala, El Gezira, Red Sea, and River Nile states, as well as in the Greater



Crop condition map synthesizing information as of November 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.***

Darfur and Greater Kordofan regions. Although about 964,000 hectares or approximately four percent of the cultivated area have been affected by the floods, an above-average cereal output is still expected. An ongoing nationwide, government-led crop assessment supported by FAO will provide detailed production estimates in early 2020. More substantial flood-induced crop losses are expected in **South Sudan**, where harvest is nearing completion in central and northern unimodal areas and second season crops will be gathered in December in the bimodal south. Exceptionally abundant late-season rains in September and October, especially in northern and eastern areas, resulted in widespread floods that affected about 900,000 people and prompted the government to declare a state of emergency. The floods have significantly reduced the harvested area, offsetting the positive impact of an increase in plantings due to an improved security situation and are expected to result in an overall lower harvest. According to preliminary estimates, about 74,000 hectares of cultivated land was lost in former Northern Bahr el Ghazal, Upper Nile, Unity, Jonglei, Lakes, Warrap, and Eastern and Central Equatoria states. National 2019 crop production estimates will be provided by a joint FAO/WFP Crop and Food Security Assessment Mission (CFSAM), fielded in the country in late December. In key growing areas of **Kenya**'s Rift Valley and Western provinces, maize harvesting activities for the main *Long Rains* season are nearing completion and conditions are generally favourable. In the **United Republic of Tanzania**'s main producing southern highlands, rains have been slightly below-average in the southeast and southwest regions over Ruvuma, Njombe, Mbeya and Rukwa, however, it is still early in the season and above-average rainfall is forecast for December.



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

In central and southern parts of the subregion, including Burundi, Rwanda, Uganda, southeastern Kenya, central and southern Somalia, and bimodal rainfall areas of the United Republic of Tanzania, planting of second season crops, for harvest in early 2020, was recently completed. The season started with heavy rains throughout October across most of the region, triggering widespread flooding in central and southern **Somalia**, northeast **Kenya**, eastern **South Sudan**, and northeast **Tanzania**. In addition, tropical storm Kyarr made landfall in Somalia and Puntland, resulting in further damage to crops and infrastructures. Planting for **Kenya**'s *Short Rains* cereal crop started under favourable weather conditions and above-average rains have favoured newly planted maize crops. However, flooding since the start of October destroyed infrastructure, cut off major roads halting transport, and displaced as many as 11,700 families, primarily in the northeast. According to the Kenya Meteorological Department, the rains in arid and semi-arid regions are two to three times above normal. In **Somalia**, *Deyr* secondary season crops are in vegetative to reproductive stages, and the flood-induced damage to about 80,000 hectares of cropland in high potential riverine-irrigated areas along the Shabelle River is expected to result in a substantial shortfall in *Deyr* crop production. However, as already occurred in previous rainy seasons characterized by similar abundant precipitation, ample areas are expected to be available for recession agriculture and the increased irrigation water availability due to high river levels will likely result in increased off-season plantings in December. As a result, an above-average off-season harvest is expected in March in these areas, offsetting the anticipated cereal production decline of the main *Deyr* crop and overall crop prospects are favourable. While floodwaters are now subsiding, a developing tropical storm is forecast to bring heavy rains in the first week of December across eastern **Somalia** and southeastern **Ethiopia** (See Regional Outlook Pg. 5). In the **United Republic of Tanzania**, short-season *Vuli* maize crops are in vegetative to reproductive stages across the bimodal northeast and both vegetation conditions

and crop prospects are generally favourable. In **Uganda**, second season maize crops are in vegetative to reproductive stages under favourable conditions with some reports of flooding in the east over Bulambuli and Butaleja districts due to continuous heavy rainfall since mid-October. In Karamoja, harvest is underway for main season crops and despite above-average vegetation conditions and yield expectations due to abundant mid and late-season rains, a reduced cereal output is expected due to severe early season dryness and seed shortages, which resulted in a sharply reduced planted area. In **Rwanda** and **Burundi**, harvesting of the 2020 A season crops has recently started and production prospects are favourable, owing to abundant seasonal rains received throughout the cropping period.

Regional Outlook: Above-average rainfall is expected to continue across the region into December, along with increased flood risk

Much of East Africa received higher than normal rainfall in the past two months, and average to above-average rainfall is forecast during December. The October to December 2019 season is on track to be one of the top three wettest on record, since 1981, for many areas. Figure 1 (left) shows an outlook for percent of normal October 1 to December 15 rainfall, based on a combination of estimated and forecast amounts. Season-to-date amounts may be 150 percent to more than than 200 percent of average.

According to the two-week forecast issued December 1, average to above-average rainfall is expected for the first half of December in most in-season areas. Substantially higher than average rainfall is forecast in central and western Kenya, the Lake Victoria region, northern Tanzania, and parts of southern Tanzania. The forecast also shows a potential for atypically high rainfall amounts in northeastern Kenya and southwestern Ethiopia in the second week. In eastern Somalia and southeastern Ethiopia there is potential for heavy rain and winds associated with a tropical storm forecast to reach the area on December 6. There some chance it could develop into a cyclone. Given the severe impacts of recent flooding on communities across the region, updated forecasts should be monitored.

During December the bulk of rains is expected to move southward and intensify in Tanzania, but some equatorial areas may also see above-average rainfall for the month (Figure 1-right). This outlook is in line with the latest forecast for a positive Indian Ocean Dipole (IOD) mode into January. A strong IOD helped to produce the very wet conditions in October and November. It has recently weakened in strength but is likely to still promote enhanced rainfall in East Africa during the next several weeks.

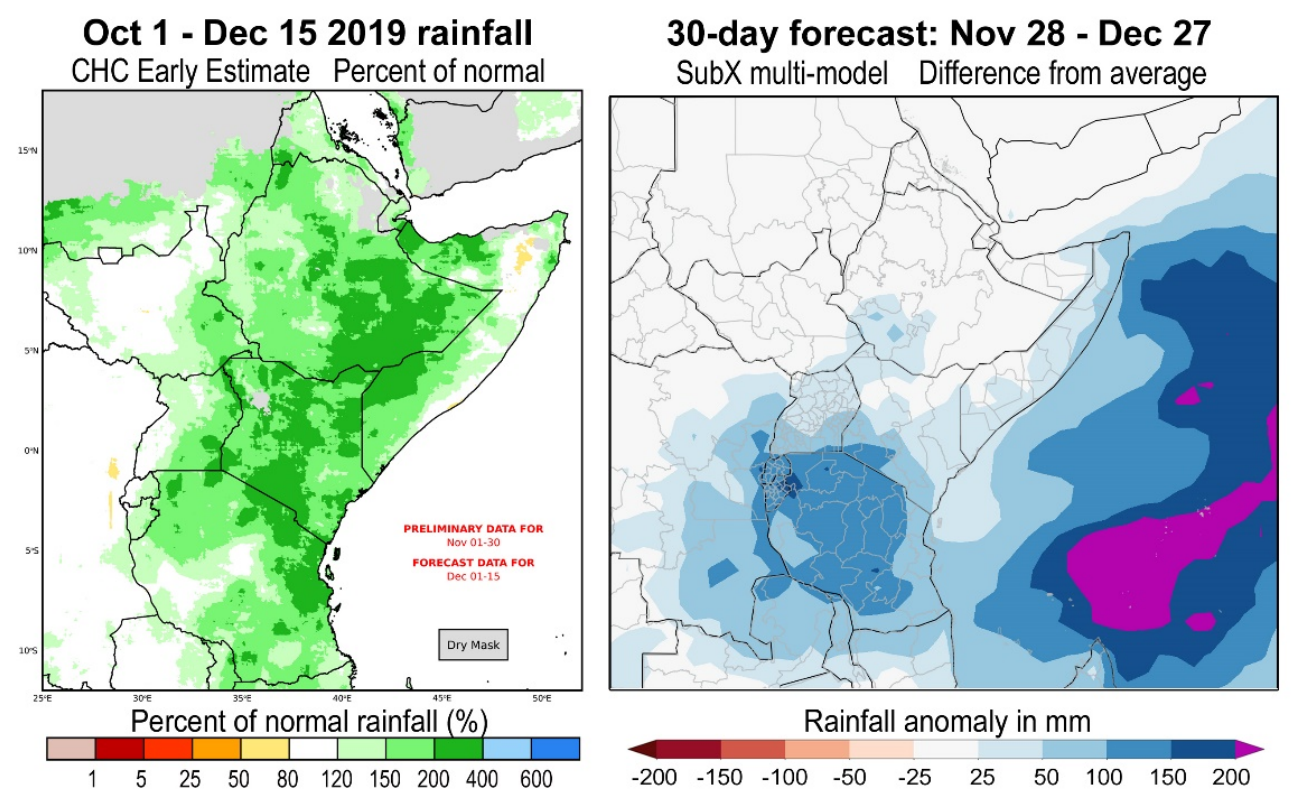
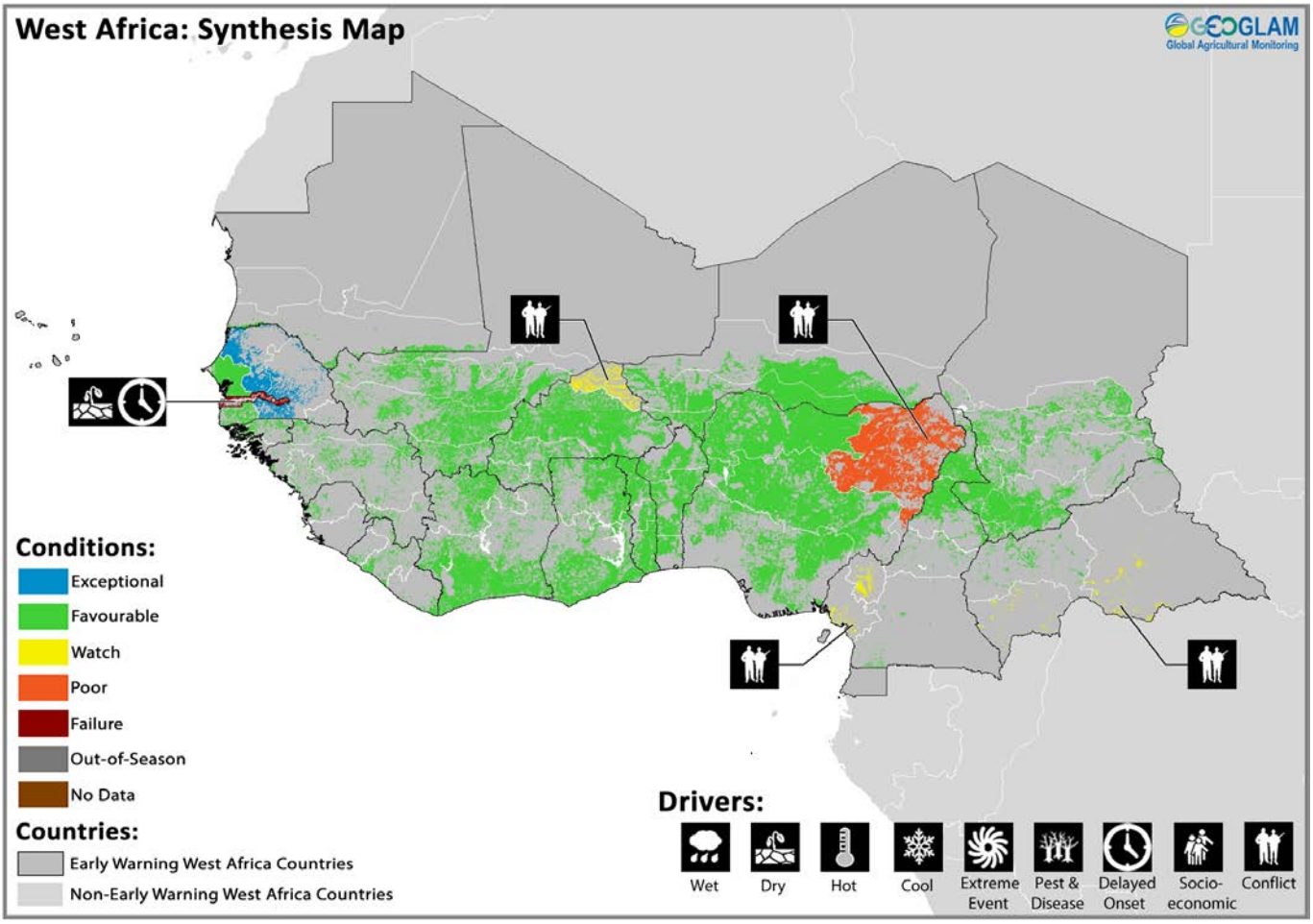


Figure 1. Outlook for October 1 to December 15, 2019 rainfall and a 30-day forecast. On the left is the UCSB Climate Hazards Center Early Estimate for October 1 to December 15, based on final CHIRPS for October 1-31, preliminary CHIRPS for November 1-30, and an unbiased GEFS forecast for Dec. 1-15. The image shows how the combined total compares to the 1981-2018 CHIRPS average, in terms of the percent of average. On the right is a 30-day forecast from November 27. The image shows the forecast difference from average according to five 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

West Africa

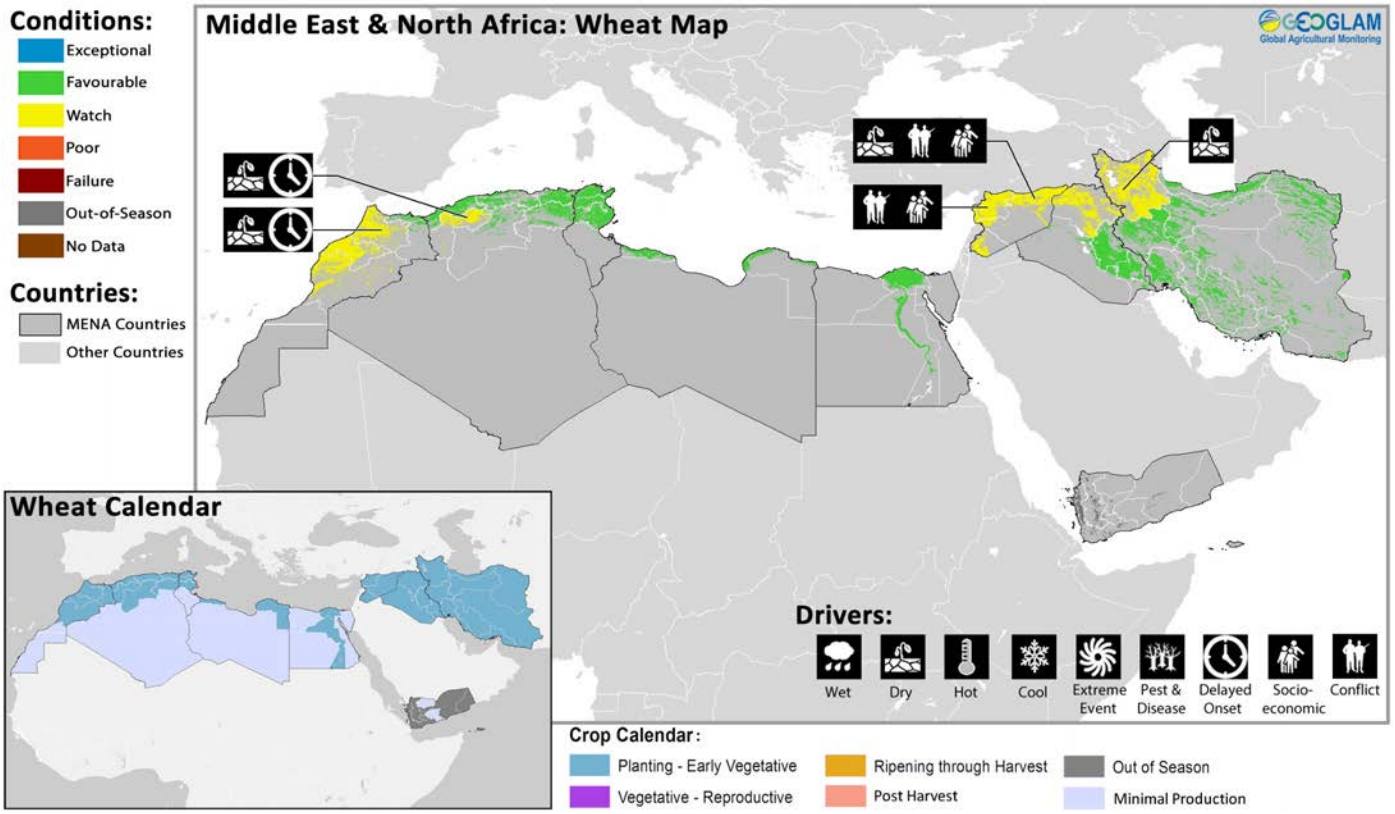


Crop condition map synthesizing information as of November 28th. Crop conditions over the main growing areas are based on a combination of inputs including remotely sensed data, ground observations, field reports, national, and regional experts. ***Crops that are in other than favourable conditions are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

Across the Sahel region, harvesting of main season sorghum and millet crops is expected to complete in December. Conditions are generally favourable across the region except in **Gambia** where delayed rains and dry conditions continue to affect crops, and in north **Burkina Faso** where insecurity and increasing flows of internally displaced persons are hampering agricultural activities. In **Gambia**, the season started with extended dry spells that delayed planting operations and affected crop development. Improved rainfall in August did not improve crop conditions and cereal production is estimated at 46 percent below the five-year average. In **Mauritania**, the season has been characterized by a late-onset, which had a negative impact on rainfed crop performance. However, the *dieri* or rainfed cropping system accounts for only 14.5 percent of production on average. A significant improvement in rainfall from August to late-October resulted in increased surface water availability, allowing for increased cropped area and yield in the irrigated and recessional cropping system. Cereal production is estimated at 23 percent above the five-year average and 15 percent above the 2018 average due to an increase in rice and maize planted area that offset the impacts from rainfall deficits. However, rainfed crop production is estimated at 17 percent below the five-year average and 32 percent below the 2018 level due to rainfall deficits. In **Burkina Faso,** worsening violence and insecurity in Nord and Centre Nord regions continues to impact agricultural activities. In **Mali**, harvest conditions are average to above-average except in some areas facing deficits due to inadequate rainfall in the western Sahel and other areas facing insecurity in the north and center of the country. In the central and bimodal rainfall areas of **Cameroon**, harvesting of millet and sorghum is ongoing and expected to complete in January. In the West and Plateau regions, precipitations have been overall adequate and well-distributed throughout the season, benefiting maize crop development. However, insecurity continues to limit household access to fields and the 2019 cereal output is forecast below the average level. In the Far-North region, following favourable weather conditions during the season and a slight increase in planted area, harvests are likely to reach average to above-average levels despite the ongoing civil unrest in the area. In the **Central African Republic**, harvesting of 2019 maize crops completed in September. The 2019 cereal harvest at the national level is estimated to be above the recent five-year average, but still below the pre-crisis levels. Food supplies from October to March are expected to be better than the previous year in central and western prefectures. In **Mauritania,** improved rainfall in October benefited the main producing eastern region, including Hodh Ech Chargi. However, in the low producing western areas of Barkna, Assaba, Hodh El Gharbi, Guidimakha and Gorgol, rains arrived too late in the season, resulting in poor crop conditions. Pastoral areas in the southern part of the country have also been affected by drought. In **Senegal**, weather conditions improved at the end of the season with near-average rainfall received since

August and extended rains through the end of October, which have partially reduced the negative impacts of water deficits. In addition, the government of Senegal put in place a farmer support program that has provided agricultural inputs to farmers impacted by early-season dryness and so production prospects are now average to above-average. Cereal production is estimated to be 27 percent above the five-year average and four percent below 2018 levels. However, rainfall deficits and dry conditions still remain in pastoral areas across the north and central areas and notably in marginal pastoral areas of Matam and Podor. In northeast **Nigeria**, there is concern for main season crops due to ongoing conflict, which has limited access to farmland and inputs. Across the region, main season rice is in ripening through harvest and conditions are favourable, except in **Mauritania** due to dry conditions.

Middle East & North Africa

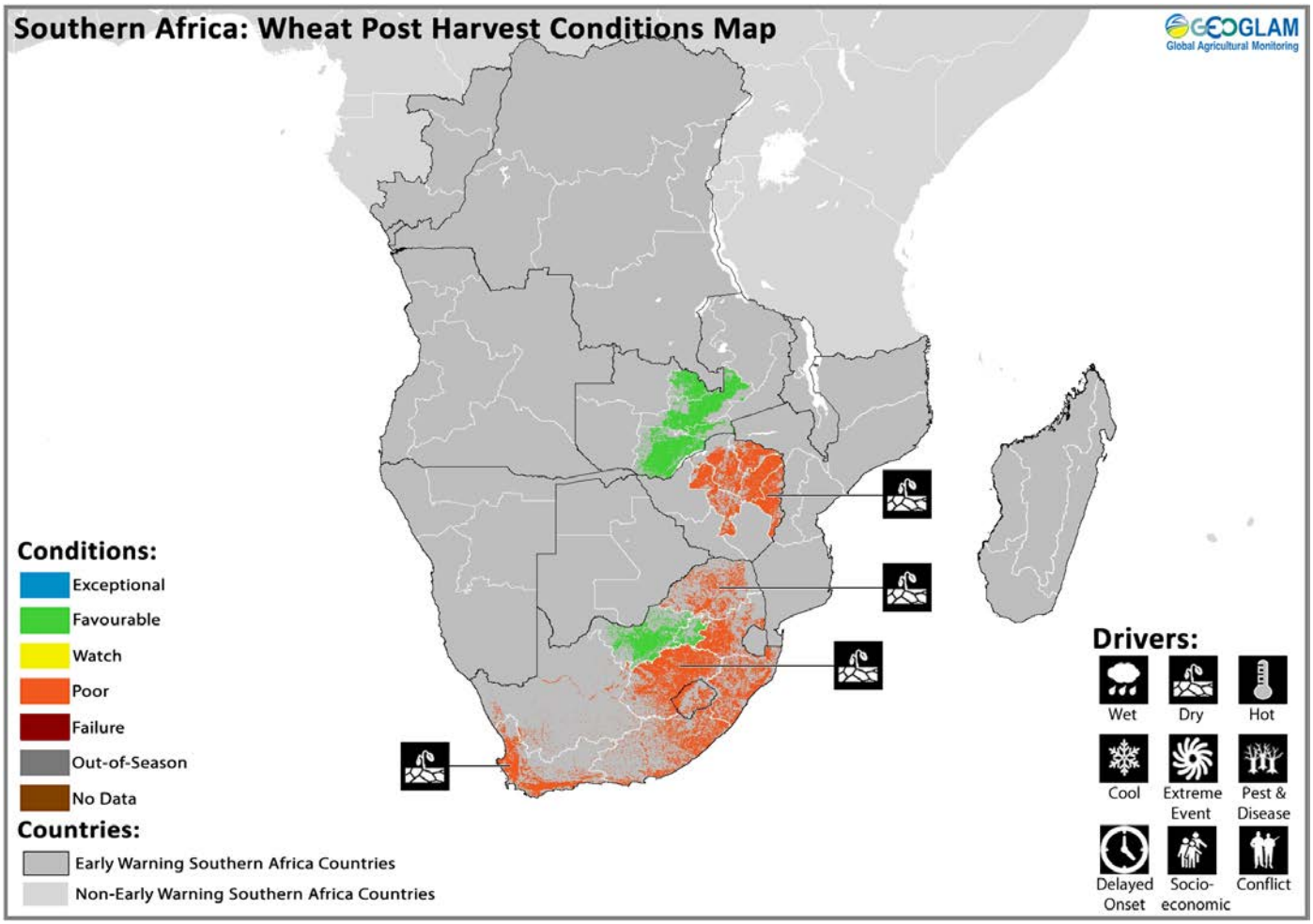


Crop condition map synthesizing information as of November 28th. Crop conditions over the main growing areas are based on a combination of inputs including remotely sensed data, ground observations, field reports, national, and regional experts. ***Crops that are in other than favourable conditions are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

In North Africa, planting for the 2019/2020 winter wheat season started in October and conditions are favourable except in parts of the northwest where below-average rainfall has delayed planting. In **Morocco**, while rainfall improved in eastern Morocco in November, rains in the western and central parts of the country remain about 50 percent below-average at this stage in the season. December is still within the region's winter cereal planting window and adequate rainfall this month will be critical for a normal start of the season. However, December rainfall outlooks indicate a high likelihood that dryness will continue in some areas along the coast. **Algeria**'s southwestern region has also seen delayed rainfall onset and dry conditions while agro-climatic conditions for winter cereal planting have been favourable in the rest of the country. In **Tunisia** and **Libya**, conditions are favourable with good rains to start the season, whereas continued military operations in the Tripoli area are expected to have a negative impact on agricultural activities in the area. In **Egypt**, harvest is complete for main season maize and main summer-planted rice. Despite an exceptional heatwave during much of the growing season, final yields were favourable with some localized losses in the south due to Fall Armyworm. The winter season has started under favourable conditions.

In the Middle East, planting of 2019/2020 winter cereals has started across the region. In eastern **Syria**, northern **Iraq**, and northwest **Iran,** early season dryness has delayed planting and December rainfall will be critical for a normal start of the season. In western and central **Iran,** rains have benefitted crop establishment. In **Syria**, concern remains due to conflict and socio-economic factors impacting agricultural production.

Southern Africa



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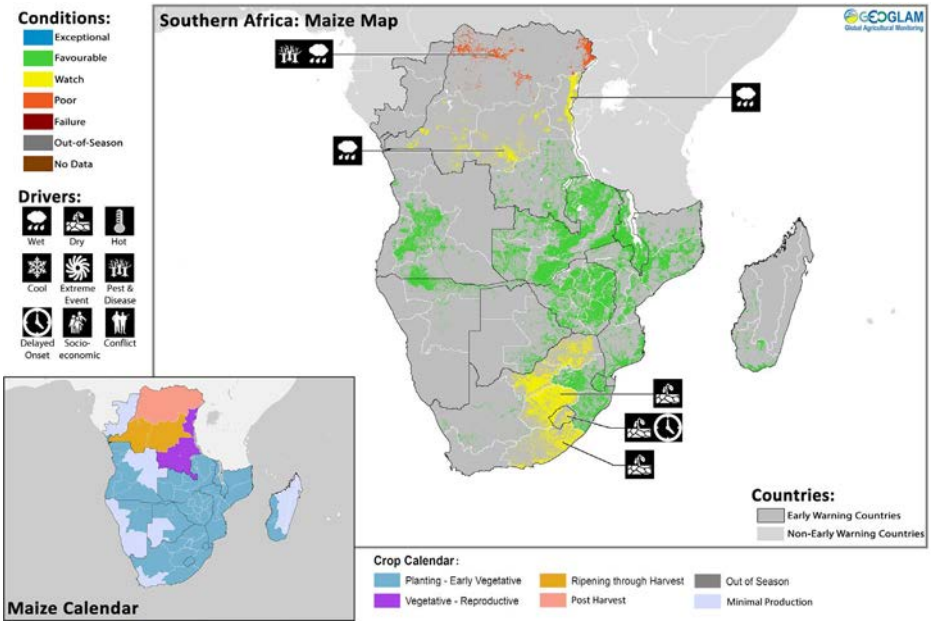
In Southern Africa, harvesting of the 2019 winter wheat is almost complete and reduced harvests are expected in Lesotho, Zimbabwe, and parts of South Africa due to the decreased planted area, carryover dry conditions from the 2018/2019 summer season and deteriorated water sources. In **Zimbabwe**, power cuts disturbed irrigation activities for the main winter growing season, reducing the area planted and leading to crop losses and below-average yields. Food insecurity levels are high across the country and the number of people in need of food assistance is expected to increase through the end of the year and beginning of 2020. The high levels of food insecurity are due to the poor cereal harvest following the severe 2018/2019 drought, significantly high food prices and adverse macroeconomic conditions. In **Zambia**, water levels in major dams in the south suggest the possibility of reduced irrigation water availability, however satellite image analysis indicates average to above-average vegetation conditions in many irrigated areas, suggesting the likelihood of a near-average winter wheat yields. Water levels in Lake Kariba were not replenished in the last summer season and have been on the decline since last year. Other water sources in the southern province are significantly lower than normal. Moreover, reduced water levels in the country's reservoirs in the south remain a concern moving into the start of the main summer cropping season in November. In **Lesotho**, production is expected well below the previous season and five-year average due to decreased planted area, poor water availability and soil moisture deficits. In **South Africa**, above-normal rainfall in July followed by dry conditions in August and September, which is foreseen to result in a slightly below-average harvest.

Planting of the main cereal crops for harvest in 2020 has started across the region with the normal onset of rains in November. Conditions are favourable across central parts of the region despite early concerns due to carryover dry conditions from the previous season and low reservoir levels. Rains were received in some north-eastern and south-eastern parts of the region in early November and over most parts of the region in mid-November. Most north-eastern areas received rainfall in late November. However, while much of the region received good rains, parts of southern **Angola**, northern **Namibia, Lesotho** and parts of **South Africa** have not received significant rainfall and temperatures have been above-average. In addition, forecasts indicate rainfall deficits may intensify in the central and southeast of the region through December (See Regional Outlook Pg. 10). Generally good rains were received in the last two dekads over the northern and highland regions of **Angola** and across much of the **Democratic Republic of Congo (DRC)**. In the **DRC**, maize harvest finished in northern areas this month and yields are expected to be below average due to heavy rains which caused flooding and damage to some central, western and eastern areas of the country. In addition, since the end of October in **DRC,** heavy rains have caused flooding in the northern provinces of Sud-Ubangi and Ituri, displacing more than 18,000



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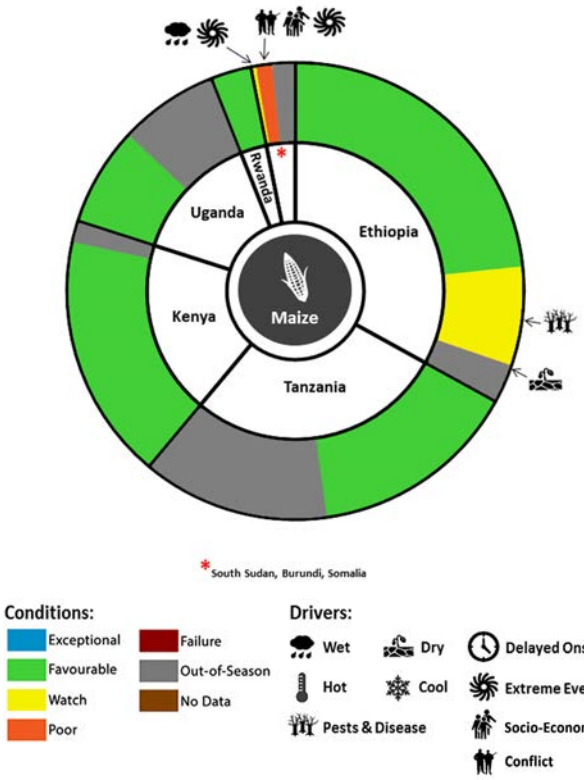
been received. In **Madagascar** and **eSwatini**, onset rains have been timely with average to above-average rainfall in the past month. However, temperatures have been persistently high in the last 2 dekads and have led to some moisture deficits in southern Madagascar. In **Botswana**, above-average rains were received in the past dekad over northern areas, however, temperatures have been above-normal, which could lead to increased evapotranspiration and decrease soil moisture. In **Lesotho**, onset rains have been delayed by over 4 dekads in some areas and poor rainfall and above-average temperatures in the past month have further aggravated moisture deficits. Rainfall may improve in the next dekad, however, this may not be a significant improvement given the poor start. Eastern **South Africa** has already experienced some delays in the onset— about a 30-day delay in the most-affected areas, and a 40-day delay in a few areas further east.

people and destroying hundreds of farms. In **Namibia**, carryover dry conditions from the previous season have decreased the water supply, possibly reducing irrigation potential across north and central areas. Above-average temperatures in late October have likely exacerbated dry conditions. In **Zimbabwe**, seasonal rains have had a timely onset and conditions are currently satisfactory. In **Zambia**, while some rains were received in November, onset rains have been generally slow and improved rains are needed to counteract moisture deficits in areas already suffering from poor water reserves and reduced soil moisture from the previous season. In **Malawi**, the start of the season was timely, and rains are expected to pick up in December. In **Mozambique**, rainfall has been mostly average with a timely onset of the rains, however, temperatures have been above average since late November in southern areas, where low rains have



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

Regional Outlook: Rainfall deficits are expected to continue across central and southern areas of Southern Africa

Above-average October to mid-December rainfall is anticipated in northern areas of Southern Africa while below-average amounts are anticipated in some central and southern areas, according to rainfall estimates and a two-week forecast issued December 1 (Figure 1-left). Areas with potentially moderate to large deficits, ranging from 50 mm to 100+ mm below-average, include southeastern South Africa and Lesotho and also in an area from southeastern Angola into southwestern Zambia, northern Botswana, and the Caprivi Strip in Namibia. Southern Tanzania, Malawi, central and northern Mozambique, and southern DRC are among the areas showing potential for moderate to large season-to-date surpluses. Some of these surpluses are coming from the two-week forecast, which shows above average rainfall in Tanzania and surrounding areas. Other areas may see mixed conditions during these two weeks.

The latest 30-day outlook points to a continued tendency for drier than average conditions in southeastern areas and wetter than average conditions in the northeastern areas (Figure 1-right). While this multi-model forecast is unlikely to depict actual 30-day outcomes, the regional pattern is consistent with other model forecasts that were released in early November and showed below normal December to February rainfall in southern areas. Given the consistency in models and a drier than normal season thus far in parts of South Africa and in Lesotho, the situation remains a concern.

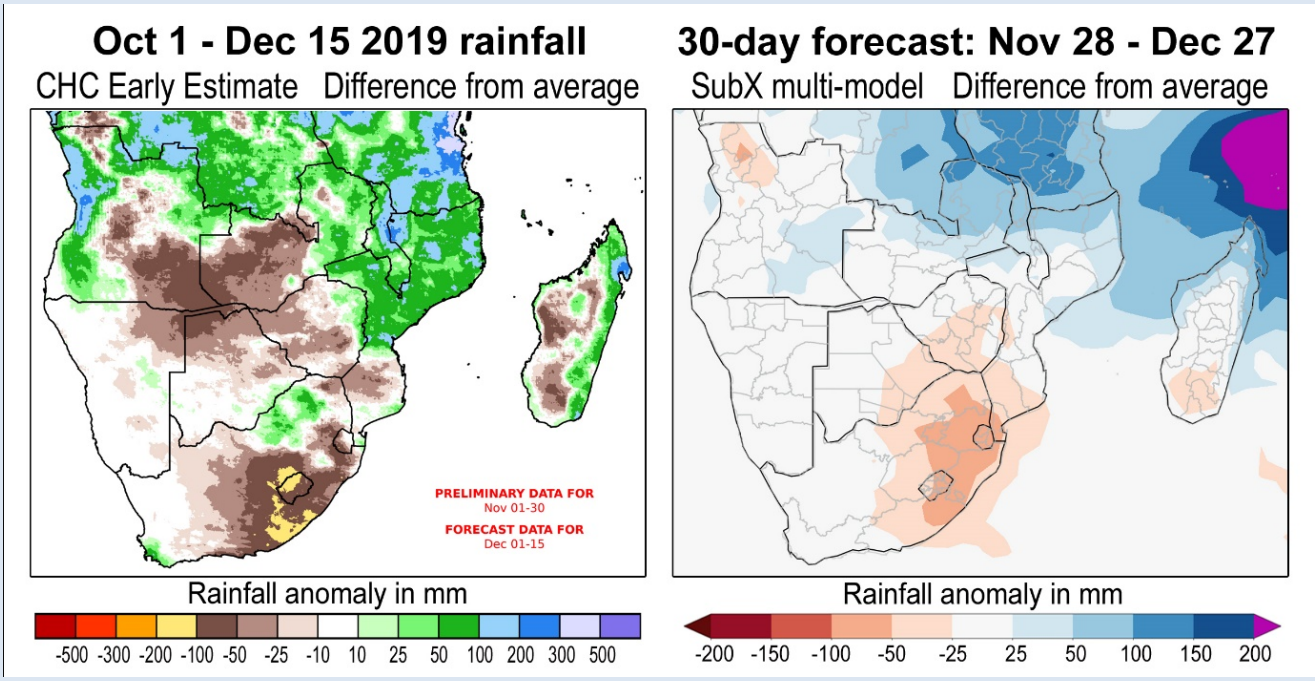
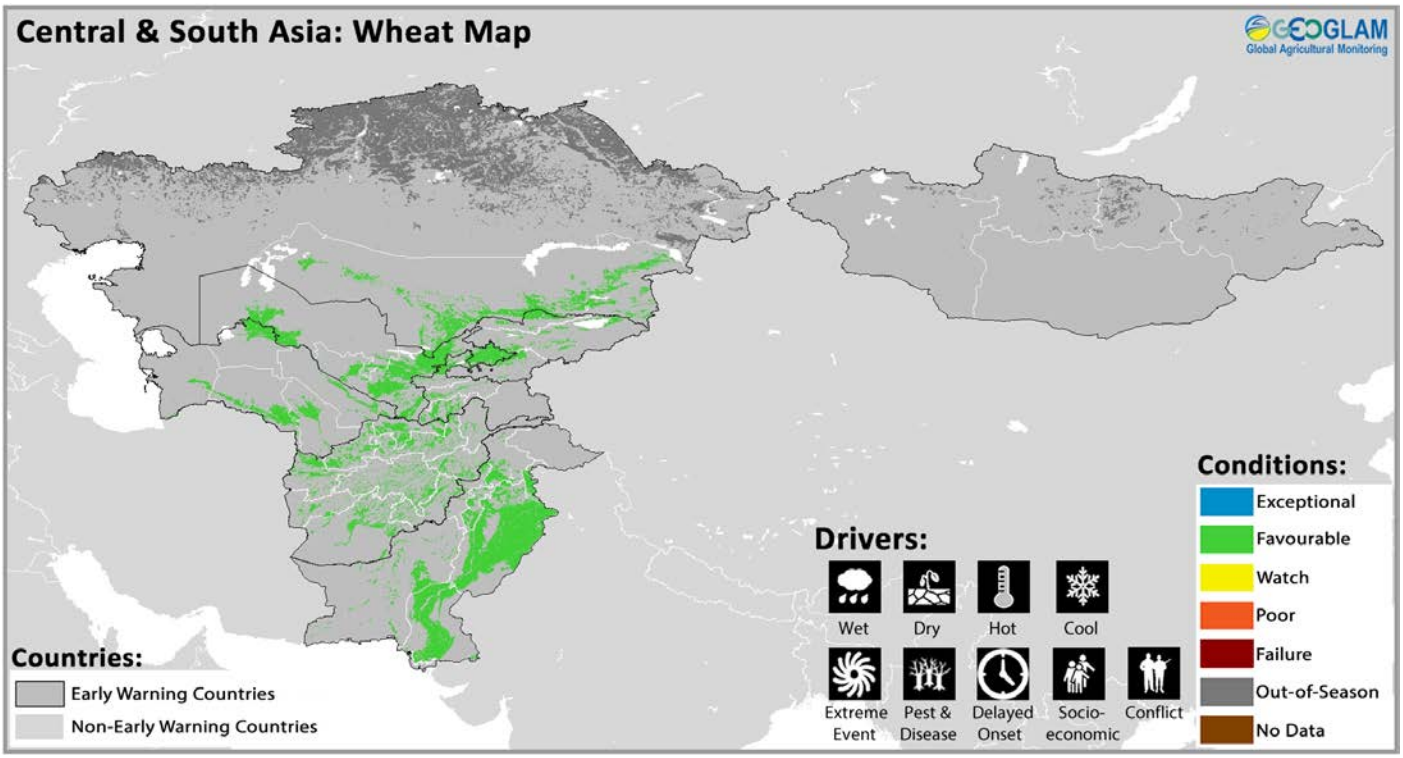


Figure 1. Figure caption: Outlook for October 1 to December 15, 2019 rainfall and a 30-day forecast. Both depict rainfall in terms of the difference from average. On the left is the UCSB Climate Hazards Center Early Estimate for October 1 to December 15, based on final CHIRPS for October 1-31, preliminary CHIRPS for November 1-30, and an unbiased GEFS forecast for December 1-15. The image shows how the combined total compares to the 1981-2018 CHIRPS average. On the right is a 30-day forecast from November 27. The image shows the average across five 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

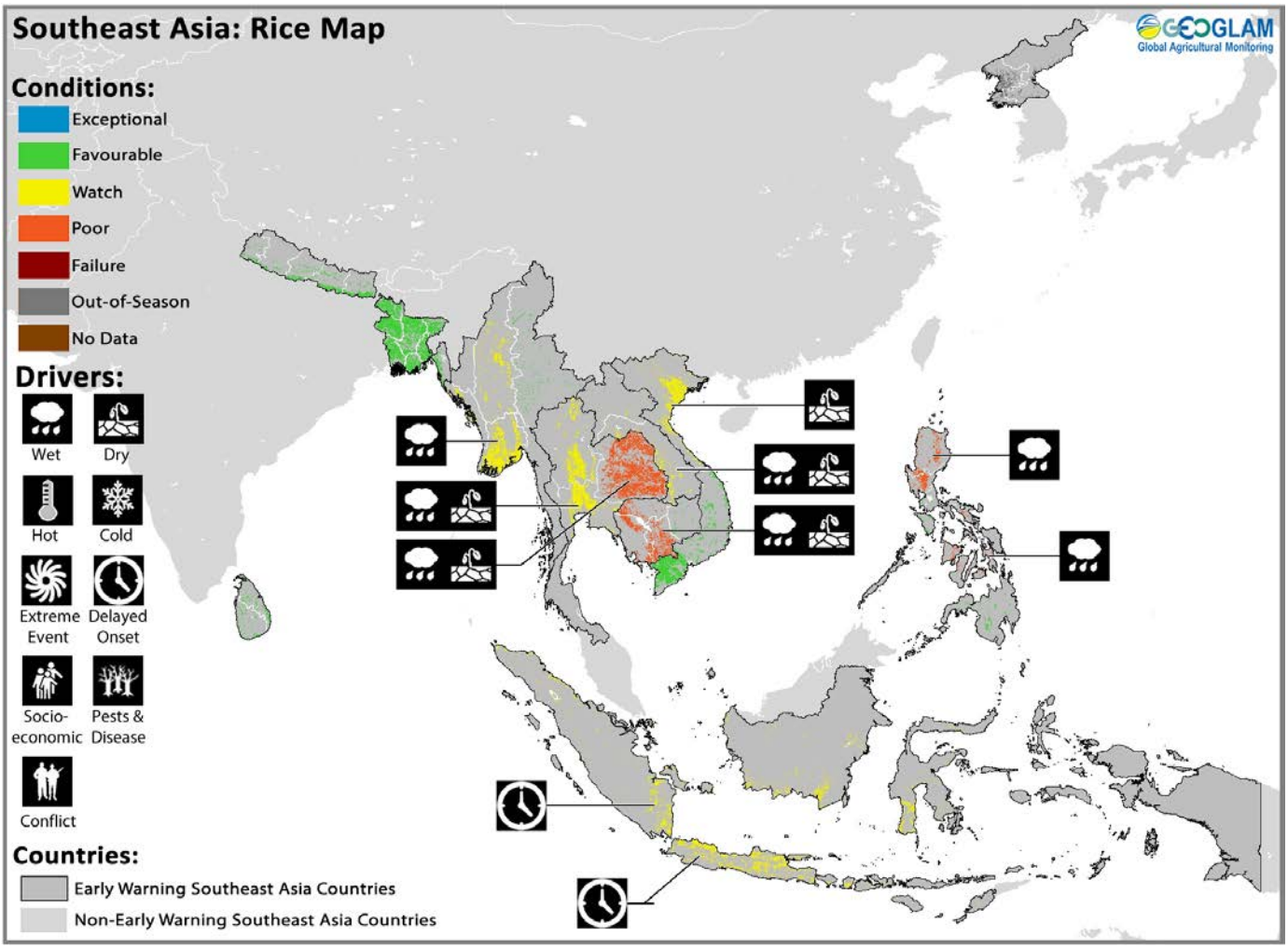
Central & South Asia



Crop condition map synthesizing information as of November 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.***

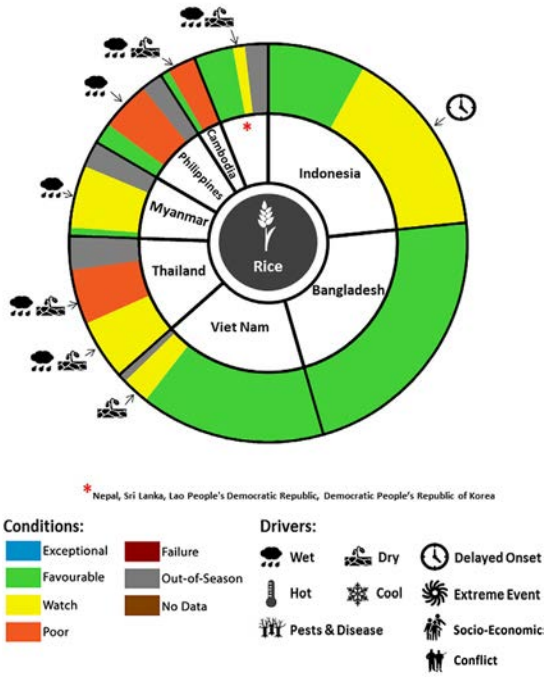
In Central Asia, planting of the 2020 winter cereal crops, to be harvested from May 2020, took place between September and November 2019 under slightly drier than average weather conditions. However, as of late-November, conditions of early-planted crops are overall favourable, according to satellite imagery, indicating proper crop establishment and germination. In **Afghanistan**, winter wheat planting operations are ongoing and rainfall has been above-average since the start of the season in October, supporting the normal progression of planting. The above-average rains have created favorable moisture conditions for farmers. In areas affected by conflict and unrest, agricultural activities have been impacted as farmers are having difficulty accessing their fields. However, in general, agricultural engagement has been increasing across the country and area planted is expected to be above-average. In **Pakistan,** harvest will finish in early December for main season rice and maize. Average yields are expected with above-average production prospects due to high planted area. Planting of the 2020 mostly irrigated *Rabi* wheat crop started in October and is progressing at a normal pace, supported by near-average rains and adequate irrigation water supplies. In **Mongolia,** wheat and barley harvests finished last month and crops are now out of season.

Southeast Asia



Crop condition map synthesizing rice conditions as of November 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, harvesting of wet-season rice is underway and has finished in southern Vietnam and Cambodia. Generally, final wet-season rice production is estimated to be slightly below-average across the region due to early-season drought damage in June and July followed by flood damage after August. Significant harvest reductions are anticipated, especially in Cambodia, Myanmar, and North Vietnam. In **Indonesia**, harvest of dry-season rice is wrapping up with yields slightly above last year's yields, though with a noticeable reduction in harvested area relative to last year due to water shortages. Wet-season rice sowing is continuing at a delayed pace due to ongoing water shortages. Planting is expected to continue through February and rainfall in the coming months will be key to improvements. Short-term forecasts indicate rainfall deficits are expected to continue across much of southern and eastern Indonesia into December (See Regional Outlook Pg. 13). In the **Philippines**, yields have been reduced for earlier sown wet-season rice due to the effects of moisture stress, while later sown crops are under favourable conditions due to normal rainfall levels. In **Thailand**, wet-season rice conditions remain mixed nationwide due to dry conditions at the beginning of the season followed by damage from heavy rainfall and flooding in August and September. In **Viet Nam**, harvest of summer-autumn rice (wet-season rice) is ongoing under mixed conditions as a mid-season drought in the north has reduced expected yields. In the south, wet-season rice yields are expected to be slightly higher than last year and dry-season rice has begun sowing. In **Laos**, about 50 percent of lowland wet-season rice has been harvested



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

and final paddy production is estimated to reach about 3.1 million tons, or 4.3 tons per hectare. Final yields are expected to be slightly lower than last year due to drought and flood damage. In the northern upland rice region, harvest is nearing completion and decreased yields are expected due to drought and pests damage during the growing stage. In **Myanmar**, more than 74 thousand hectares of wet-season rice were damaged by heavy rains and 40 thousand hectares of planted area have been replanted. The remaining damaged area will be used for growing winter crops. In addition, an unexpected heavy rain hit during the second week of November, providing water for the early reproductive wet-season rice crops in central Myanmar. In **Cambodia**, harvesting of wet-season rice is nearly complete and final yields are in line with last year at 3.6 tons per hectare. However, total production saw a 13.8 percent decrease from last year, mainly due to drought damage, as well as flood damage. On the other hand, the planting of dry-season rice has already started under favourable weather conditions. In the **Democratic People's Republic of Korea**, harvest finished last month for main season cereals and yields were below-average. In **Sri Lanka**, planting of the main *Maha* season is underway and conditions are favourable with good rains at the start of the season. In **Nepal**, harvest will complete in December for rice crops and production prospects are favourable. In **Bangladesh**, harvest started in November for the 2019 *Aman* crop, which accounts for 35 percent of the annual output, and production prospects are favourable due to good weather conditions since the start of the season.

Regional Outlook: Rainfall deficits are expected to continue across Indonesia

Moderate to large rainfall deficits are possible by mid-December across much of southern and eastern Indonesia, according to preliminary data and a two-week forecast. In Indonesia and other areas of Southeast Asia, October and November were drier than average. Figure 1 (left) shows an outlook for October 1 to December 15 rainfall in terms of the difference from the historical average.

According to the two-week forecast, issued December 1, much of southern and eastern Indonesia will continue to see below-average rainfall. Forecast rainfall totals range from 50 mm to 150 mm. Higher rainfall totals and locally wetter-than-average conditions are forecast in northern and western Sumatra and western Borneo. Wet conditions are also forecast for southern Malaysia and the northern Philippines. Below-average rainfall is forecast in northern and eastern Australia. According to a longer term outlook, drier than normal conditions will persist through much of December in the southern Indo Pacific region (Figure 1-right).

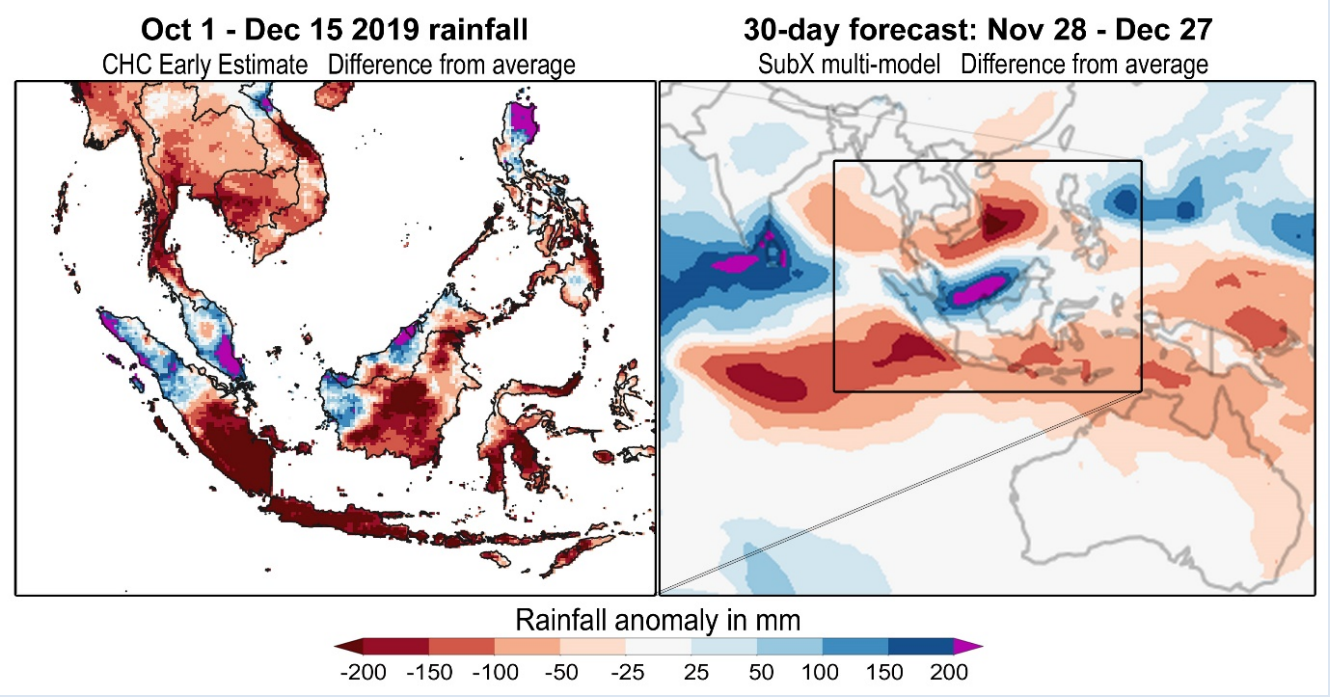


Figure 1. Outlook for October 1 to December 15, 2019 rainfall and a 30-day forecast. Both depict rainfall in terms of the difference from average. On the left is the UCSB Climate Hazards Center Early Estimate for October 1 to December 15, based on final CHIRPS for October 1-31, preliminary CHIRPS for November 1-30, and an unbiased GEFS forecast for December 1-15. The image shows how the combined total compares to the 1981-2018 CHIRPS average. On the right is a 30-day forecast from November 27. The image shows the average across five 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

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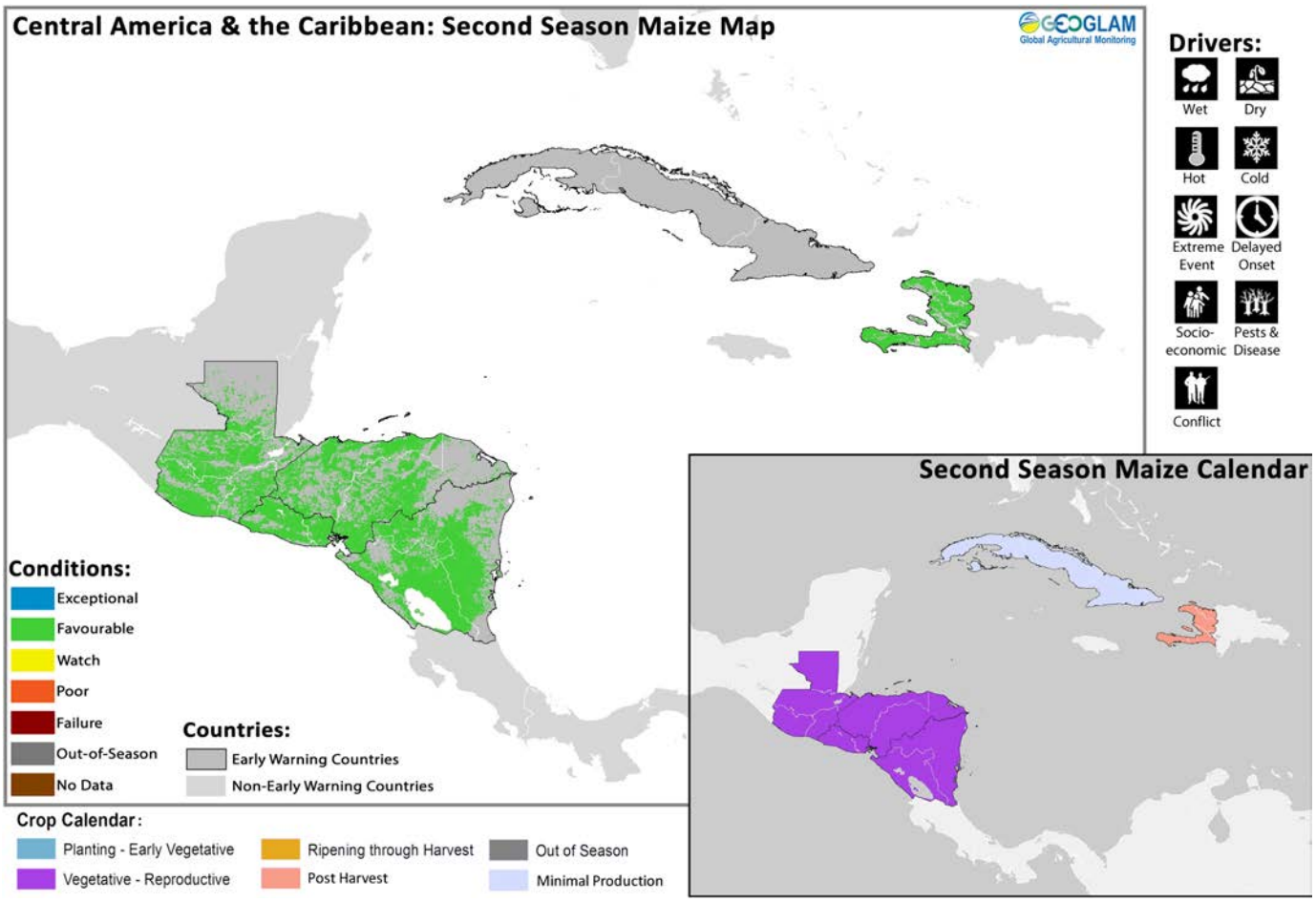
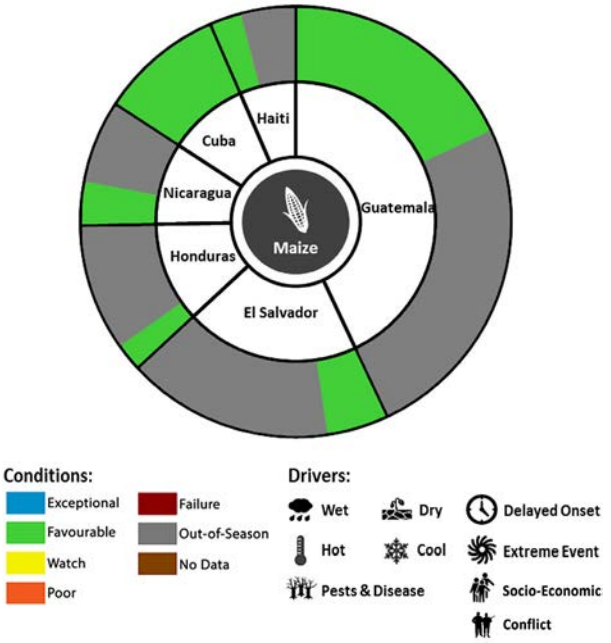
Central America & Caribbean



Crop condition map synthesizing information as of November 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, *Segunda* (*Postrera)* season bean and maize crops are in vegetative to reproductive stages and crops are showing normal development due to above-average and well-distributed rainfall across most areas. In **El Salvador**, growing conditions are favourable throughout the country due to excessive rainfall during October and maize and bean crops are showing normal development. In **Guatemala**, conditions are favourable, especially in the eastern region where above-average rainfall has benefitted crop establishment and growth. In **Honduras,** conditions are generally favourable due to sufficient rainfall over the north. However, despite increased rainfall at the end of October, soil moisture deficits have been observed in Francisco Morazan and El Paraiso departments, though recent field reports indicate deficits do not represent a problem to crops at this time. In **Nicaragua**, secondary maize and bean crops are generally favourable despite below-average rainfall in November. In **Haiti**, harvest is complete for second season crops and final yields were favourable– including in Sud department and, to a lesser extent, in the southwest despite the below-average rains and dry conditions since October. Harvesting of main season rice completed in November and yields were average throughout most of the country, including the Artibonite department where about 80 percent of national rice production is



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

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obtained. However, food security remains a concern with reports from an Integrated Food Security Classification study conducted in October warning that more than one in three Haitians is in a situation of urgent food insecurity due to rising prices, economic unrest and declining agricultural production. In **Cuba**, despite below-average precipitation in November, conditions remain favourable for main "Winter" season crops, which make up 60 percent of the total annual production. Starting in September fuel shortages have affected some agricultural activities in the southern coastal areas.

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 slide 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 cnditions in the main production and export countries can be found in the Crop Monitor for AMIS, published December 5th2019.

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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.

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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	

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Central America & Carribean				
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

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Contributing partners

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