West Africa: The 2021 Rainy Season in Review

WFP | vam food security analysis

World Food Programme, Regional Bureau Dakar

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Overview

This special edition of the Seasonal Monitor provides an in-depth review of the 2021 rainy season in West Africa, using satellite data on rainfall estimates (CHIRPS) and vegetation (Modis NDVI). The document is structured around six sections:

1. *First, an overview of the overall performance of the 2021 rainy season, focusing on the period May-October 2021. Note that for October, rainfall estimates up to 20 October were included in the analysis (slides 4-7).*

The following sections focus on three key periods within the rainy season, providing an in-depth review of rainfall and vegetation indicators for:

2. *The start of the season from May to June 2021 (slides 8-10);*
3. *The peak period of the season from July to August 2021 (slides 11-13); and*
4. *The end of the season from September to October 2021 (slides 14-16).*

5. *This is followed by a month-by-month review of the rainfall performance from May to October 2021 (slides 17-19).*

6. *Finally, the last section consists of an analysis of rainfall performance and vegetation indicators at the Admin 2 level, to complement the more granular analyses provided in the first sections of the document (slides 20-23).*

This in-depth review of the 2021 rainy season is intended to inform ongoing food security analysis exercises, including the Cadre Harmonisé exercises in the Sahel region, providing a closer look at the performance of the 2021 season in West Africa.

Contents

Highlights

- As of mid-October, the rainy season has come to an (early) end in most of the region. Overall, it appears that the season has been marked by average to above average rainfall. However, a more detailed analysis of rainfall patterns indicates that – particularly for the northern parts of the region, including the Sahel – the season has in fact started late and ended early. This means that most of the rainfall has been received over a relatively short period of time, between July and August. This poor temporal distribution of rains is likely to have had a negative impact on crop and pasture development, particularly in areas affected by prolonged dry spells at the beginning or end of the season**.** This includes parts of northern Senegal, southern Mauritania, central and northern Mali, northern Nigeria, Niger and the Lake Chad Basin.

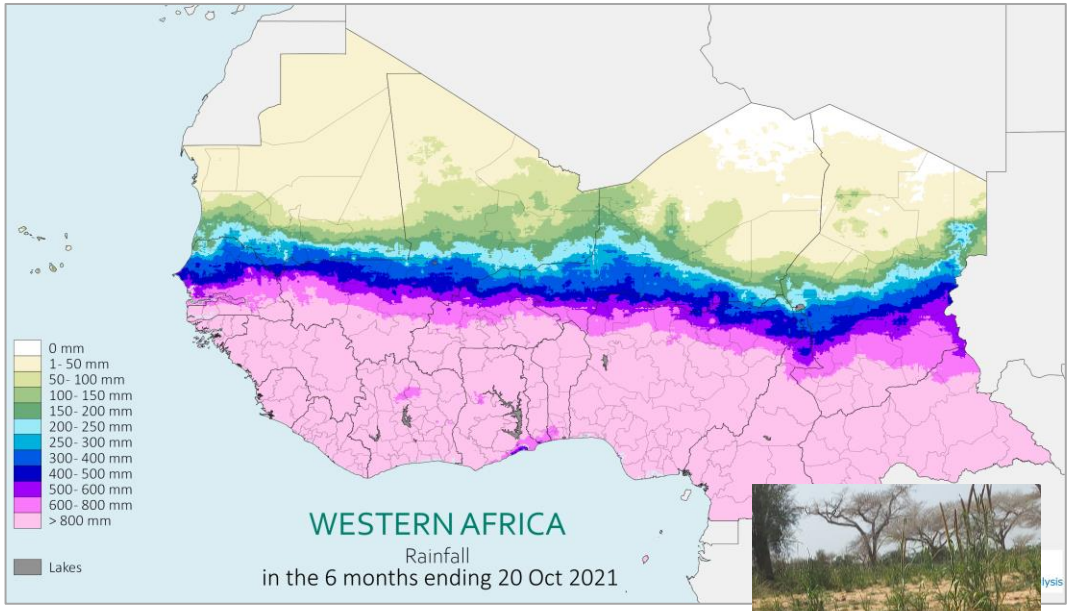
- At the early stages of the season (May to June), west Africa was characterised by mixed conditions and rainfall deficits were observed in Niger, northern Nigeria, western Chad, southern Mauritania, and the border areas between Senegal and Mali. Below average rains were also recorded across the central belt of Mali, Guinea Bissau, western Guinea and south-western Ghana. The deficits in some areas, including central Nigeria, Niger and the Lake Chad Basin, as well as in the border areas between Senegal, Mali and Mauritania, point towards a delayed start of the season. From July to September at the peak period, the 2021, rainy season has been characterised by mostly average to above average conditions across the region. Beginning from mid-July to late August, the rainfall situation over the region has improved resulting in a significant decline in cumulative rainfall deficits.. it is unlikely that these excess rains would have been able to fully offset early season dryness in areas affected by a late start of the rainy season. Similarly, to the early stages, the latter parts of the 2021 rainy season (During September – October) in West Africa were characterised by below normal rainfall. This suggests that the season ended early, particularly in the central and northern parts of the region, including most of the Sahel. Coupled with the late start of the season and excess rains received in July and August, these patterns highlight the erratic nature of the 2021 rainy season in West Africa, which is likely to have negatively impacted crop and pasture development.

- During 2021 rainy season, most of the western and eastern parts of the region have experienced a higher-than-normal number of days without rainfall. This particularly affected western Guinea, Sierra Leone, central Nigeria, southern Chad and southern Cameroon, as well as northern CAR. The Sahelian band, as well as some coastal areas in the south-western (southern Liberia, southern Côte d'Ivoire, southern Ghana) and south-eastern parts (south-western Cameroon) of the region experienced prolonged dry sequences of over 21 days. The central parts of the region, stretching from south-eastern Guinea through to CAR, experienced more consistent rainfall throughout the season. Long dry-spells observed between September and October, affected most Sahelian countries, including Niger, central Chad, north-eastern Burkina Faso, central and northern Mali, as well as Senegal and Mauritania. These poor rains in the Sahel region coincide with a critical period of the agricultural season, namely flowering and crop maturation, might have negatively impacted crop yield and pasture production.

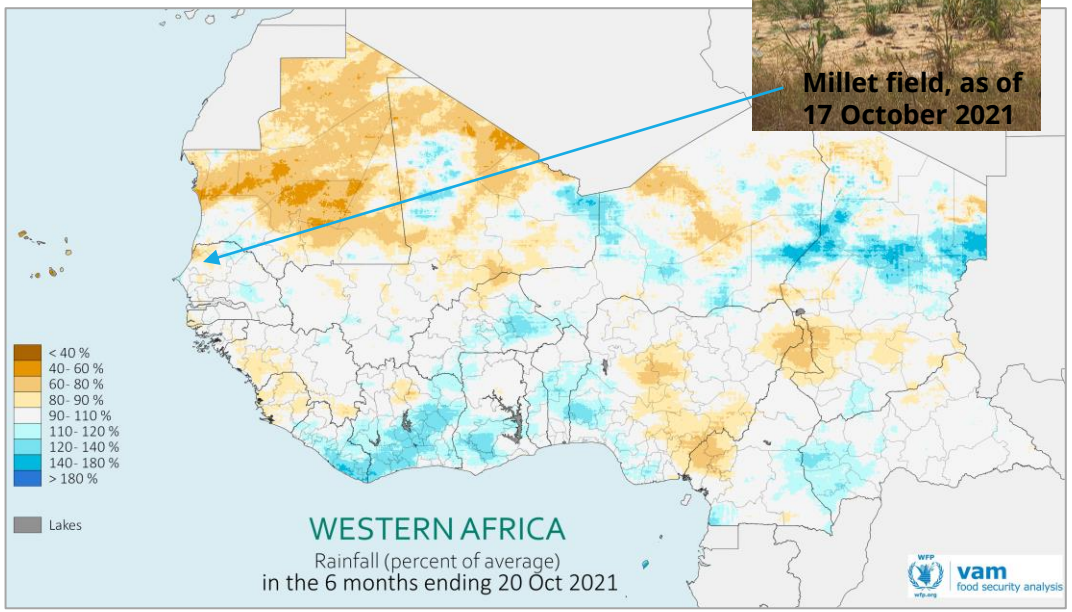
- As of mid-October 2021, vegetation conditions remained average to above average across most of the central and eastern Sahel, however this is likely to be a carry-over of significantly above average rains and better than normal vegetation conditions in the peak period of the rainy season. Given the early end of the season and below normal rains in September and October, vegetation conditions are likely to deteriorate quickly over the coming weeks. It can be observed in most of the region over Mauritania, northern and central Senegal, central and western Mali, western and eastern Niger, as well as northern and southern Chad, with below normal of biomass production. A similar situation is observed in the costal countries, including Nigeria, Ghana, Togo, Benin and Cote d'Ivoire. This will be of particular concern for the countries of the Sahel with a pastoral lean period that could start earlier than usual. This rainfall pattern has negatively impacted the availability of water resources, leading 'watch conditions' across the Sahel in mid-October that could negatively impact pastoral activities in the Sahel.

Section 1: The 2021 season at a glance

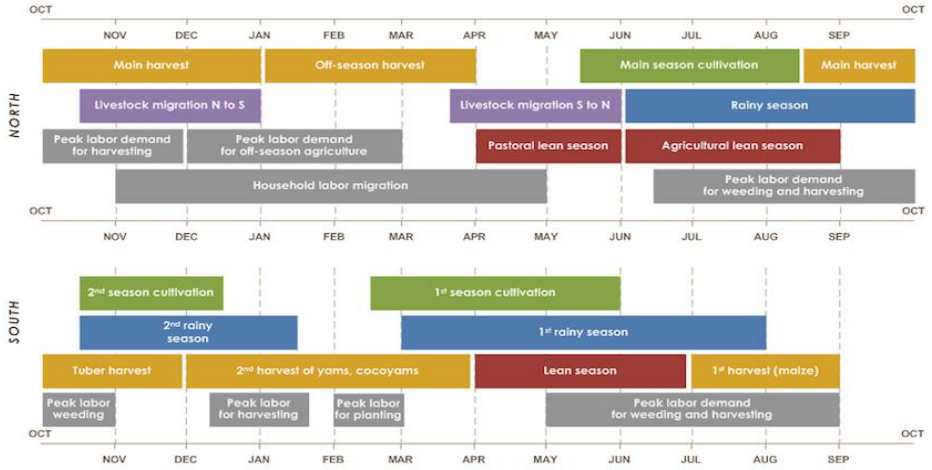
Overall performance of the 2021 rainy season (May-October)



Cumulative rainfall (May -20 October 2021): *The map to the left shows the total rainfall received over the last dekad, based on CHIRPS satellite rainfall estimates.*



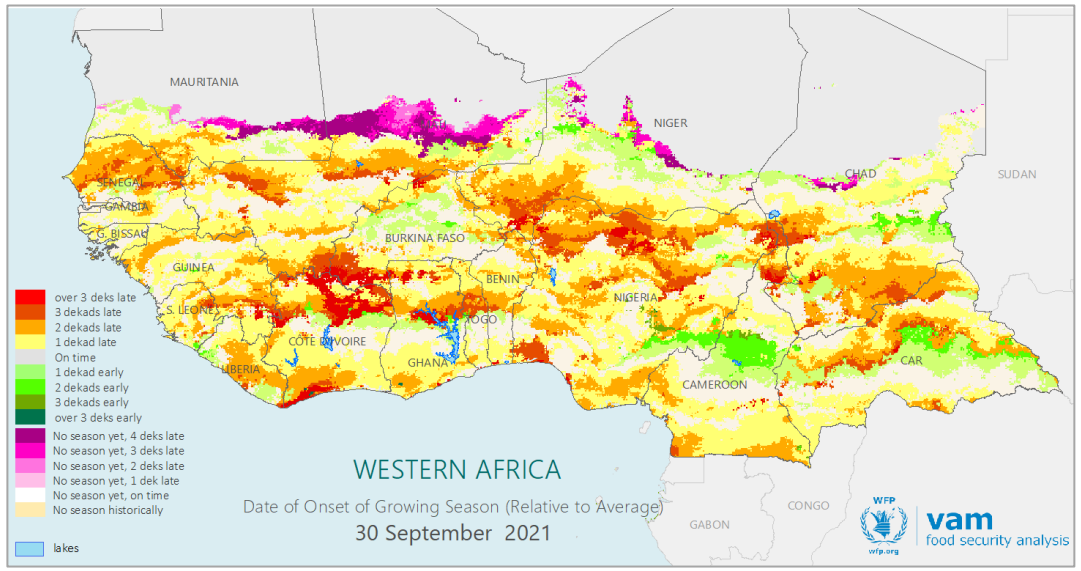
Rainfall anomaly (May -20 October 2021): *The map to the left shows the rainfall anomaly over the last dekad in percentage of long-term average, based on CHIRPS satellite rainfall estimates.*



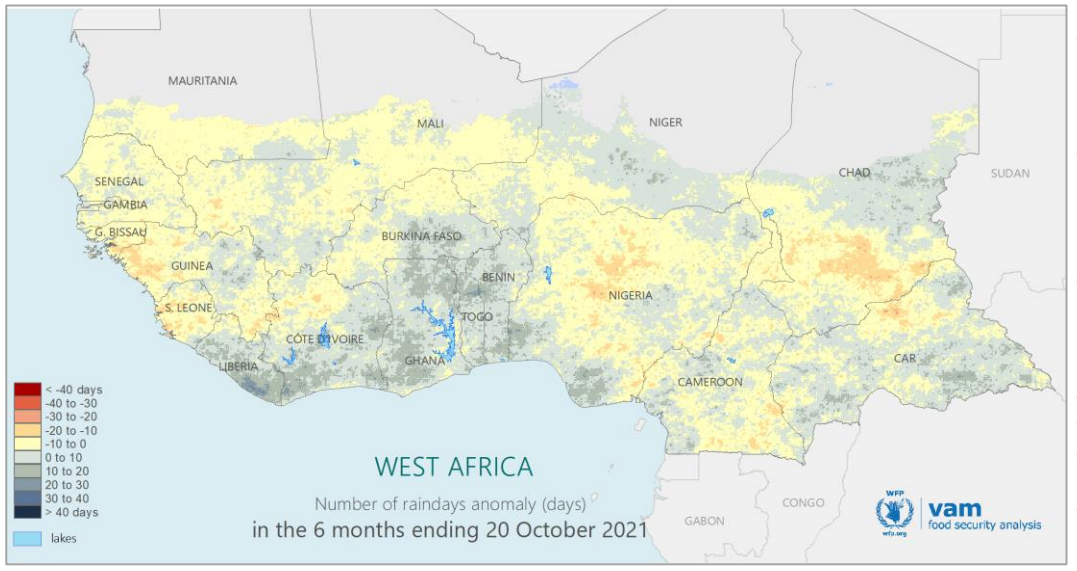
West Africa Agriculture calendar (FewsNet).

- **Cumulative rainfall**: By late October, the 2021 rainy season in West Africa is coming to and end. Over the past six months (May-October), heavy rains of over 500 mm have been recorded over most of the southern parts of the region, up to the Sahel (incl. southern Senegal, Gambia, south-western Mali, southern Burkina Faso and southern Chad. Over the Sahel, rainfall varied between 200-500 mm. Low rainfall amounts (less than 200 mm) were received over the northernmost parts of the region, from north-western Senegal through central Mauritania, northern Mali, northern Niger and northern Chad.
- **Rainfall anomaly:** Overall, the 2021 rainy season has been characterised by mostly average to above average cumulative rainfall. Rainfall deficits mainly affected northern Mauritania, central and northern Mali and northern Niger. Furthermore, in pockets in central Nigeria, extending into south-eastern Nigeria and neighbouring regions of southwestern Cameroon, as well as in the southern Lake Chad Basin, southern Chad, south-western Guinea and Sierra Leone, below average rainfall was recorded. It is important to note however that these normal to above normal cumulative rainfall amounts hide a poor spatial and temporal distribution of rainfall over the course of the season, particularly over Sahelian countries, where most of the rains were received between July and August (see the following slides and the slide 3).
- ***Summary:*** *As of mid-October, the rainy season has come to an (early) end in most of the region. Overall, it appears that the season has been marked by average to above average rainfall. However, a more detailed analysis of rainfall patterns indicates that – particularly for the northern parts of the region, including the Sahel – the season has in fact started late and ended early. This means that most of the rainfall has been received over a relatively short period of time, between July and August. This poor temporal distribution of rains is likely to have had a negative impact on crop and pasture development, particularly in areas affected by prolonged dry spells at the beginning or end of the season. This includes parts of northern Senegal, southern Mauritania, central and northern Mali, northern Nigeria, Niger and the Lake Chad Basin. In central Mali and southwestern Niger, rainfall deficits in July were compounded by severe deficits in September, which is likely to have impacted crops at critical flowering and maturation stages and exacerbated poor conditions resulting from ongoing conflict. There is concern in localised parts of southern Chad, which received below average seasonal rains, followed by floods in September. The picture of a millet field (taken on 17 October 2021) on the Dakar Saint-Louis axis near Kebemer gives an illustration of how the impact of the poor rainfall distribution – similar situations have been reported from other areas in northern Senegal.*

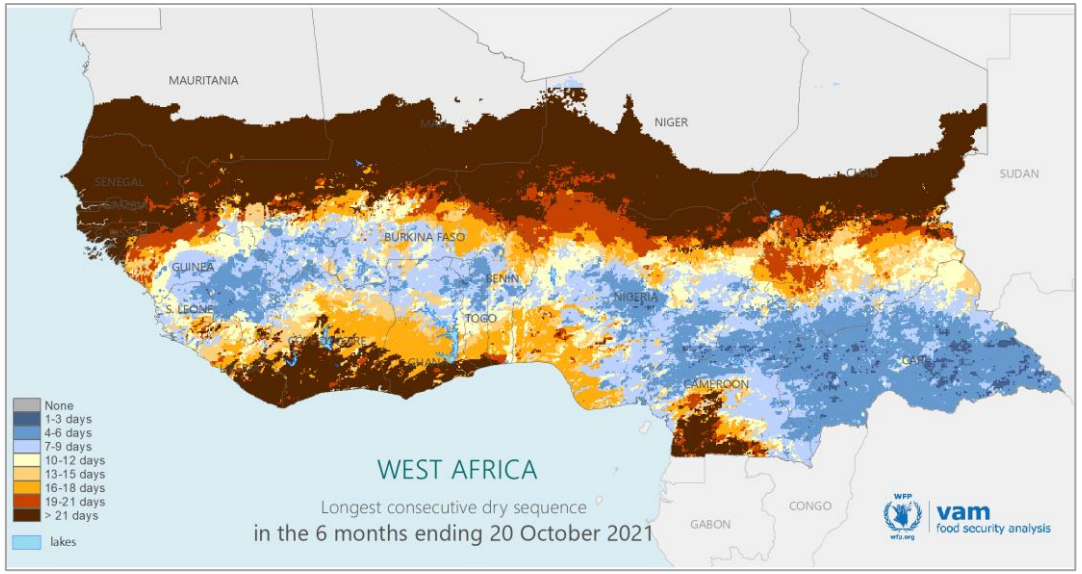
Overall performance of the 2021 rainy season (May-October)



2021 Onset of growing season anomaly (as of September 30, 2021): The map uses the vegetation phenological cycle to show the possible start of sowing activities.



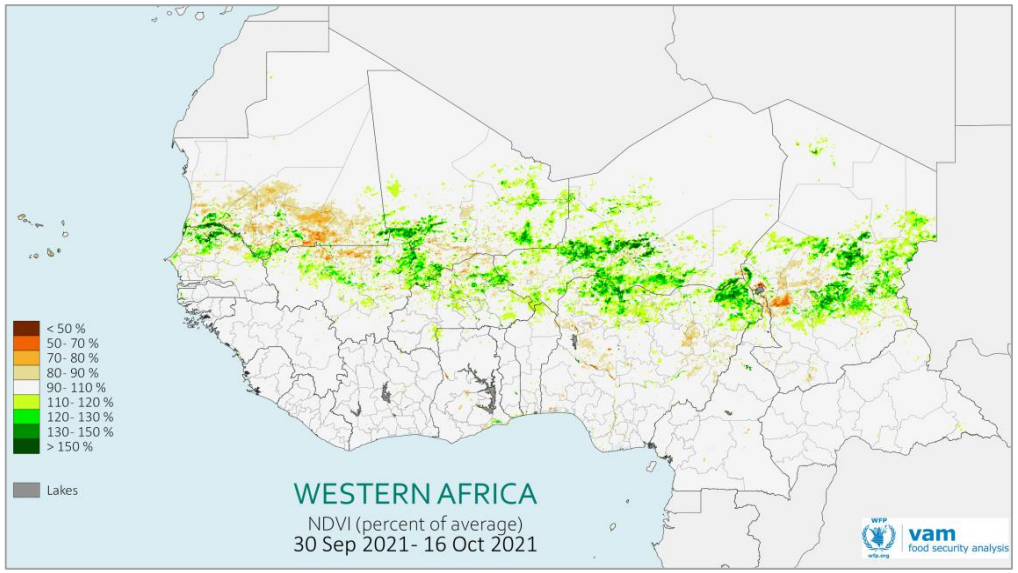
***Number of raindays anomaly (May-October 2021):** The map to the left shows the anomaly of the number of raindays for the 6 months leading up to 20 October 2021*



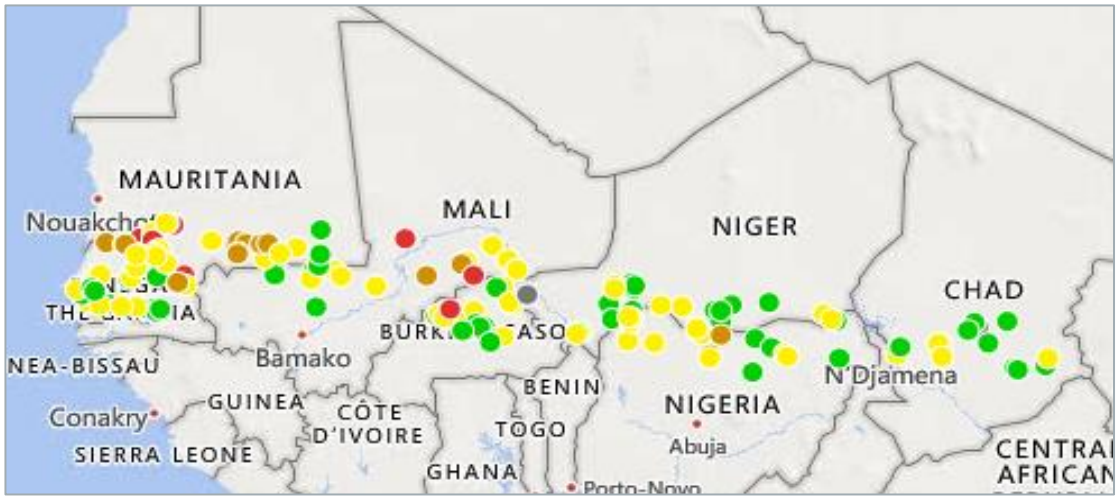
***Longest consecutive dry sequence (May – 10 October):** Map of the Longest Consecutive dry sequence in 6 months .*

- **Start of season:** The 2021 growing season onset map shows that most of West Africa experienced a growing season that started later than normal (10-30 days). An earlier than normal start of the season was only recorded in central Burkina Faso, as well as localised areas of central Senegal, southern Mauritania, eastern Chad and central Cameroon. Until the end of August, delays of up to 4 weeks and more were recorded as a result of poor rains in the onset of rains, particularly in south-eastern and central Mali. The pink areas on the start of season map highlight areas where the conditions for the potential start of planting activities have not been met.
- **Consecutive dry sequence:** During the 2021 rainy season, the Sahelian band, as well as some coastal areas in the south-western (southern Liberia, southern Côte d'Ivoire, southern Ghana) and south-eastern parts (south-western Cameroon) of the region experienced prolonged dry sequences of over 21 days. Rainfall in the central parts of the region, stretching from south-eastern Guinea through to CAR, experienced more consistent rainfall throughout the season. This is in part due to the nature of the rainy season in West Africa, which sees a northward progression of the rains between May and October, with a short dry season in some coastal areas.
- **Raindays anomaly:** The anomaly of raindays over the 2021 rainy season suggests that most of the western and eastern parts of the region have experienced a higher than normal number of days without rainfall. This particularly affected western Guinea, Sierra Leone, central Nigeria, southern Chad and southern Cameroon, as well as northern CAR.

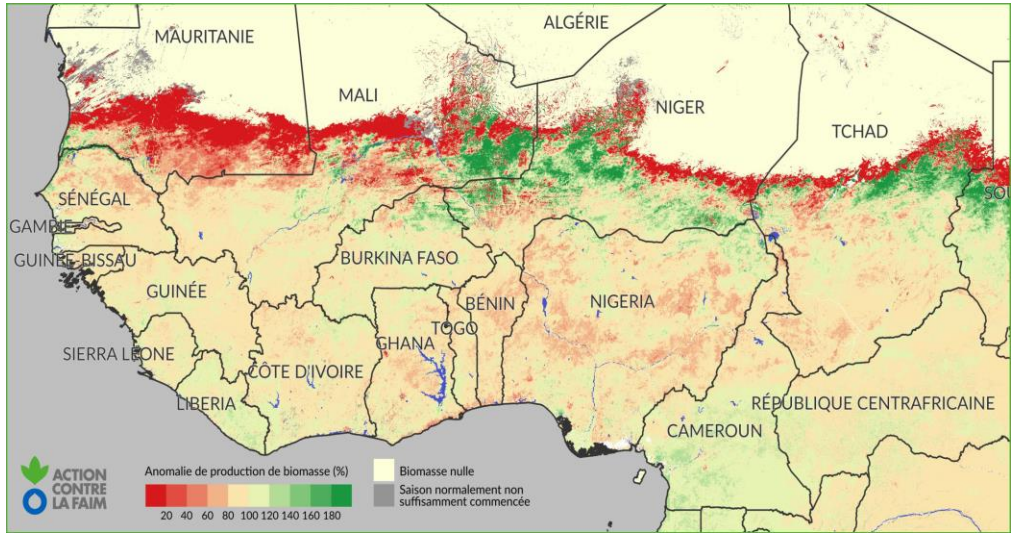
Overall performance of the 2021 rainy season (May-October)



NDVI (September 30- October 16 2021): the map on the left shows the vegetation anomaly as a percentage of the average, based on the MODIS NDVI



Water point status (as of 20 October 2021): *Good: Higher than long term level (LTL), Watch: Between 50 to 100% of LTL, Alert: Between 3% and 50% of LTL, Near-Dry: Below 3% of LTL (https://earlywarning.usgs.gov/fews/waterpoint/index.php)*

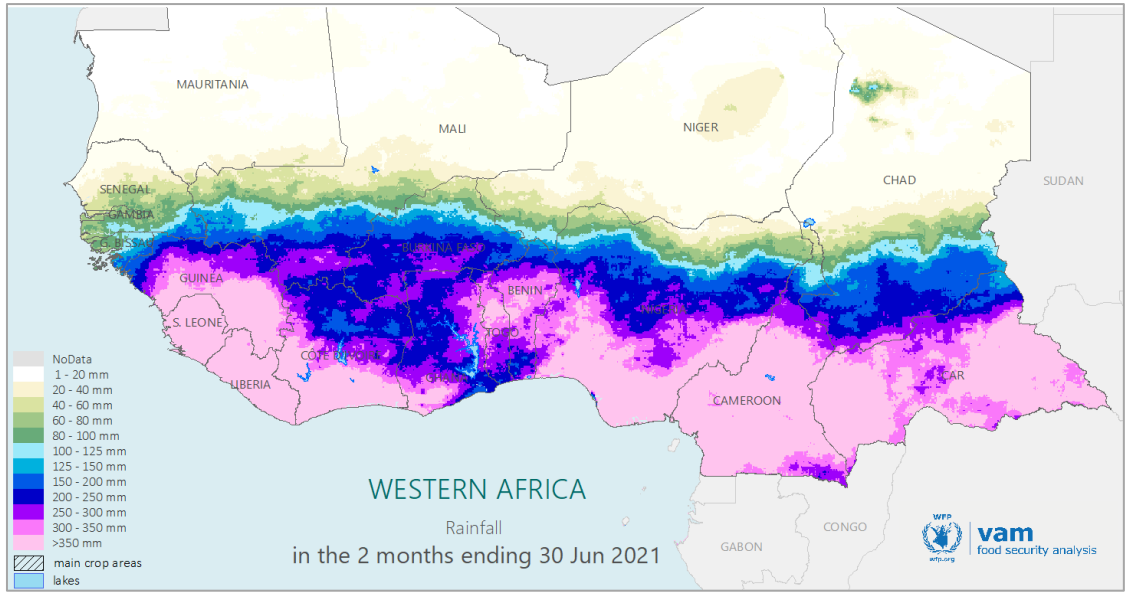


Biomass production anomalies as of October 5, 2021, expressed as a percentage of the 1998 2021 average. In the map the surplus areas in green, the deficit areas in red and normal production areas in yellow (Source: ACF, FSWG, 2021)

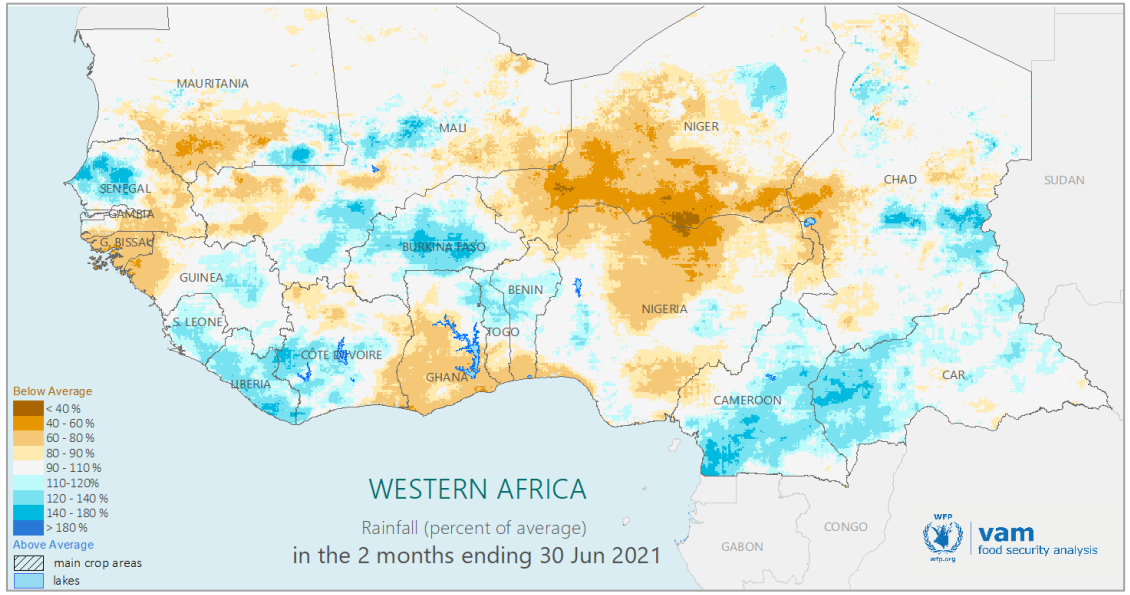
- **Vegetation:** As a result of the mostly average to above average rainfall in the region from mid- July to August, above average vegetation cover extends over much of the Sahel across Mali, north-eastern Burkina Faso, Niger, Chad, northern Nigeria and northern Senegal. Meanwhile, a low vegetation recovery can be observed in some pockets in the western parts of the region (southern Mauritania, northern Senegal, central Mali), in northern Nigeria and around Lake Chad, due to early rainfall deficits and erratic seasonal rains. It should be noted that despite the rainfall deficits in the latter stages of the season, vegetation conditions were maintained in some areas. However, these areas are likely to be affected by the earlier than normal end of the rainy season, which could see a quicker than normal depletion of vegetation. In these areas, the pastoral lean season might start earlier than usual this season.
- **Biomass anomaly:** Early season dryness, erratic rainfall distribution and long dry spells negatively impacted biomass development across the region. This can be observed in most of the region over Mauritania, northern and central Senegal, central and western Mali, western and eastern Niger, as well as northern and southern Chad, with below normal of biomass production. A similar situation is observed in the costal countries, including Nigeria, Ghana, Togo, Benin and Cote d'Ivoire. This will be of particular concern for the countries of the Sahel with a pastoral lean period that could start earlier than usual.
- **Water resources:** The availability of water resources in the region was generally favourable until August. The below normal rainfall distribution experienced during September, aggravated by absent rains in October has negatively impacted the availability of water resources, leading '**watch conditions**' across the Sahel. Given the ongoing and forecasted conditions, this could negatively impact pastoral activities in the Sahel.

Section 2: The start of the season (May-June 2021)

2021 rainy season – the start of the season (May-June)



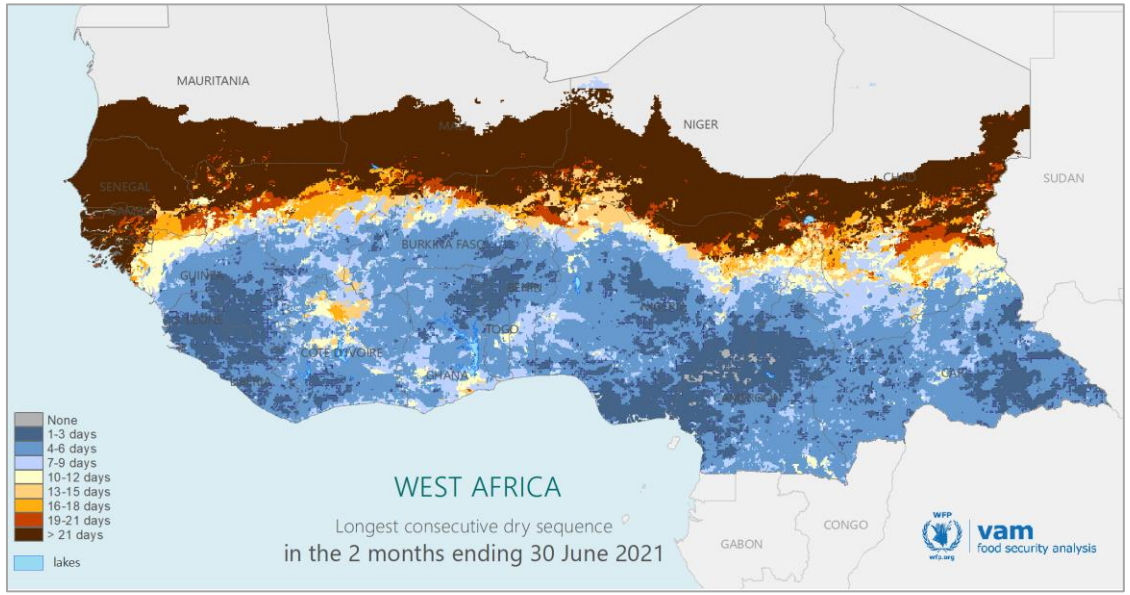
Cumulative rainfall (1May 10 June 2021): The map to the left shows the total rainfall received over the last dekad, based on CHIRPS satellite rainfall estimates.



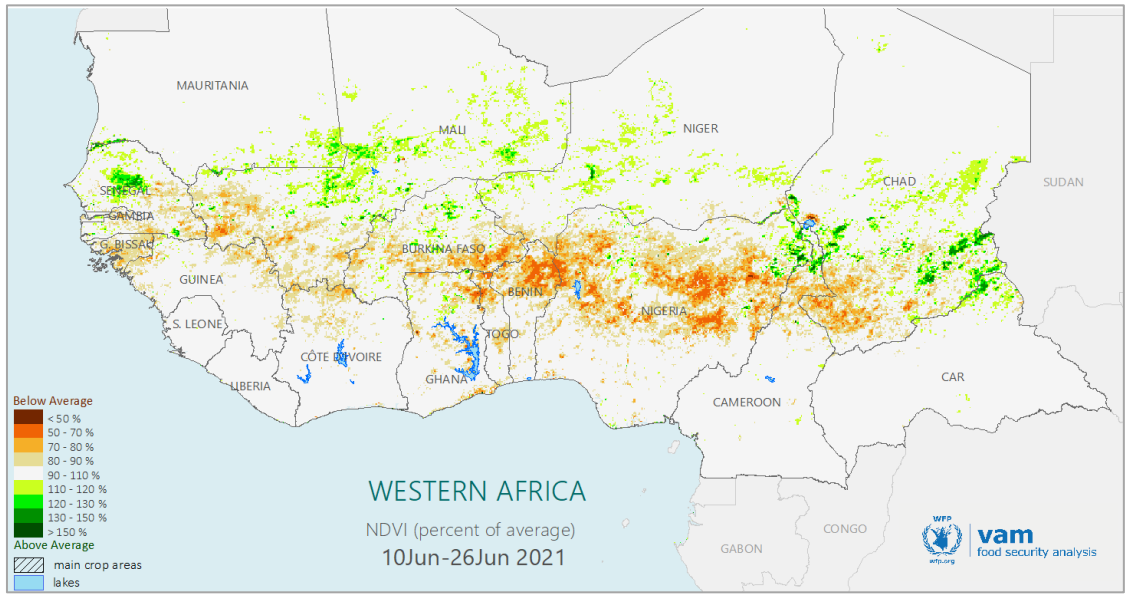
Rainfall rainfall (1May 10 June 2021): : The map to the left shows the rainfall anomaly over the last dekad in percentage of long-term average, based on CHIRPS satellite rainfall estimates.

- **Cumulative rainfall:** During the early stages of the season (May-June), the heaviest seasonal rains were received in the southern parts of the region. The Sahel received little rainfall. Only the southernmost parts of the Sahelian belt received moderate rains up to 100 mm. In the region the highest cumulative rainfall amounts (over 350 mm) were recorded in Sierra Leone, Liberia, south–eastern Guinea, southern Nigeria and eastern CAR. Important seasonal rainfall was also observed over Guinea, Cote d'Ivoire, southern and eastern Ghana, in Togo, Benin, central Nigeria, southern Cameroon and the whole of CAR, as well as in pockets of south-eastern Burkina Faso.
- **Rainfall anomaly:** The early stages of the rainy season were characterised by mixed conditions. Rainfall deficits were observed in Niger, northern Nigeria, western Chad, southern Mauritania, and the border areas between Senegal and Mali. Below average rains were also recorded across the central belt of Mali, Guinea Bissau, western Guinea and south-western Ghana. On the other hand, above average rainfall was received in the Mano River countries (eastern Guinea, Sierra Leone, Liberia, western Côte d'Ivoire), in southern Mali and central Burkina Faso, as well as in Cameroon and western CAR.
- ***Summary:*** *The below average rains recorded in some areas, including central Nigeria, Niger and the Lake Chad Basin, as well as in the border areas between Senegal, Mali and Mauritania, point towards a delayed start of the season in some parts of the region. However, the situation across the region is mixed, with some areas receiving above normal rains, particularly central Burkina and southern Mali, as well as parts of eastern Chad.*

2021 rainy season – the start of the season (May-June)



*(**May – 30 June**): Map of the Longest Consecutive dry sequence in 6 months .*

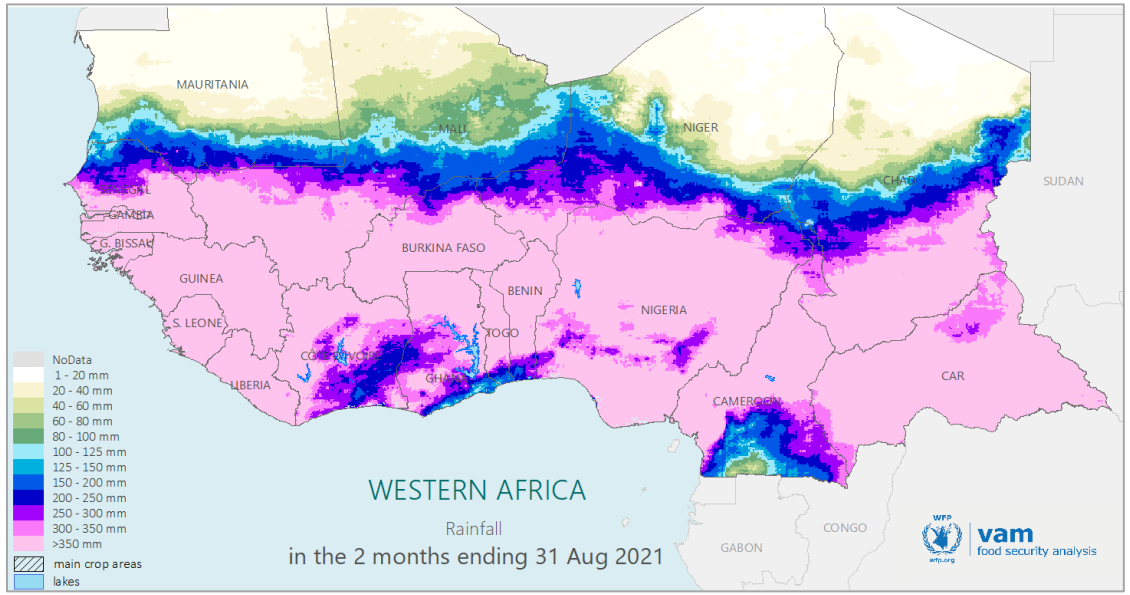


NDVI (September 10 Jun 26 Jun 2021): the map on the left shows the vegetation anomaly as a percentage of the average, based on the MODIS NDVI

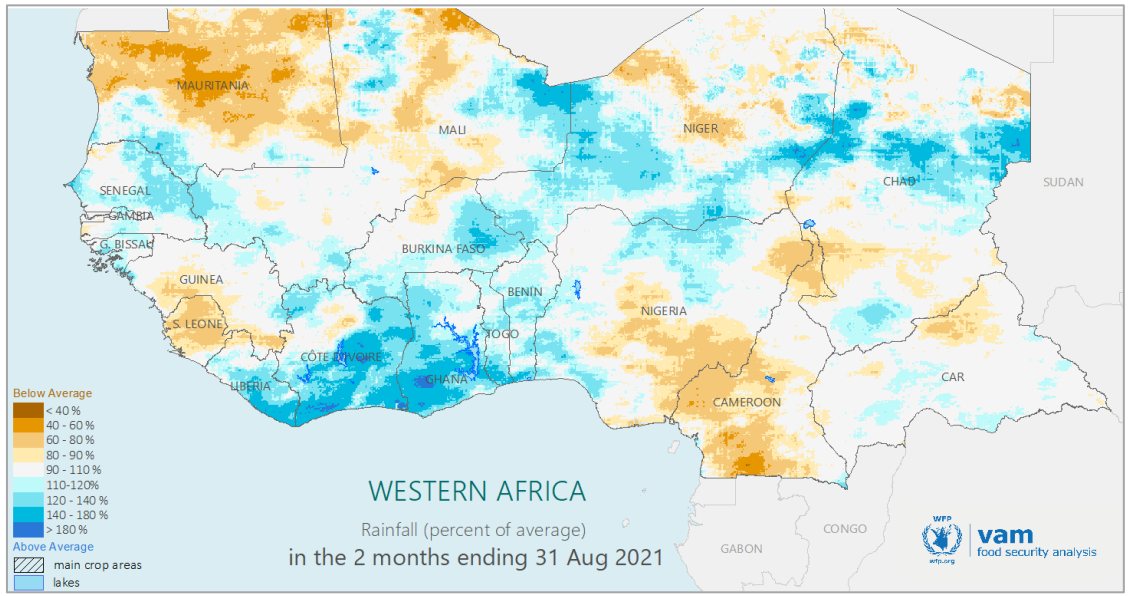
- **Consecutive dry sequence :** Between May and June, consecutive dry sequences of over 21 days were recorded in most of the northern parts of the region, where the seasonal rains only started towards late June. This confirms the delayed start of the 2021 rainy season. The southern parts of the region were characterised by very short dry-spells of less than 7 days, which are unlikely to have had major impacts on crop development.
- **Vegetation:** Early rainfall deficits have had an impact on vegetation conditions at the end of June 2021, which were below average in the western parts of the region (south-eastern Senegal, south-western Mali), in southern Burkina Faso, northern Ghana, northern Benin, central Nigeria, central Cameroon and south-eastern CAR. It can be noted that the vegetation is slowly recovering in some areas linked to rainfall improvement, but in the areas where rainfall deficits persist – particularly in northern Nigeria. Central Cameroon (North Region) and south-western Chad – below average vegetation conditions are most pronounced. Above average vegetation can be seen in the northern part of the Sahel (northern Mali, northern Burkina Faso, Niger, as well as north-eastern Nigeria and most of Chad. This can be linked to the above average 2020 rainy season.

Section 3: The peak of the rainy season (July-August 2021)

2021 rainy season – the peak of the rainy season (July-August)



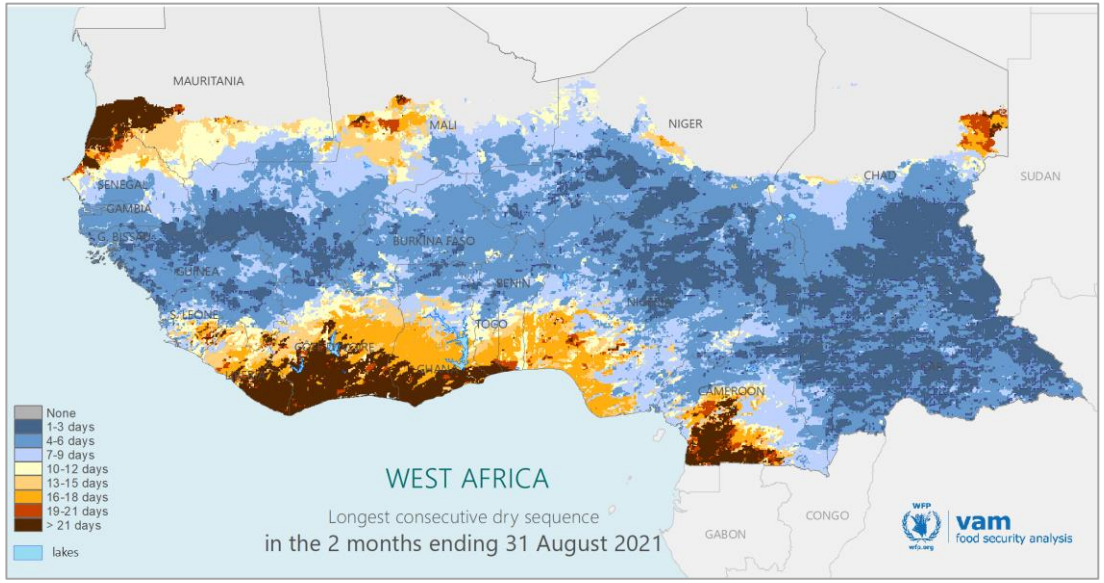
Cumulative rainfall (1July -31 August 2021): *The map to the left shows the total rainfall received over the last dekad, based on CHIRPS satellite rainfall estimates.*



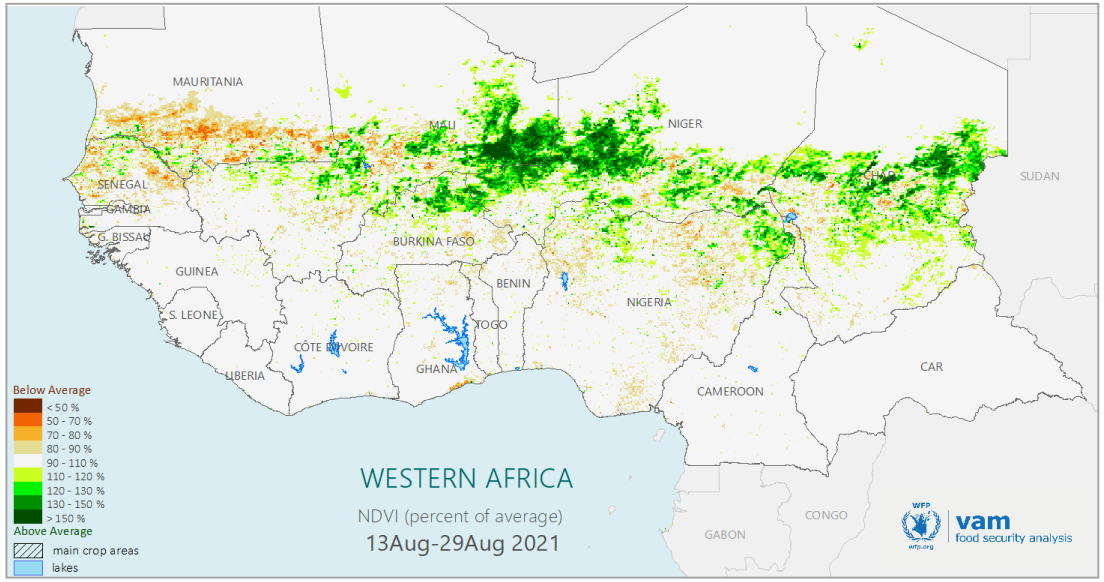
Rainfall anomaly (1July -31 August 2021): *The map to the left shows the rainfall anomaly over the last dekad in percentage of long-term average, based on CHIRPS satellite rainfall estimates.*

- **Cumulative rainfall**: Between July and August 2021, heavy rains (above 350 mm) were recorded over most of the region reaching the southern parts of the Sahel in southern Senegal, Gambia, Guinea Bissau, Guinea, Sierra Leone, Liberia, Cote d'Ivoire, Ghana, Togo, Benin, Nigeria, Cameroon, Car, Southern Chad, most Burkina Faso, western Niger, Western Mali. Meanwhile, moderate seasonal rainfall (up to 150mm) was received in the northern parts of the sahelian belt. Only northern Mauritania experienced light to moderate seasonal rains.
- **Rainfall anomaly:** In its peak period, the 2021 rainy season has been characterised by mostly average to above average conditions across the region. Rainfall deficits were recorded in some areas, including northern Mauritania, central Guinea and Sierra Leone, the Central Sahel, Lake Chad Basin, as well as south-eastern Nigeria and most of Cameroon. Conversely, the eastern (eastern Burkina Faso, Niger, central Chad) and western Sahel (Senegal, western Mali, southern Mauritania), as well as coastal countries (Liberia, Côte d'Ivoire, Togo, Benin) received significantly above average rains (more than 140% of the long-term average).
- ***Summary:*** *The bulk of the seasonal rains in 2021 were received over the peak period of the season, between July and August. However, it is unlikely that these excess rains would have been able to fully offset early season dryness in areas affected by a late start of the 2021 season.*

2021 rainy season – the peak of the rainy season (July-August)



(July – 31 August): Map of the Longest Consecutive dry sequence in 6 months .

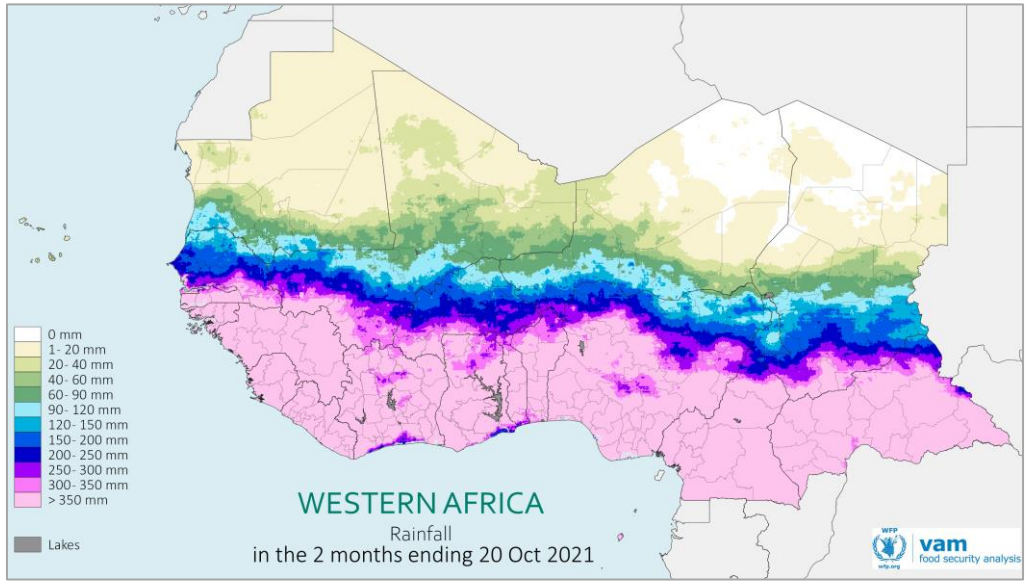


NDVI (13 August - 29 August 2021): the map on the left shows the vegetation anomaly as a percentage of the average, based on the MODIS NDVI

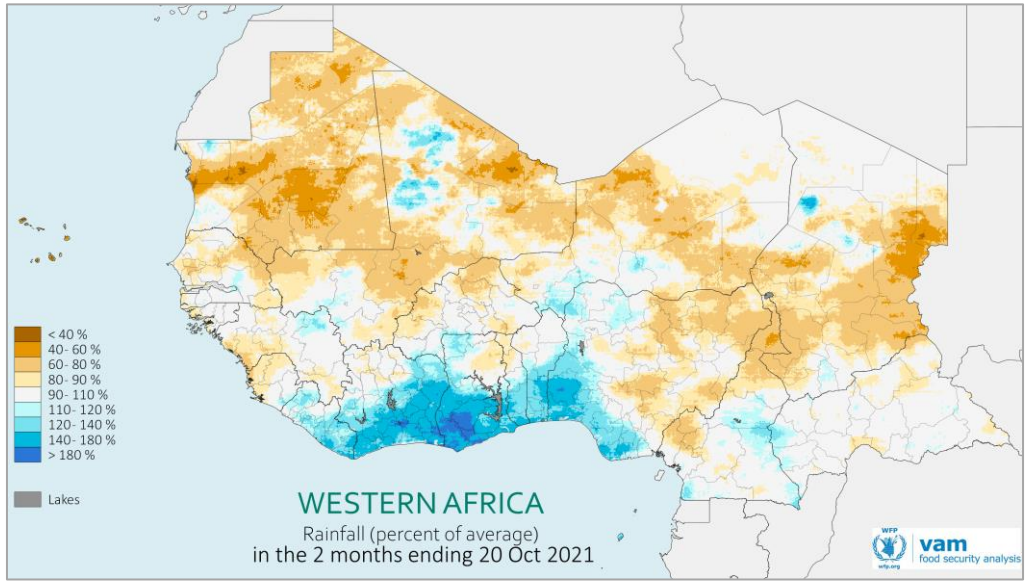
- **Consecutive dry sequence :** Between July and August 2021, most of the region was characterised by short dry sequences of up to 7 days, in line with seasonal trends, which usually see relatively consistent rainfall being received during this period. Southern coastal areas (southern Liberia, southern Côte d'Ivoire, southern Ghana), as well as parts of south-western Cameroon recorded longer dry-spells, which is also in line with seasonal trends, which see a short dry season in these areas around this time of the year. However, it is important to note that some parts of northern Senegal and western Mauritania also recorded long dry sequences, that occurred during the peak of the rainy season and are an indication of an erratic distribution of rains.
- **Vegetation:** As a result of the significantly higher than normal rains across the region during the peak of the rainy season, above average vegetation conditions were observed at the end of August 2021, particularly in the central and eastern parts of the Sahel. The western Sahel (northern Senegal, Mauritania) recorded below normal conditions, which could be linked to the average to below average rains received in these areas, as well as the erratic distribution of rainfall mentioned above.

Section 4: The end of the season (September-October 2021)

2021 rainy season – towards the end of the season (September-October)



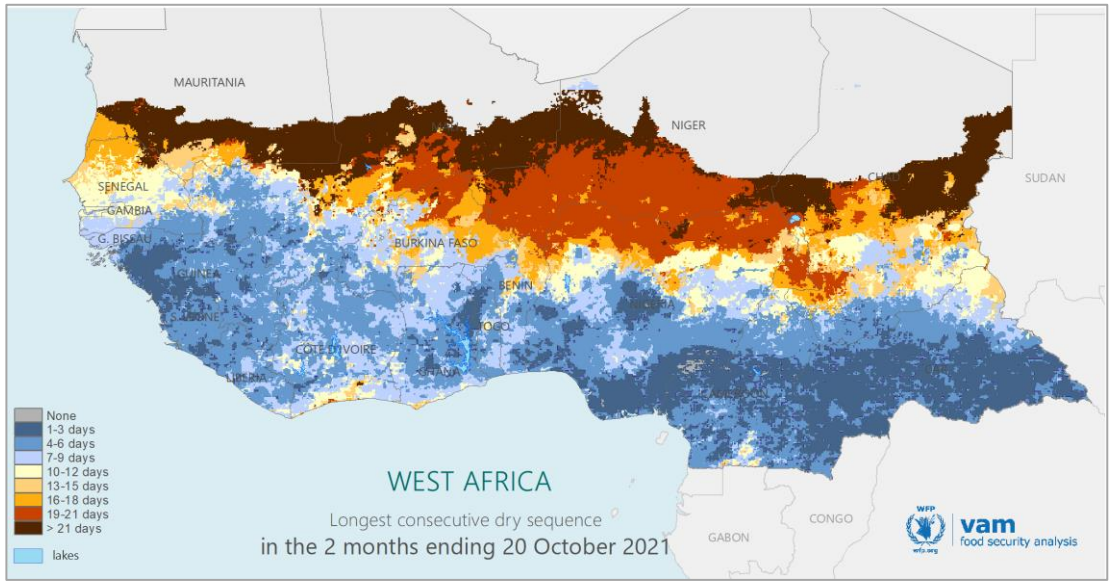
Cumulative rainfall (September -20 October 2021): *The map to the left shows the total rainfall received over the last dekad, based on CHIRPS satellite rainfall estimates.*



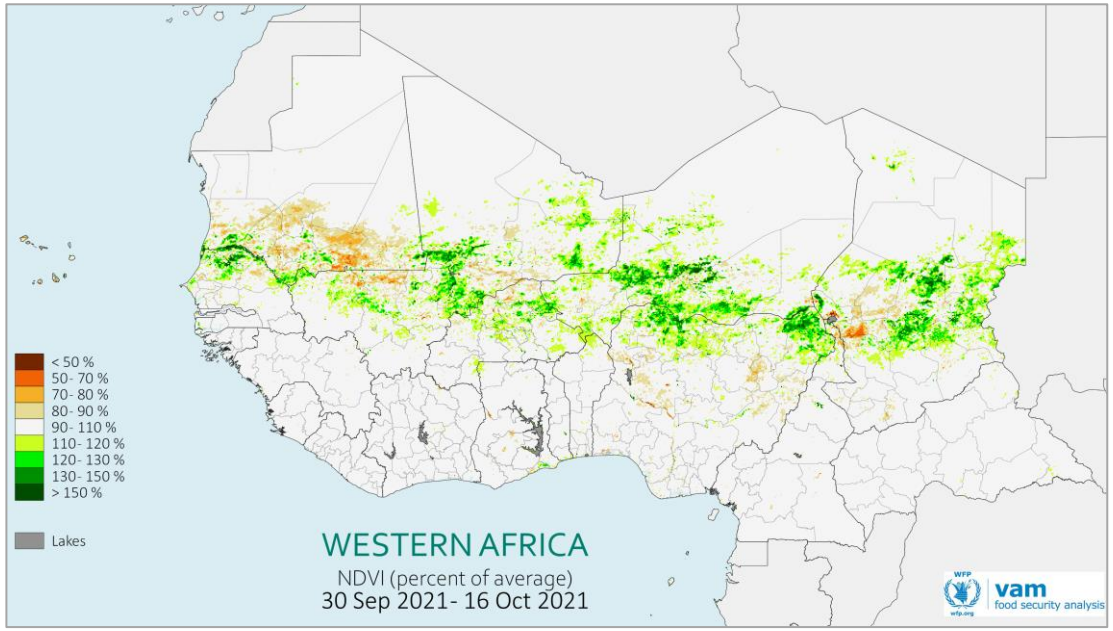
Rainfall anomaly rainfall (September -20 October 2021 : *The map to the left shows the rainfall anomaly over the last dekad in percentage of long-term average, based on CHIRPS satellite rainfall estimates.*

- **Cumulative rainfall**: September and October mark the final months of the rainy season, particularly in the northern parts of the region. Cumulative rainfall totals up to 20 October suggest that moderate to heavy rainfall over 250 mm was received in the southern half of the region (from CAR and Cameroon through to southern Senegal). Further north, rainfall totals ranged from 90 to 250 mm, across northern Senegal, central Mali, central Burkina Faso, southern Niger and central Chad. This reduction in rainfall totals compared to the previous period marks the end of the rainy season in the Sahel.
- **Rainfall anomaly:** Compared to the long-term average, rainfall totals in September and October 2021 were mostly below normal, particularly across the Sahel region. The most significant deficits were recorded in eastern Senegal, eastern and northern Mauritania, the central Sahel, as well as the wider Lake Chad Basin and most of Chad. Only the southern parts of the region, including coastal areas of southern Liberia, southern Côte d'Ivoire, southern Ghana southern Nigeria recorded above normal rainfall.
- ***Summary:*** *Similarly to the early stages, the latter parts of the 2021 rainy season in West Africa were characterised by below normal rainfall. This suggests that the season ended early, particularly in the central and northern parts of the region, including most of the Sahel. Coupled with the late start of the season and excess rains received in July and August, these patterns highlight the erratic nature of the 2021 rainy season in West Africa, which is likely to have negatively impacted crop and pasture development – particularly across the Sahel. Most notably, sustained rainfall deficits were recorded throughout the season in the central Sahel, including in northern Burkina Faso and central Mali, as well as in the Lake Chad Basin.*

2021 rainy season – towards the end of the season (September-October)



*(**September– 20 October**): Map of the Longest Consecutive dry sequence in 6 months .*



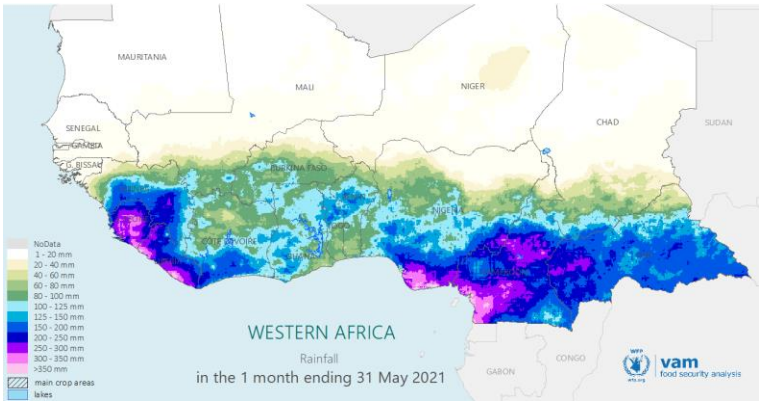
NDVI (30 September – 16 October 2021): the map on the left shows the vegetation anomaly as a percentage of the average, based on the MODIS NDVI

- **Consecutive dry sequence:** The analysis of dry sequences confirms the early end of the season across most of the Sahel, particularly over most of central and northern Mali, northern Burkina Faso, Niger, northern Nigeria, and central Chad. In these areas, long dry sequences of over 19 days were recorded. The westernmost areas of the region (northern Senegal and south-western Mauritania) were also affected by moderately long dry sequences of over 16 days. Further south, rains were more consistent in the latter stages of the season (September-October).
- **Vegetation:** As of mid-October 2021, vegetation conditions remained average to above average across most of the central and eastern Sahel, however this is likely to be a carry-over of significantly above average rains and better than normal vegetation conditions in the peak period of the rainy season. Given the early end of the season and below normal rains in September and October, vegetation conditions are likely to deteriorate quickly over the coming weeks.

Section 5: Month-by-month progression of the season (May-October 2021)

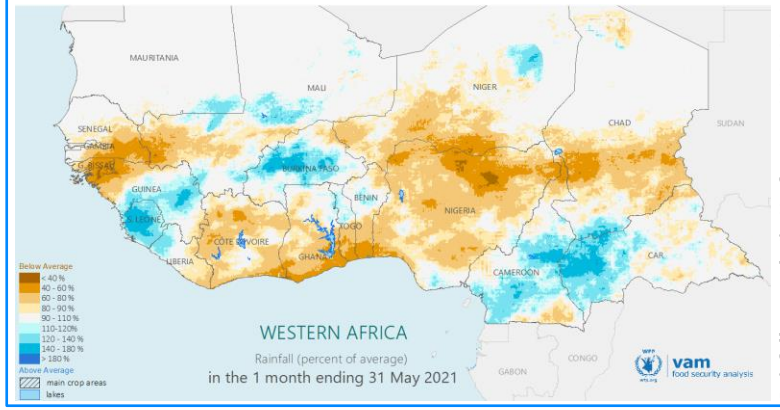
Month-by-month progression of the 2021 rainy season (May-July)

May



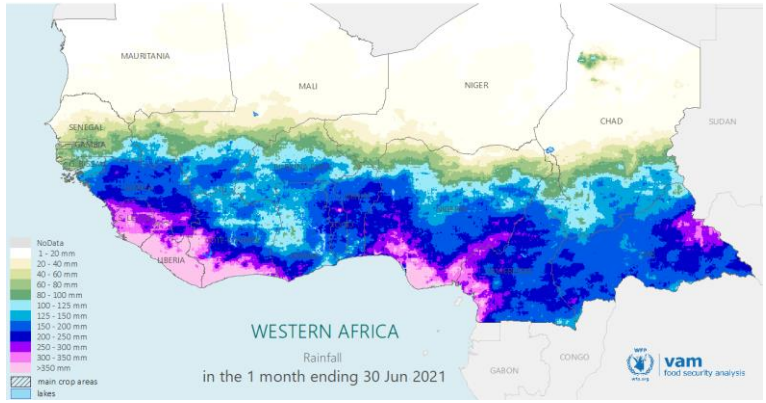
Cumulative rainfall (in mm) 1-31 May 2021 (CHIRPS)

May 2021: In May, significant rainfall (above 250 mm) were received in the south-western (Guinea, Sierra Leone, Liberia) and south-eastern parts (southern Nigeria, central Cameroon, CAR) of the region. Rainfall was light to moderate in the rest of the region. Compared to the long-term average, areas mentioned above (south-western and south-eastern parts of West Africa) received excess rains, while below normal rains were recorded in the rest of the region.



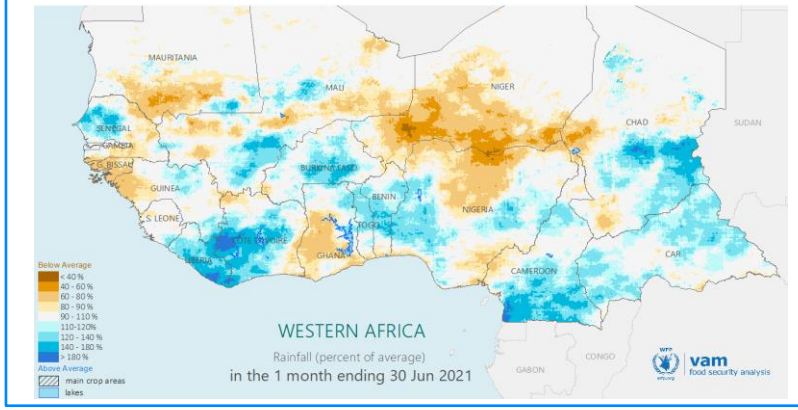
Rainfall anomaly (in % of average) 1-31 May 2021 (CHIRPS)

June



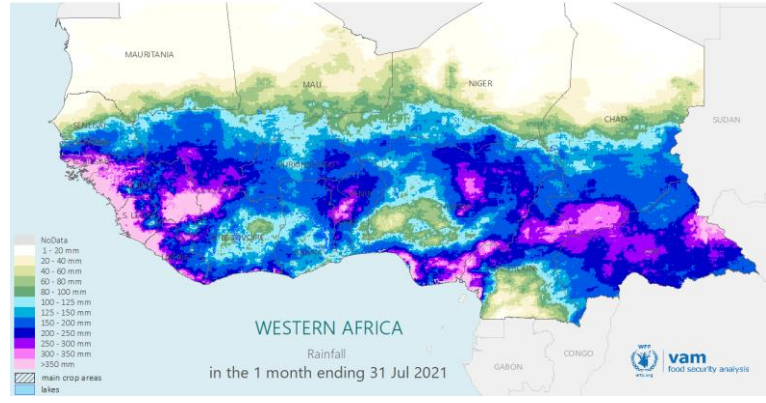
Cumulative rainfall (in mm) 1-30 June 2021 (CHIRPS)

June 2021: In June, rains progressively intensified in the south-central parts of the region (Cote d'Ivoire, Burkina Faso, Togo, Benin). Over the eastern Sahel, rainfall deficits mainly affected Niger, northern Nigeria, western Chad and northern Cameroon. Furthermore, in the westernmost areas of the region below average rainfall was recorded over southern Mauritania, eastern and southern Senegal, north-western Mali, Guinea Bissau and western Guinea as well as northern Cote d'Ivoire, southern Ghana and in some pockets over eastern CAR. In contrast, seasonal rainfall is above average in western Senegal. Burkina Faso, Liberia, Sierra Leone, eastern Guinea, southern Cameroon, western CAR and pockets in eastern Chad and central Mali.



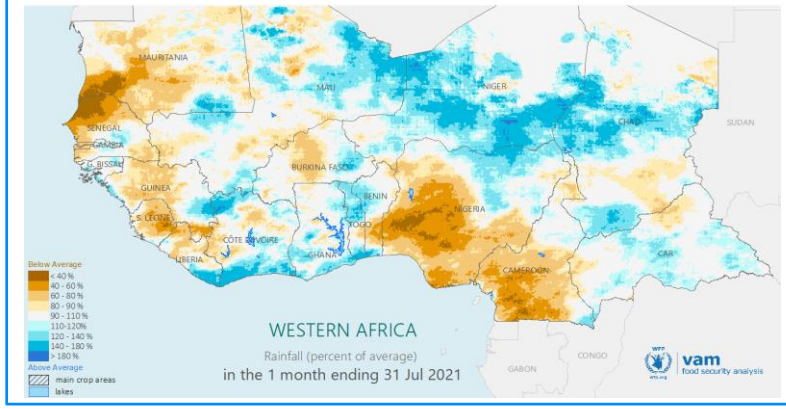
Rainfall anomaly (in % of average) 1-30 June 2021 (CHIRPS)

July



Cumulative rainfall (in mm) 1-31 July 2021 (CHIRPS)

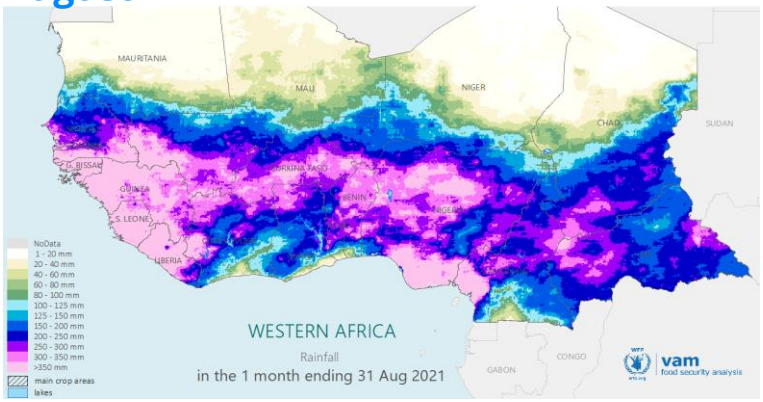
July 2021 : In July, the seasonal rains intensified further, however some areas such as central Cote d'Ivoire, central and southern Nigeria, as well as southern Cameroon only received light rainfall (less than 100 mm). Compared to the long-term average, this translates into significant rainfall deficits for most of Nigeria and Cameroon, parts of central Burkina and central Mali, southern Chad, as well as most of the western parts of the region (Mauritania, Senegal, Guinea, Sierra Leone and northern Liberia). Conversely, Niger and the northern Lake Chad Basin received above average rainfall over the month of July.



Rainfall anomaly (in % of average) 1-31 July 2021 (CHIRPS)

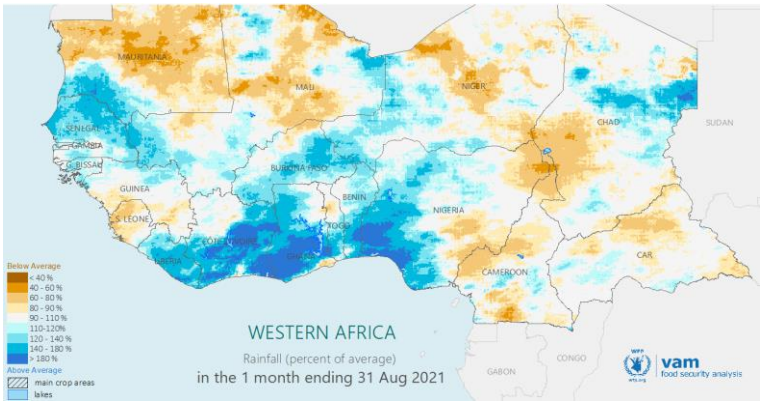
Month-by-month progression of the 2021 rainy season (August-October)

August



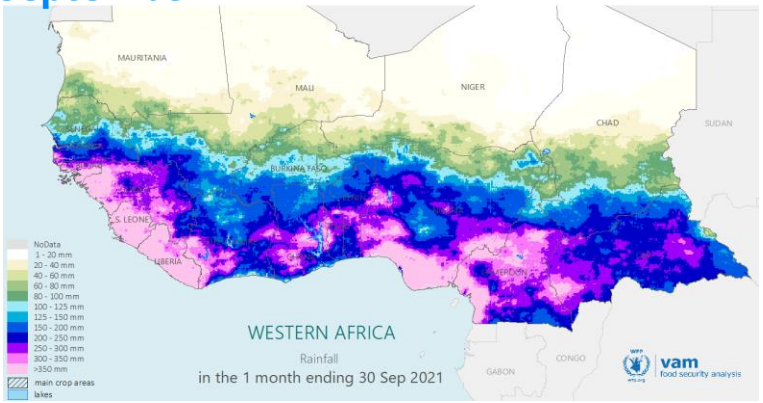
Cumulative rainfall (in mm) 1-31 May 2021 (CHIRPS)

August 2021: During the month of August, intense rainfall of 250 mm and more was received across most of the region, with the exception of its northernmost parts (northern Senegal, southern Mauritania, central and northern Mali, Niger and southern Chad). Lighter rainfall was also received in some south-western and south-eastern pockets of the region. These rainfall patterns translate into below normal rainfall across northern Mauritania, the Central Sahel, the wider Lake Chad Basin, as well as most of south-eastern Nigeria, Cameroon and CAR. Average to above average rains were recorded in coastal countries in the southern parts of the region, most of Senegal, western Mali and southern Mauritania, as well as in Burkina Faso and western Niger.



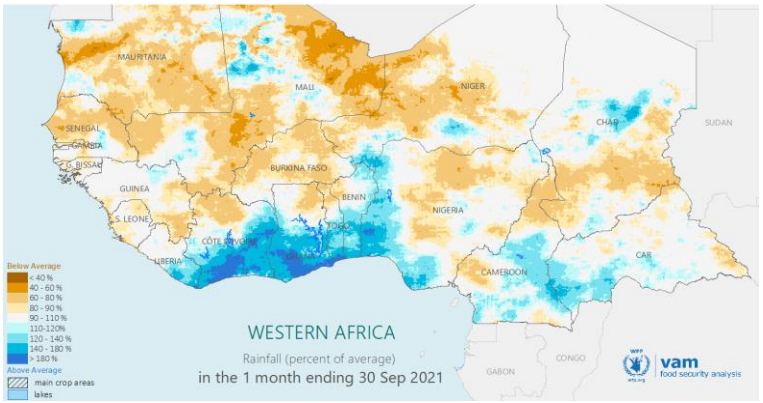
Rainfall anomaly (in % of average) 1-31 May 2021 (CHIRPS)

September



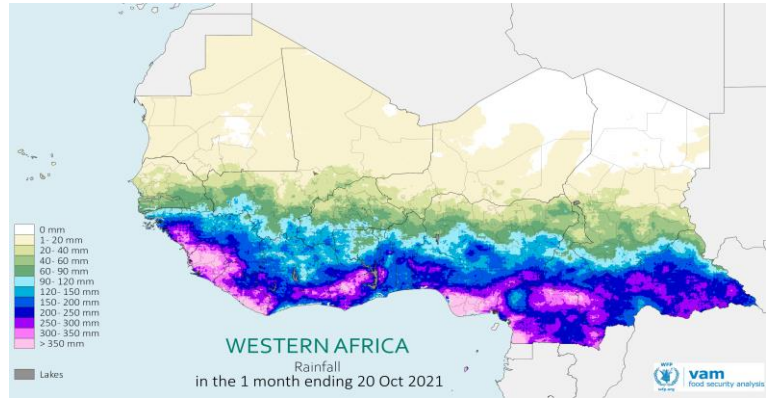
Cumulative rainfall (in mm) 1-30 June 2021 (CHIRPS)

September 2021: Cumulative rainfall totals in September highlight a pattern of a southward shift of seasonal rains, as the season enters its latter stages. Only the south-western and central parts of the region received significant rains during this period, while most of the central and northern parts of West Africa received moderate rainfall (100-250 mm). Compared to the long-term average, rains were well below normal across most of the region, particularly in the northern parts, including most of the Sahel. Only coastal areas of Cote d'Ivoire, Ghana, Togo, Benin and Nigeria, as well as eastern Cameroon and western CAR received above normal rains in September 2021.



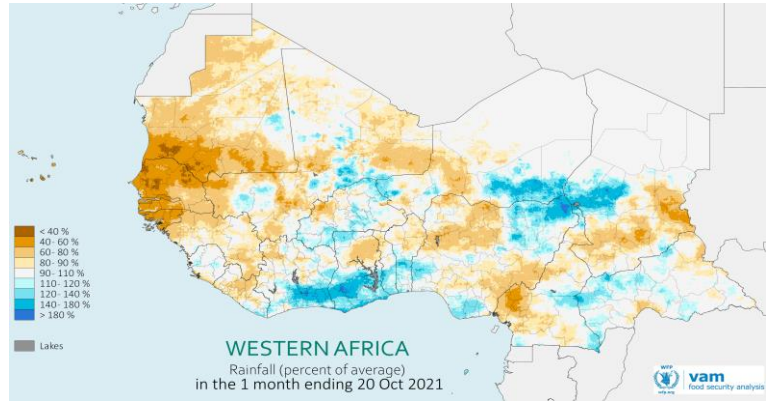
Rainfall anomaly (in % of average) 1-30 June 2021 (CHIRPS)

October



Cumulative rainfall (in mm) 1-31 July 2021 (CHIRPS)

October 2021: In October, seasonal rains decreased further, with mostly dry conditions across the Sahel. Only the south-western and south-eastern parts of the country received significant rains of over 250 mm. This mixed distribution of rainfall results in significantly drier than normal conditions across most of the region. The most affected areas are the western parts of the Sahel (Senegal, Mauritania, western Mali), parts of the central Sahel (northern Burkina Faso, central Mali), north-western Nigeria, as well as the border areas between Nigeria and Cameroon, and southern Chad.



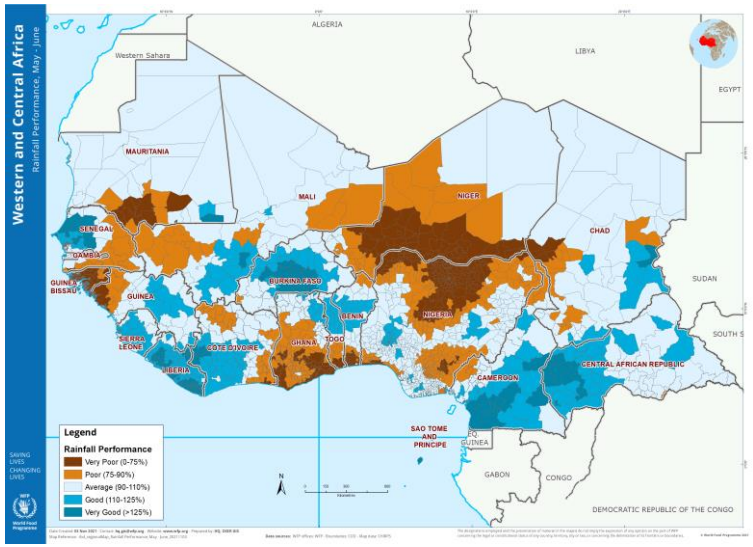
Rainfall anomaly (in % of average) 1-31 July 2021 (CHIRPS)

Section 6: Analysis of seasonal performance at Admin 2 level

Rainfall anomalies (at Admin 2 level)

The following maps illustrate rainfall anomalies over key periods of the 2021 rainy season, aggregated at the Admin 2 level. It is important to note that this aggregation can hide significant differences within administrative areas, which can have significant impacts on crop and pasture development. They thus need to be combined with the pixel-level rainfall estimates found on slides 8, 11 and 14.

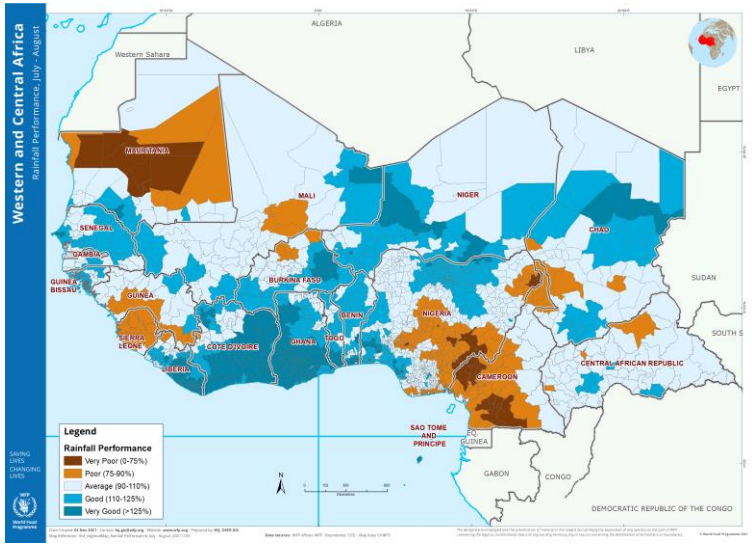
May - June



Rainfall performance May – June 2021 (CHIRPS)

May–June: As discussed on slide 8, rainfall in the early stages of the season (May-June) was above average in the south-western and south-eastern parts of the region, as well as in parts of the centre of West Africa (Burkina Faso, southern Mali). In the western Sahel (Guinea-Bissau, eastern Senegal, western Mali, southern Mauritania) and the central and eastern parts of the region (Niger, central Nigeria, Lake Chad Basin), rainfall was well below average. Similar patterns were observed in central coastal areas, namely eastern Cote d'Ivoire, southern Ghana, as well as coastal areas of Benin and Togo).

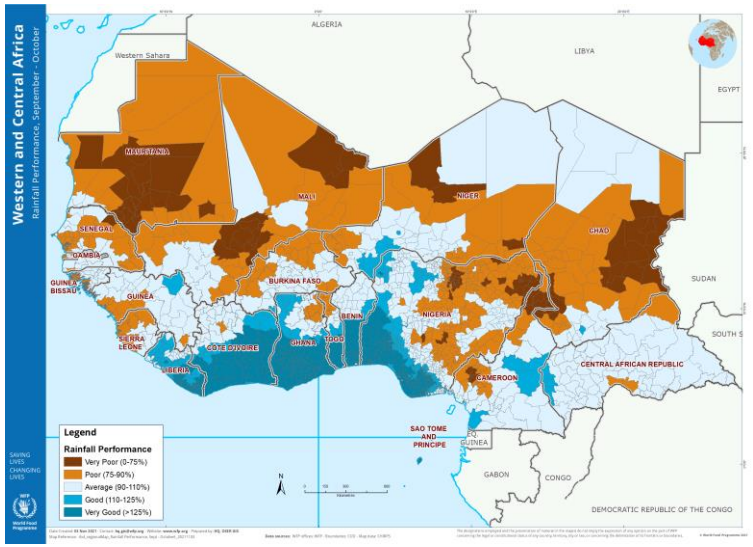
July - August



Rainfall performance July – August 2021 (CHIRPS)

July-August: During the peak period of the season, rainfall was mostly average to above average across West Africa, with the exception of the south-eastern (south-eastern Nigeria, Cameroon), western (Sierra Leone) and north-western parts (northern Mauritania) of the region, as well as over the Lake Chad Basin.

September - October



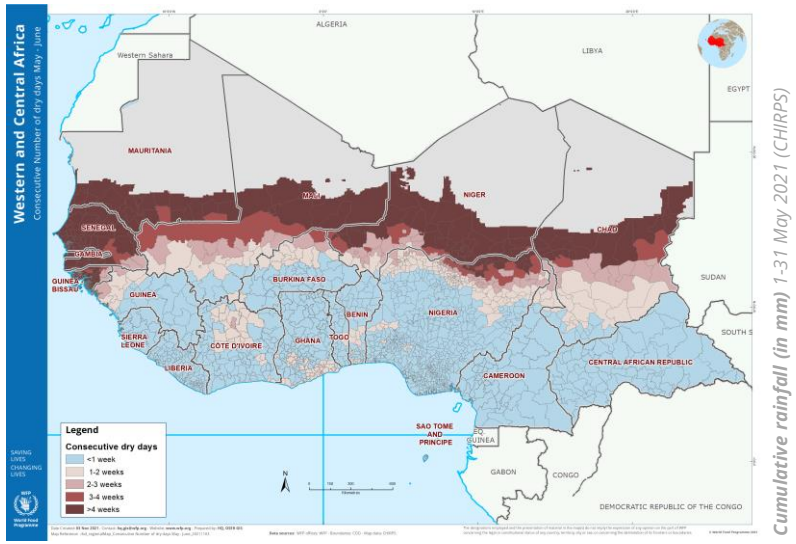
Rainfall performance September – October 2021 (CHIRPS)

September-October: Towards the end of the season (September-October), rainfall performance across most of West Africa was poor, with below average rains received across most of the region. Only the southernmost areas (southern Cote d'Ivoire, southern Ghana, Togo, Benin and south-western Nigeria) received above normal rains. The poor rains in the Sahel region coincide with a critical period of the agricultural season, namely flowering and crop maturation. Rainfall deficits recorded during this period might have negatively impacted crop and pasture conditions.

Consecutive dry periods (at Admin 2 level)

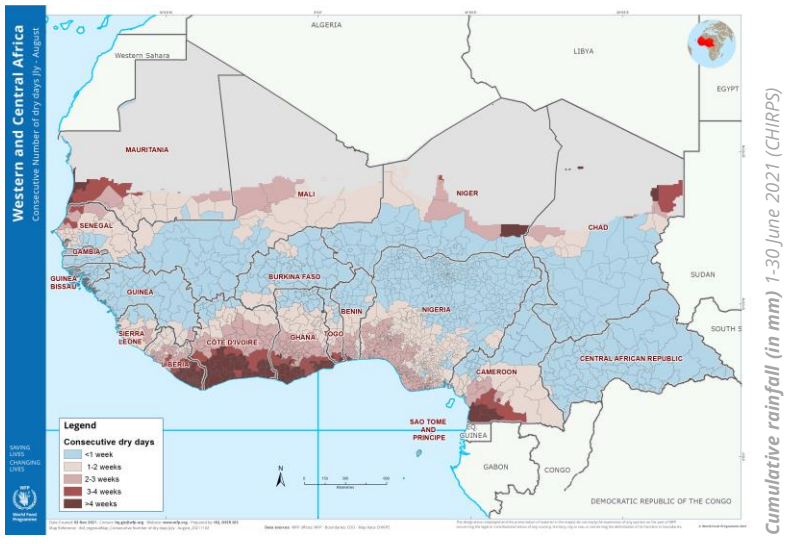
The following maps visualise the most frequently occurring length of consecutive dry sequence at the Admin 2 level. As for the rainfall anomalies, the aggregation at Admin 2 level is done to quickly identify the most affected areas – however, it can hide variances within administrative areas, that can be explored further on slides 9, 12 and 15.

May - June



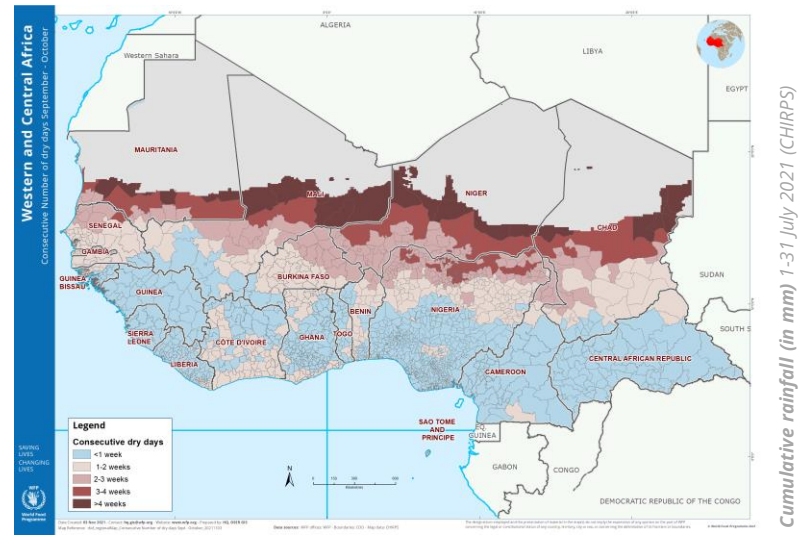
May-June: During the early stages of the season, long dry sequences of over 4 weeks were observed over the northern part of the region, including most of the Sahel. While this is partly in line with normal seasonal patterns, it also signals a late start of the season in some areas. The southern half of West Africa experienced less dry sequences, however some areas such as northern Cote d'Ivoire and southern Ghana were affected by moderate dry-spells of 1-3 weeks.

July - August



July-August: During the peak period of the rainy season, most areas experienced relatively consistent rainfall, with dry sequences of less than a week. Only the northernmost areas of West Africa, as well as some coastal regions in the south-western and south-eastern parts of West Africa experienced longer dry-spells. While these are in line with seasonal patterns in the southernmost parts of the region, they do highlight the erratic nature of the rainy season further north, particularly in northern Senegal and southern Mauritania.

September - October



September-October: As discussed in previous sections of this analysis, the 2021 rainy season came to an early end in most of the region, particularly the northern parts. This is highlighted by the long dry-spells observed between September and October, which affected most Sahelian countries, including Niger, central Chad, north-eastern Burkina Faso, central and northern Mali, as well as Senegal and Mauritania. Rainfall was more consistent in the southern parts of the region.

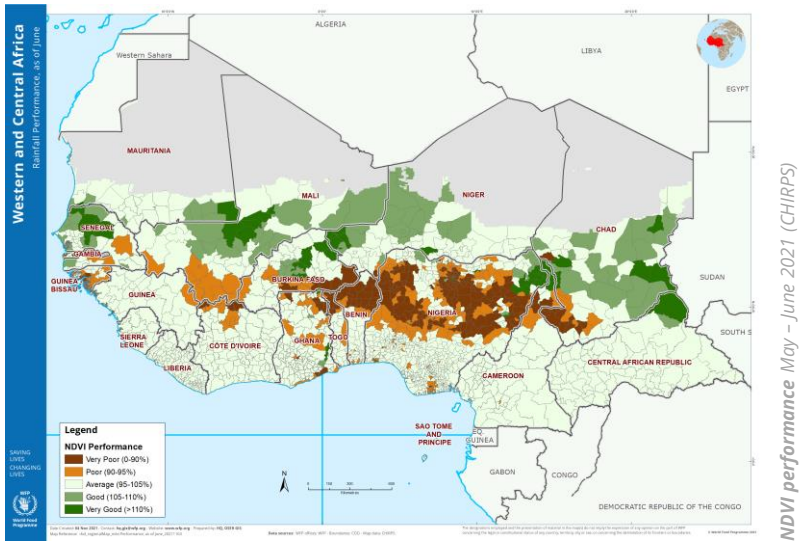
In early season, over Burkina Faso in Seno, Soum and Oudalan provinces, respectively predominance of 20, 20 and 27 days of dry sequence were observed leading late onset in July dekad 1, 2 and Dekad3 respectively. In south eastern and western parts of Niger over Abala, Aguie, Ayerou, Balleyara, Bani Bangou, Bankillare, Belbedji, Bermo, Bosso, Dakoro, Damagaram Takaya, Diffa, Dungass, Gazaoua, Gotheye, Goudoumaria, Goure, Guidan Roumji, Kantché, Magaria, Maïne Soroa, Mayahi, Mirriah, N'guigmi, Ouallam, Tahoua, Takieta, Tanout, Tera, Tessaoua, Tillaberi departments, late onset (July dekad 3 and/or August deka1) with long consecutive dry days up to 61 days (characterised by very poor rainfall performance) was observed. In western Mali (Bafoulabe, Banamba, Bandiagara, Diema, Douentza, Kayes, Kolokani, Koulikoro, Macina, Mopti, Nara, Niafunke, Niono, Nioro, Segou, Tenenkou and Yelimane) a predominance of 18 – 25 days of dry sequence, the departments in soudanian zone of Chad with consecutive dry sequences over 4 week and 2-3 weeks as well as southern Senegal and Gambia, consecutive dry sequences over than 4 week and 2-3 weeks, Guinea Bissau and Far north-eastern Nigeria LGAs in Borno, Jigawa, Bauchi, Katsina and Yobe states with consecutive dry sequences over than 4 week and 2-3 weeks, potentially impacted the planting activities by delaying sowing. During the peak of the season, predominance consecutive dry sequences of 14 -15 days in Mali (Dire and Niafunke), in Senegal (Louga, Matam, Dagana and Podor) and in Mauritania (Barkeol, Aleg, Bababe, Boghe, Kaedi, M'Bout and Monguel) in addition to the early season dryness, impact negatively the crops yield and pasture dynamic.

Toward the end of the season, consecutive long dry sequences affected the whole Niger (consecutive dry days up to more than 4 weeks). In the Sahel Niger is most affected as well as neighbouring LAGs in North-eastern Nigeria, Southern Mauritania, central belt of Mali and Chad sahelian belt. Northern Senegal (Louga, Linguere, Kebemer and Saint – Louis) and eastern Burkina were affected by consecutive dry sequences of 1 – 2 weeks

Vegetation conditions (at Admin 2 level)

The following maps show the anomaly of the NDVI at the end of each period of the season (end of June, end of August, mid-October). As for the previous two slides, the aggregation of vegetation indices at the Admin 2 level is intended to provide high-level insights into overall vegetation conditions, to complement the more granular data showed in previous sections of this analysis (slides 9, 12 and 15).

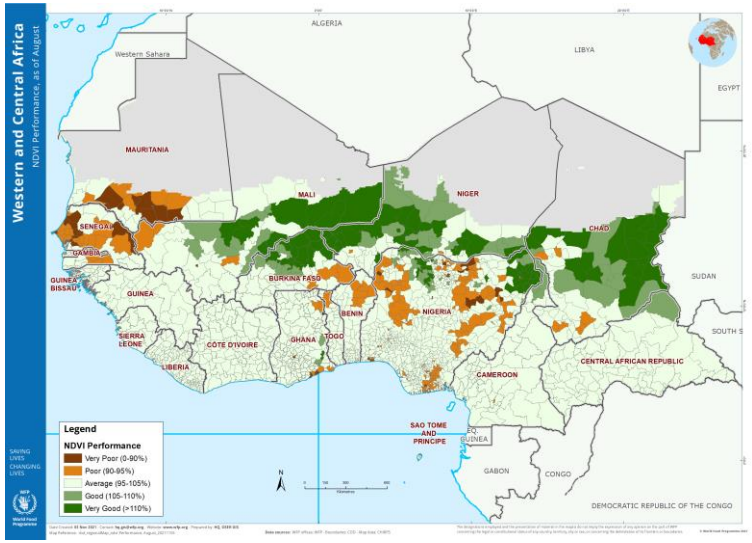
As of June



NDVI performance May – June 2021 (CHIRPS)

May–June: Vegetation conditions at the end of the first phase of the rainy season (end of June 2021) suggest that below average vegetation conditions prevailed in central parts of the region, including southern Mali, northern Benin and northern and central Nigeria. Further north, in the Sahel, vegetation conditions were better, a likely carry-over of the above normal rainy season in 2020, considering the late start of the 2021 season.

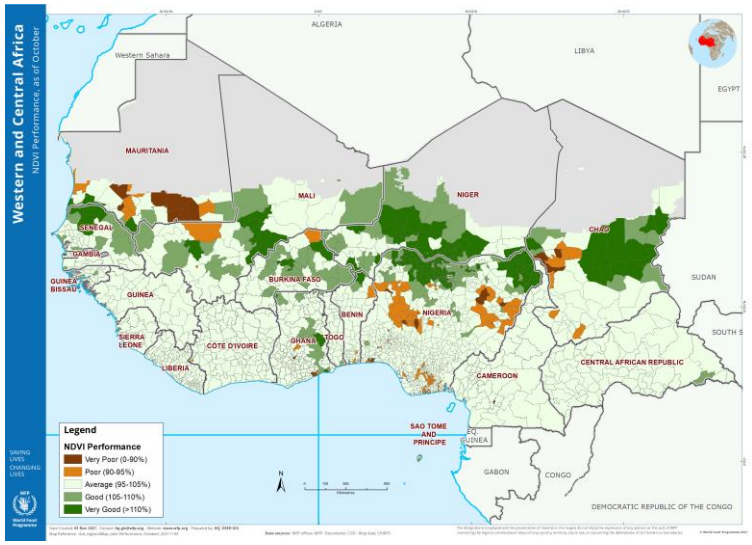
As of August



RNDVI performance July – August 2021 (CHIRPS)

July-August: During the peak period of the season, at the end of August, vegetation conditions in the Sahel were well above average, as a result of above normal rainfall. However, in the westernmost parts of the region (Senegal, southern Mauritania), below normal vegetation conditions were observed – this also applies to parts of northern and central Nigeria, where rainfall totals remained below average during this period.

As of October



NDVI performance September – October 2021 (CHIRPS)

September-October: Towards the end of the season, vegetation conditions across most of West Africa were average to above average, except for some pockets of central Nigeria and southern Mauritania. However, given the early end of the season with below normal rainfall in September and October, it is likely that an accelerated depletion of vegetation will be observed over the coming weeks and months.

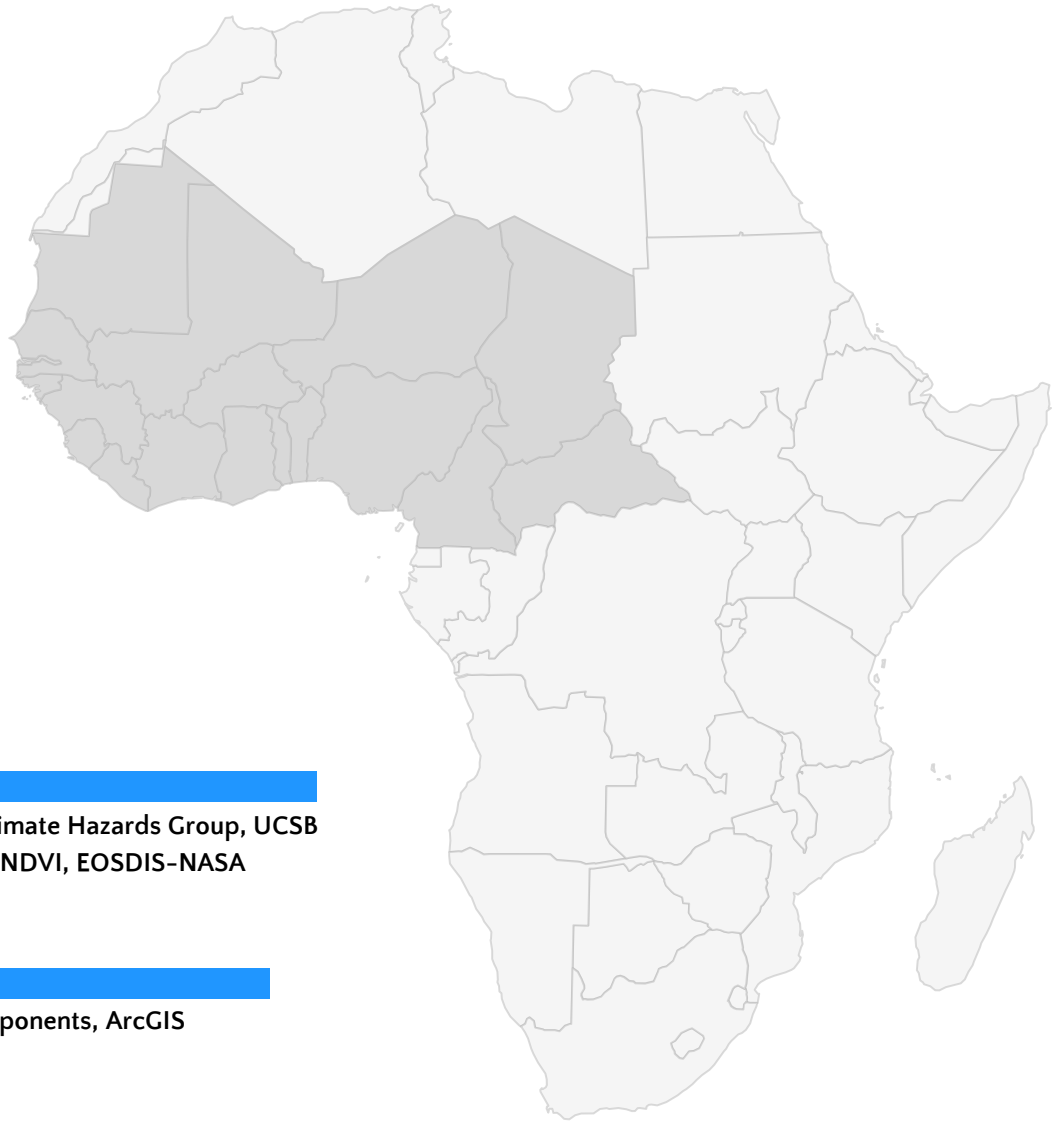
Section 7: Annex

Detailed table of climate indicators at Admin 2 level

Country (adm0)	Region (adm1)	District (adm2)	adm2Pcod3	Anomaly number of Rainy days (May-Oct)	Anomaly Rainfall (May-June)	Anomaly Rainfall (Jul-Aug)	Anomaly Rainfall (Sep-Oct)	Anomaly Rainfall (May-Oct)	Rainfall Performance [CUT-OFFS] (May-June)	Rainfall Performance [CUT-OFFS] (July-August)	Rainfall Performance [CUT-OFFS] (September-October)	Onset Date
Senegal	Tambacounda	Bakel	SEN012001	-3	83.4	124.6	77.4	103.2	Poor (75-90%)	Good (110-125%)	Poor (75-90%)	18
Senegal	Kaffrine	Birkilane	SEN004001	-2	122.1	118.4	94.0	105.5	Good (110-125%)	Good (110-125%)	Average (90-110%)	19
Senegal	Sedhiou	Bounkiling	SEN011001	-0.3	99.8	103.2	99.6	98.3	Average (90-110%)	Average (90-110%)	Average (90-110%)	17
Senegal	Dakar	Dakar	SEN001001	2	121.5	141.0	85.5	116.0	Good (110-125%)	Very Good (>125%)	Poor (75-90%)	22
Senegal	Fatick	Gossas	SEN003003	-1	128.3	106.3	80.0	92.5	Very Good (>125%)	Average (90-110%)	Poor (75-90%)	21
Senegal	Tambacounda	Goudiry	SEN012002	-1	82.6	122.8	88.8	105.7	Poor (75-90%)	Good (110-125%)	Poor (75-90%)	18
Senegal	Sedhiou	Goudomp	SEN011002	-4	81.6	110.9	98.2	98.8	Poor (75-90%)	Good (110-125%)	Average (90-110%)	17
Senegal	Kaolack	Guinguineo	SEN005001	-1	127.3	115.0	83.2	99.0	Very Good (>125%)	Good (110-125%)	Poor (75-90%)	20
Senegal	Kaffrine	Kaffrine	SEN004002	-0.2	124.2	112.7	90.6	101.5	Good (110-125%)	Good (110-125%)	Average (90-110%)	19
Senegal	Kedougou	Kedougou	SEN006001	-2	83.8	100.7	86.6	95.2	Poor (75-90%)	Average (90-110%)	Poor (75-90%)	16
Senegal	Dakar	Guédiawaye	SEN001002	0.0	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Senegal	Dakar	Pikine	SEN001003	-4	120.0	141.5	89.0	116.5	Good (110-125%)	Very Good (>125%)	Poor (75-90%)	22
Senegal	Kolda	Kolda	SEN007001	-3	77.8	114.9	102.7	101.3	Poor (75-90%)	Good (110-125%)	Average (90-110%)	17
Senegal	Kaffrine	Koungueul	SEN004003	0.5	126.8	112.7	88.6	102.9	Very Good (>125%)	Good (110-125%)	Poor (75-90%)	18
Senegal	Tambacounda	Koupentoum	SEN012003	-0.4	106.9	116.5	98.1	107.9	Average (90-110%)	Good (110-125%)	Average (90-110%)	18
Senegal	Kaffrine	Maleme hodar	SEN004005	-2	127.7	111.8	89.1	100.6	Very Good (>125%)	Good (110-125%)	Poor (75-90%)	19
Senegal	Kolda	Medina yoro foula	SEN007002	-3	81.4	113.7	101.2	100.8	Poor (75-90%)	Good (110-125%)	Average (90-110%)	17
Senegal	Kedougou	Salemata	SEN006002	-2	80.8	101.9	88.7	95.3	Poor (75-90%)	Average (90-110%)	Poor (75-90%)	16
Senegal	Kedougou	Saraya	SEN006003	-4	90.4	110.0	87.9	99.4	Average (90-110%)	Average (90-110%)	Poor (75-90%)	16
Senegal	Sedhiou	Sedhiou	SEN011003	-4	88.6	108.4	100.5	98.9	Poor (75-90%)	Average (90-110%)	Average (90-110%)	17
Senegal	Tambacounda	Tambacounda	SEN012004	-2	80.4	110.9	103.5	104.9	Poor (75-90%)	Good (110-125%)	Average (90-110%)	17
Benin	Alibori	Banikoara	BEN001001	7	98.3	111.0	103.0	106.1	Average (90-110%)	Good (110-125%)	Average (90-110%)	13
Benin	Alibori	Gogounou	BEN001002	7	108.9	113.7	99.6	107.1	Average (90-110%)	Good (110-125%)	Average (90-110%)	13
Benin	Alibori	Kandi	BEN001003	3	98.2	111.4	97.4	104.4	Average (90-110%)	Good (110-125%)	Average (90-110%)	14
Benin	Alibori	Karimama	BEN001004	5	88.9	115.7	106.3	108.3	Poor (75-90%)	Good (110-125%)	Average (90-110%)	16
Benin	Alibori	Malanville	BEN001005	4	84.8	105.8	100.3	101.1	Poor (75-90%)	Average (90-110%)	Average (90-110%)	15
Benin	Alibori	Segbana	BEN001006	5	107.3	105.8	104.7	104.9	Average (90-110%)	Average (90-110%)	Average (90-110%)	14
Benin	Atakora	Boukoumbe	BEN002001	8	116.0	117.7	91.7	107.1	Good (110-125%)	Good (110-125%)	Average (90-110%)	13
Benin	Atakora	Kerou	BEN002002	10	105.5	111.5	99.2	105.3	Average (90-110%)	Good (110-125%)	Average (90-110%)	13
Benin	Atakora	Kobli	BEN002003	11	121.5	112.1	92.5	107.2	Good (110-125%)	Good (110-125%)	Average (90-110%)	13
Benin	Atakora	Kouande	BEN002004	9	111.9	113.9	94.0	106.3	Good (110-125%)	Good (110-125%)	Average (90-110%)	13
Benin	Atakora	Materi	BEN002005	12	112.9	111.4	93.8	105.6	Good (110-125%)	Good (110-125%)	Average (90-110%)	13
Benin	Atakora	Natitingou	BEN002006	7	112.7	115.9	90.8	106.2	Good (110-125%)	Good (110-125%)	Average (90-110%)	12
Benin	Atakora	Tanguieta	BEN002008	7	102.0	106.5	100.6	109.8	Good (110-125%)	Good (110-125%)	Average (90-110%)	12
Benin	Atakora	Toucountouna	BEN002009	7	102.0	106.5	93.2	100.8	Average (90-110%)	Average (90-110%)	Average (90-110%)	13
Benin	Atlantique	Abomey-calavi	BEN003001	6	112.3	111.6	90.0	104.1	Good (110-125%)	Good (110-125%)	Average (90-110%)	13
Benin	Atlantique	Allada	BEN003002	6	68.4	140.6	139.6	96.8	Very Poor (0-75%)	Very Good (>125%)	Very Good (>125%)	8
Benin	Atlantique	Kpomasse	BEN003003	9	73.2	135.9	127.7	98.1	Very Poor (0-75%)	Very Good (>125%)	Very Good (>125%)	8
Benin	Atlantique	Ouidah	BEN003004	5	66.3	145.6	148.6	103.0	Very Poor (0-75%)	Very Good (>125%)	Very Good (>125%)	11
Benin	Atlantique	So-ava	BEN003005	3	65.3	141.1	143.2	97.0	Very Poor (0-75%)	Very Good (>125%)	Very Good (>125%)	11
Benin	Atlantique	Toffo	BEN003006	7	68.7	138.3	140.3	98.7	Very Poor (0-75%)	Very Good (>125%)	Very Good (>125%)	8
Benin	Atlantique	Tori-bossito	BEN003007	15	72.8	113.4	127.1	97.1	Very Poor (0-75%)	Good (110-125%)	Very Good (>125%)	8
Benin	Atlantique	Ze	BEN003008	7	67.3	144.6	141.1	99.1	Very Poor (0-75%)	Very Good (>125%)	Very Good (>125%)	8
				11	73.4	131.8	135.0	99.9	Very Poor (0-75%)	Very Good (>125%)	Very Good (>125%)	8

Please click below to download a detailed table with climate indicators for the 2021 rainy season at Admin 2 level.

Microsoft Excel Worksheet



FOR FURTHER INFORMATION:

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DATA SOURCES:

Rainfall: CHIRPS, Climate Hazards Group, UCSB
Vegetation: MODIS NDVI, EOSDIS-NASA

PROCESSING:

VAM software components, ArcGIS

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