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U.S. DEPARTMENT OF AGRICULTURE

**Foreign Agricultural Service**
Global Market Analysis
International Production Assessment Division
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Commodity Intelligence Report

# Severe Drought in Morocco, Dryness expanding in Algeria

Extreme drought continues to afflict winter grains in Morocco; almost the entire growing region of Morocco is mired in a severe seasonal drought. Dryness concerns have expanded across much of Algeria and parts of Tunisia (Figures 1 and 2). Initial USDA global crop production estimates for marketing year (MY) 2022/23, including wheat and barley production estimates for Morocco, Algeria, and Tunisia, will be released on May 12, 2022.

In Northwest Africa, the growing area for cereals is a relatively narrow band that stretches along the coast and into the interior plateaus of all three countries. Further inland, mountains and desert make the land non-suitable for grains (Figures 3 and 4). Each of these three countries relies on a successful annual harvest to reduce their large wheat import requirements. Total grain production, primarily just wheat and barley as seen in Figure 5, varies significantly in Northwest Africa each year, driven by seasonal rainfall. Both the amount and timing of rainfall are critical in this semi-arid, hot climate. Once planting rains have established crops during the fall, adequate rainfall is essential in March and April for proper reproduction and grainfill. This year, they are already facing a significant moisture deficit, and the most vulnerable period remains upcoming. As cereals transition toward the highly moisture-sensitive flowering stage in March (Figure 6), the need for significant rainfall will become even more critical, as soil moisture has been depleted.

The January to early February, 1-month, satellite-derived Percent of Average Seasonal Greenness (PASG) image depicts areas of seasonal drought extending across much of Morocco and into the border region of Morocco and Algeria. Not all areas are as bad and the PASG shows healthier conditions in northwest Morocco, along the coast of central and eastern Algeria, and in northern Tunisia (Figure 7).

More recent conditions can be visualized using the eight-day, satellite-derived, Normalized Difference Vegetation Index (NDVI) for mid-late February. The NDVI composite depicts near-real-time vegetation vigor, with higher NDVI values shown in green correlating to healthier crops, while poorer crops are shown in red. The extensive red color throughout central and southern Morocco, eastern Morocco, and western Algeria indicates a widespread expanse of poor vegetation canopy. In addition, the mid-late February NDVI image reveals additional areas of declining vegetation vigor in northern Morocco and central Algeria (Figure 8). These areas have just recently begun to deteriorate so it was not visible in the earlier temporal view shown by PASG in

January and early February.

**Morocco**

Morocco is Northwest Africa's dominant wheat producer, typically tallying about 60 percent or more of the total Northwest Africa crop (Figures 9 and 10). Like the rest of the region, Morocco is dependent upon highly variable precipitation for its grain production. There is very little irrigation of cereal crops. For MY 2022/23, during the autumn and winter of 2021 and 2022, Morocco experienced one of the driest starts in 30 years. This dryness encompassed the large central and southern growing regions that comprise the bulk of the national crop. Planting in Morocco typically occurs during November and December but, depending on early-season rainfall, can occur as early as October or as late as January. During the fall 2021 planting campaign, rainfall was both late and minimal; hence, planted area is reported to be below average. Similarly, with poor rainfall and low soil moisture, plant emergence, jointing, and tillering have experienced significant, unfavorable issues. Barley crop stages are even further along due to the extreme weather conditions and have similar problems. To date, rainfall amounts have been far below average in almost the entire country since the new season began last autumn. Croplands in Morocco during the three-month period from November through January are almost exclusively classified to be in drought categories based on the Standard Precipitation Index (Figure 11). In addition, temperatures have often been higher than average, exacerbating dryness and quickening crop development for both wheat and barley.

Southern growing areas of Morocco have suffered the most intense effects of the drought to date, with some locations receiving less than one-fifth of their normal, climatically meager, precipitation total. During the current season, Morocco's southwest (Marrakesh region), where barley is prominent, had the lowest precipitation totals from September through mid-February in the last 30 years (Figure 12). Similarly, rainfall amounts in central Morocco, the country's dominant growing region (the large area south and west of Casablanca), are also the lowest in 30 years (Figure 13). The last appreciable rain event through February in the south and central region occurred in late December.

NDVI values for the large central and southern growing region show poor vegetation vigor during this season compared to previous years and the 17-year mean. Last year, as shown in blue on the chart, was near normal until February, but then dropped precipitously with no rainfall. The corresponding average wheat yield for MY 2020/21 was less than 1.0 ton per hectare. For MY 2022/23, with much of the season left ahead of it, NDVI values are already far below last year and are approaching record lows (Figure 14).

Further contributing to lowered expectations, rainfall has also been especially scant in the northeast, with precipitation totals far below average. Favorable rain during January helped to revive diminished expectations, but conditions have dried out since. Satellite imagery shows croplands near the Algeria border to be in very poor condition. This area comprises a small, but not inconsequential portion of the national growing area. In the

far northern region of the country, just south of the Mediterranean Sea from Spain and Gibraltar and where the climate typically produces higher precipitation amounts, crops have received the most rainfall. This area is noticeable in satellite imagery as the least negatively affected region of the country, but even here, conditions have slipped in recent weeks. For a chart showing past wheat, yield, and production totals for Morocco, please see Figure 15.

**Algeria**

Drought has expanded from northeast Morocco and includes adjacent areas of western Algeria. Vegetative conditions are below average in this drought-stressed region and continue to deteriorate with the ongoing lack of rainfall. NDVI shows this region to be the most stressed crop area of Algeria. Central Algeria has fared better due to heavy November rains; recently, however, rains have subsided, and dryness concerns are increasing along the central coast. Conditions in eastern Algeria, particularly along the Mediterranean Coast, appear to be in fair condition based on NDVI imagery. Short term dryness, however, has likely affected barley fields planted farther inland. NDVI charts indicate below-average conditions in western and central Algeria and average conditions in eastern Algeria (Figure 16). For a chart showing past wheat area, yield, and production totals for Algeria, please see Figure 17.

**Tunisia**

In Tunisia, coastal growing regions benefitted from heavy rain in December and early January. Rainfall has continued during the winter at an average rate, keeping growing conditions adequate for continued development. Rainfall rankings show the current season's precipitation total to be slightly below average (Figure 18), and NDVI values depict an average level of green-ness or vegetation vigor for the wheat crop (Figure 19). Farther south, storms haven't produced as much rain, leaving marginal areas much drier than average. Wheat dominates the coastal plains where precipitation is typically heaviest and most frequent and precipitation this year has followed that pattern. Similar to Algeria, barley is grown farther south and on Tunisia's more rain-challenged interior plateau. Weather and satellite analysis indicate average levels of seasonal precipitation and growth in the barley region but with a sharp cutoff of precipitation just to its south, where agriculture transitions into more olive groves and tree nuts. For a chart showing past wheat area, yield, and production totals for Tunisia, please see Figure 20.

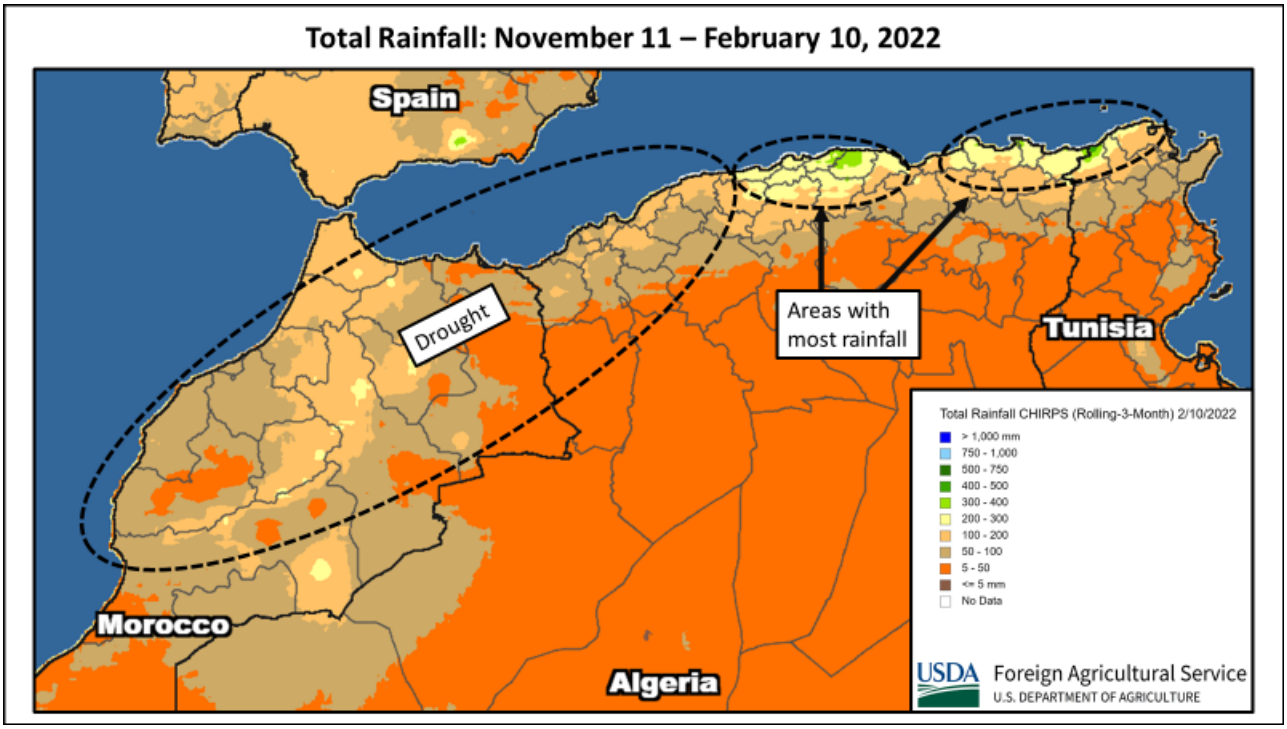


**Figure 1. Total Rainfall: November 11 – February 10, 2022; Source: CHIRPS, University of California Santa Barbara (UCSB), Climate Hazards Center (CHC)**

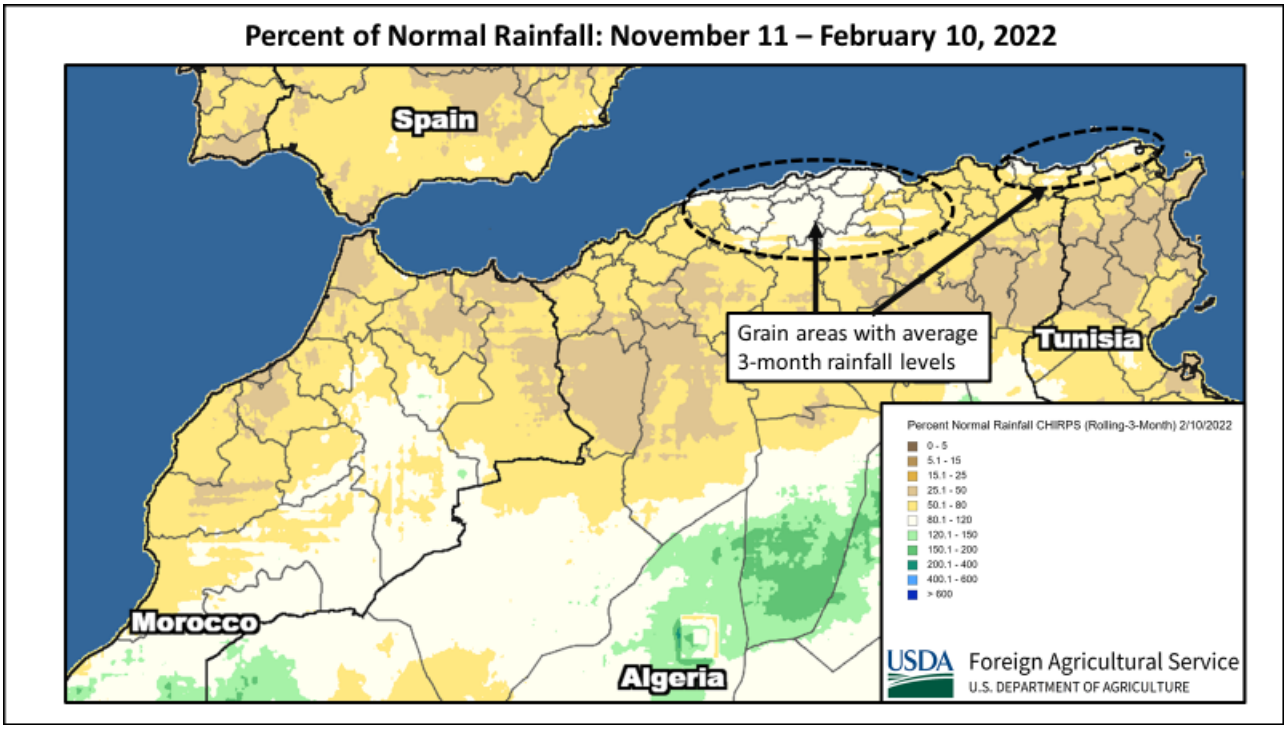


**Figure 2. Percent of Normal Rainfall: November 11 – February 10, 2022; Source: CHIRPS, University of California Santa Barbara (UCSB), Climate Hazards Center (CHC)**

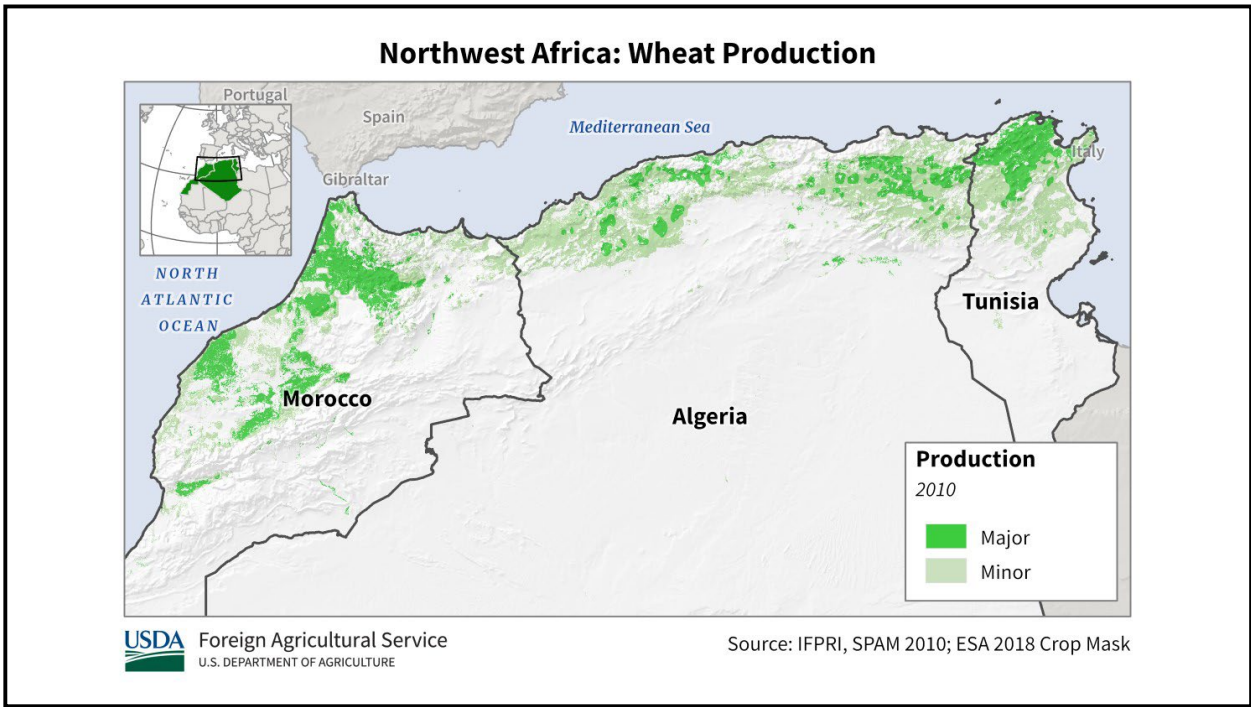


**Figure 3. Northwest Africa: Wheat Production Areas; Source: IFPRI, SPAM 2010, ESA 2018 Crop Mask**

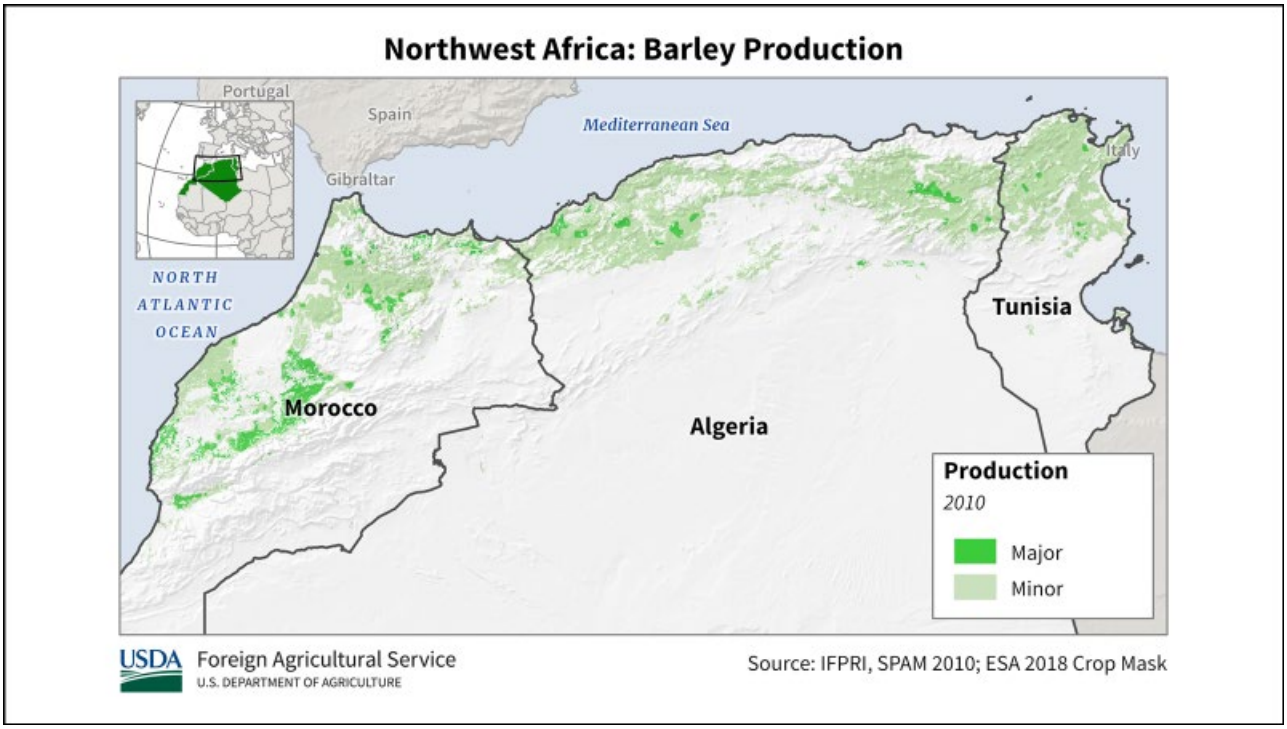


**Figure 4. Northwest Africa: Barley Production Areas; Source: IFPRI, SPAM 2010, ESA 2018 Crop Mask**

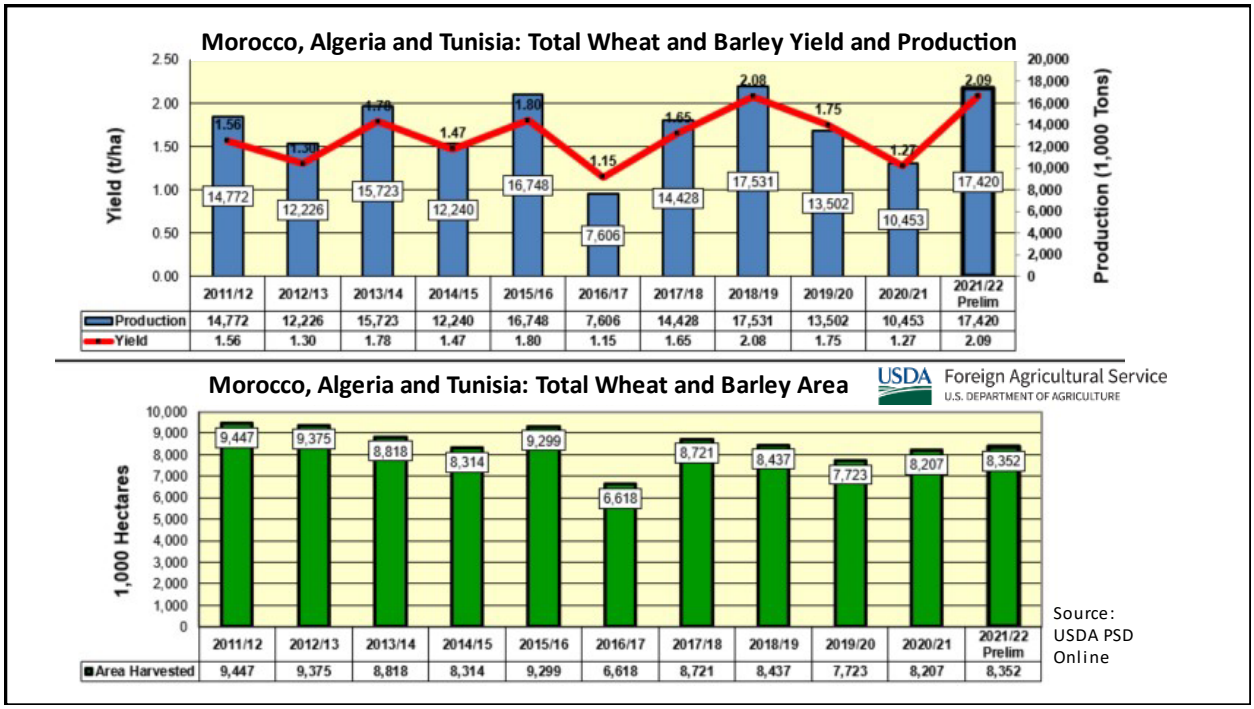


**Figure 5. Northwest Africa, Total Wheat + Barley: Area, Yield and Production; Source: USDA PSD Online**

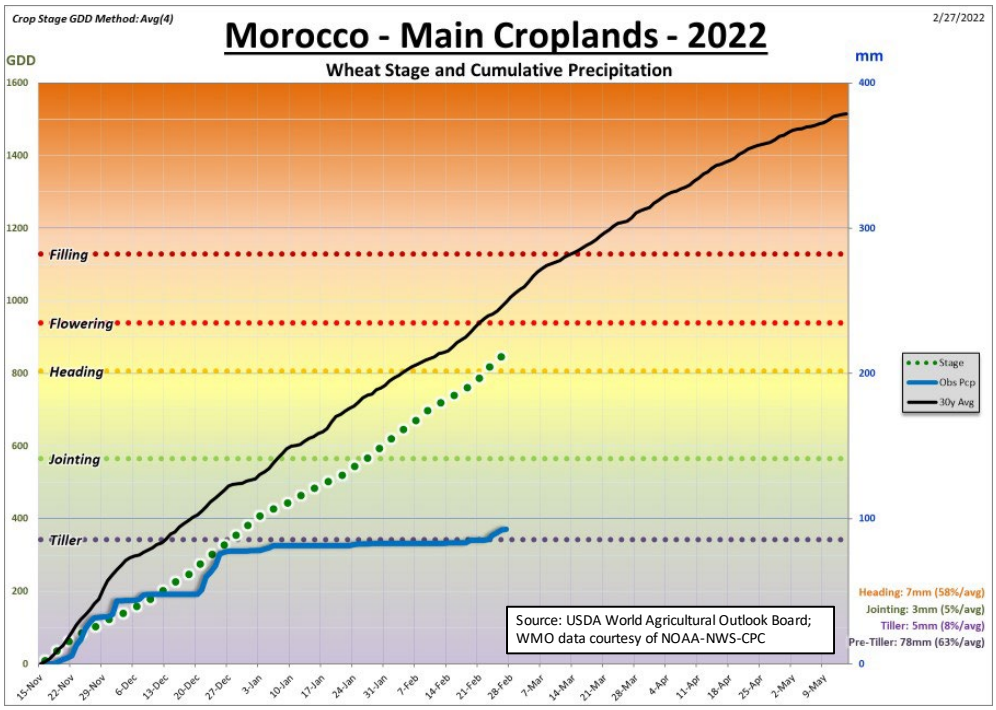


**Figure 6. Morocco: Wheat Growing Stage and Cumulative Precipitation; Source: USDA World Agricultural Outlook Board; WMO data courtesy of NOAA-NWS-CPC**

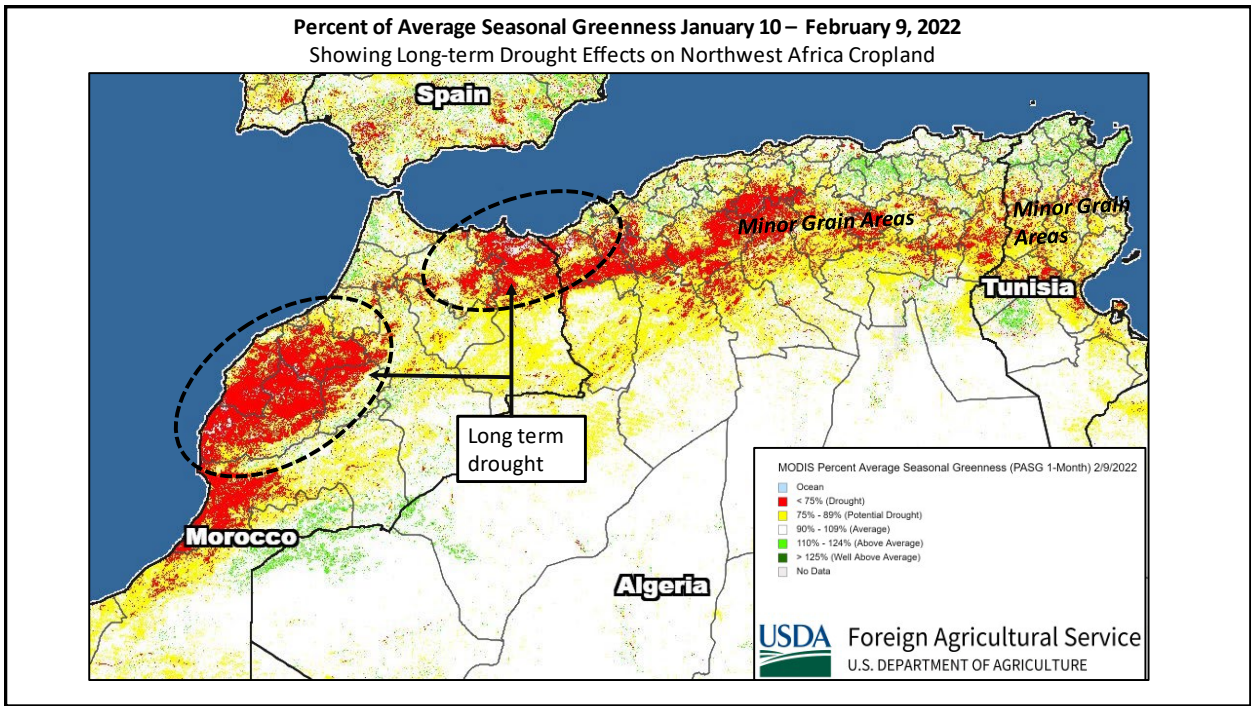


**Figure 7. Percent of Average Seasonal Greenness January 10 – February 9, 2022; Source: USDA/NASA Global Agricultural Monitoring (GLAM) System**

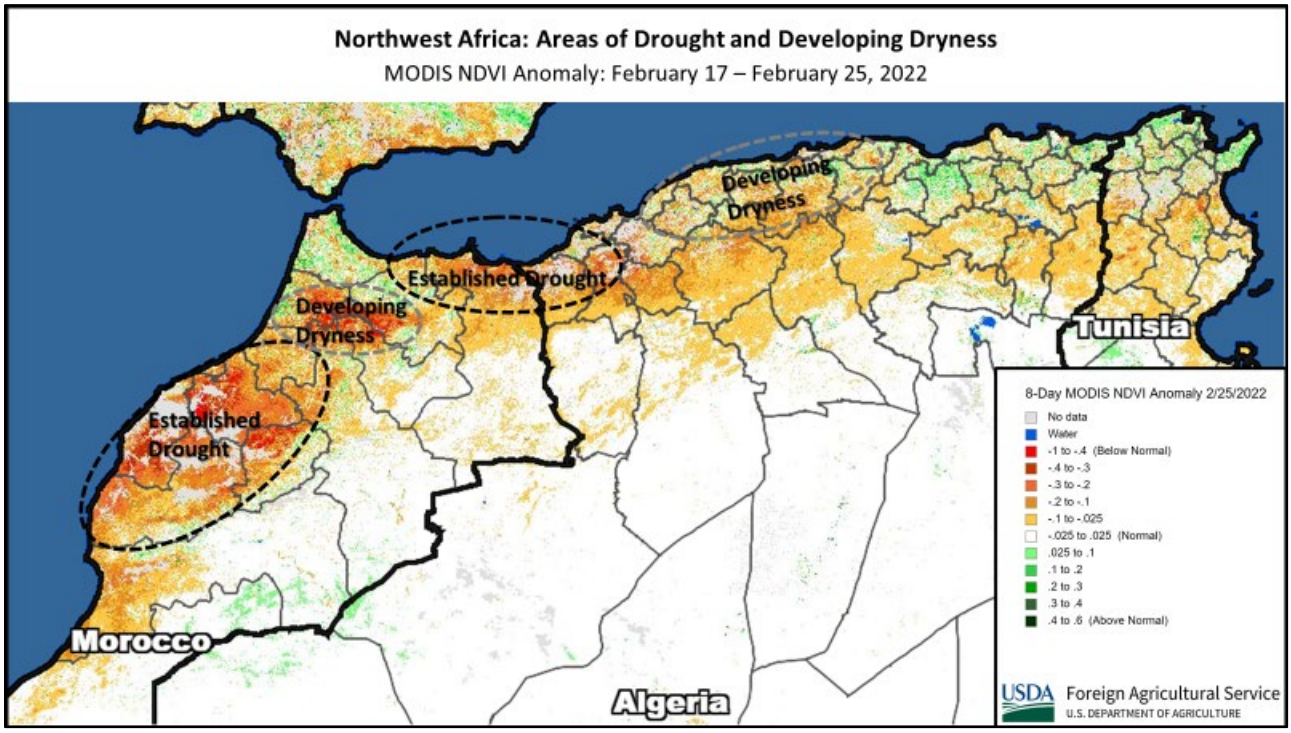


**Figure 8. MODIS NDVI Anomaly: February 17 – February 25, 2022; Source: USDA/NASA Global Agricultural Monitoring (GLAM) System**

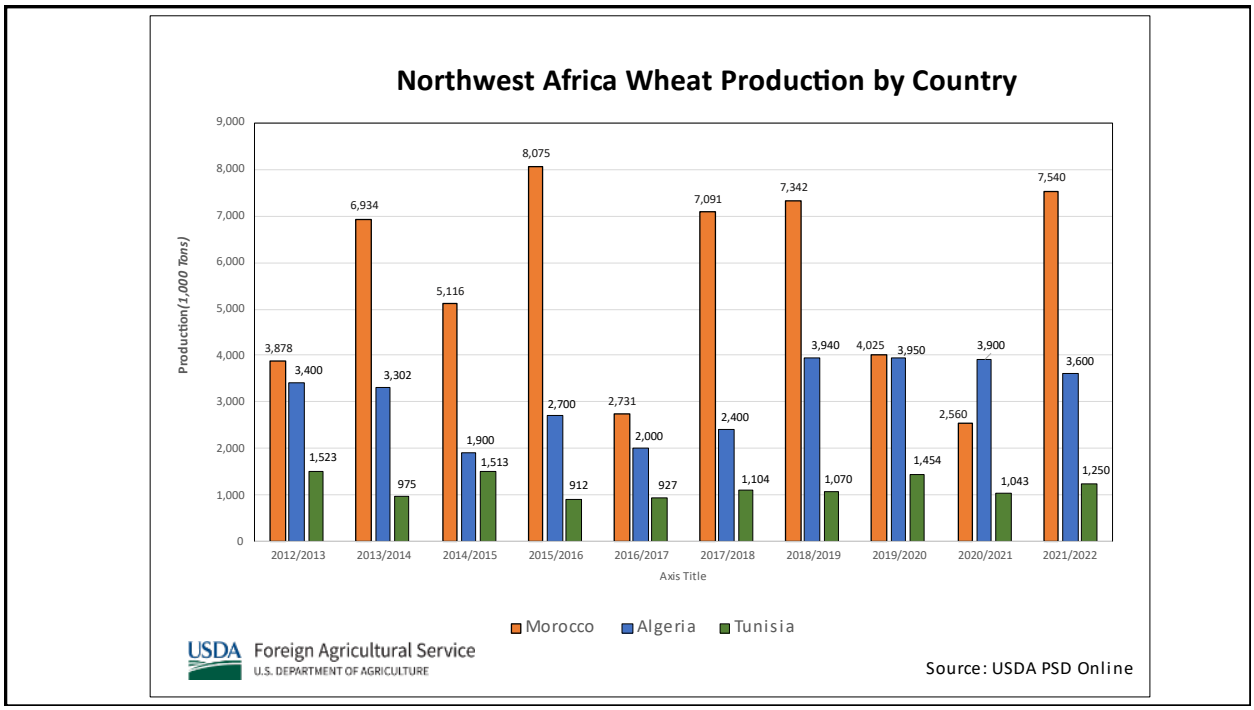


**Figure 9. Northwest Africa Wheat Production by Country; Source: USDA PSD Online**

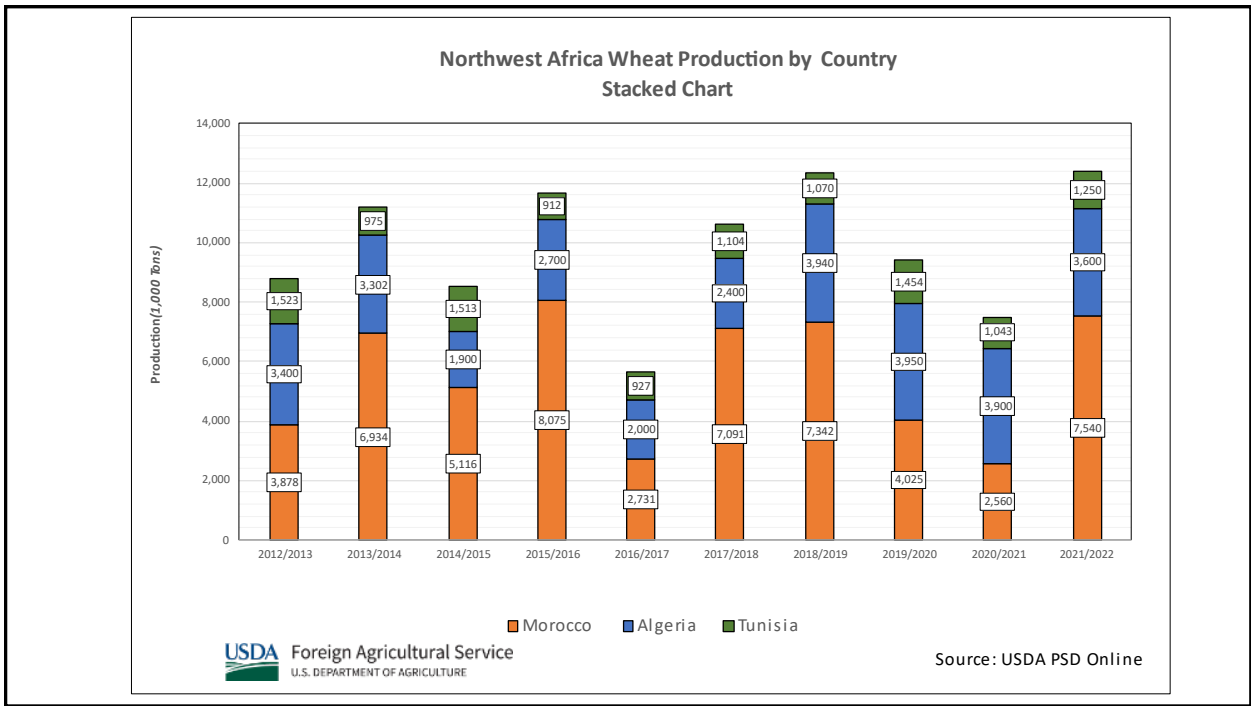


**Figure 10. Northwest Africa Wheat Production by Country; Source: USDA PSD Online**

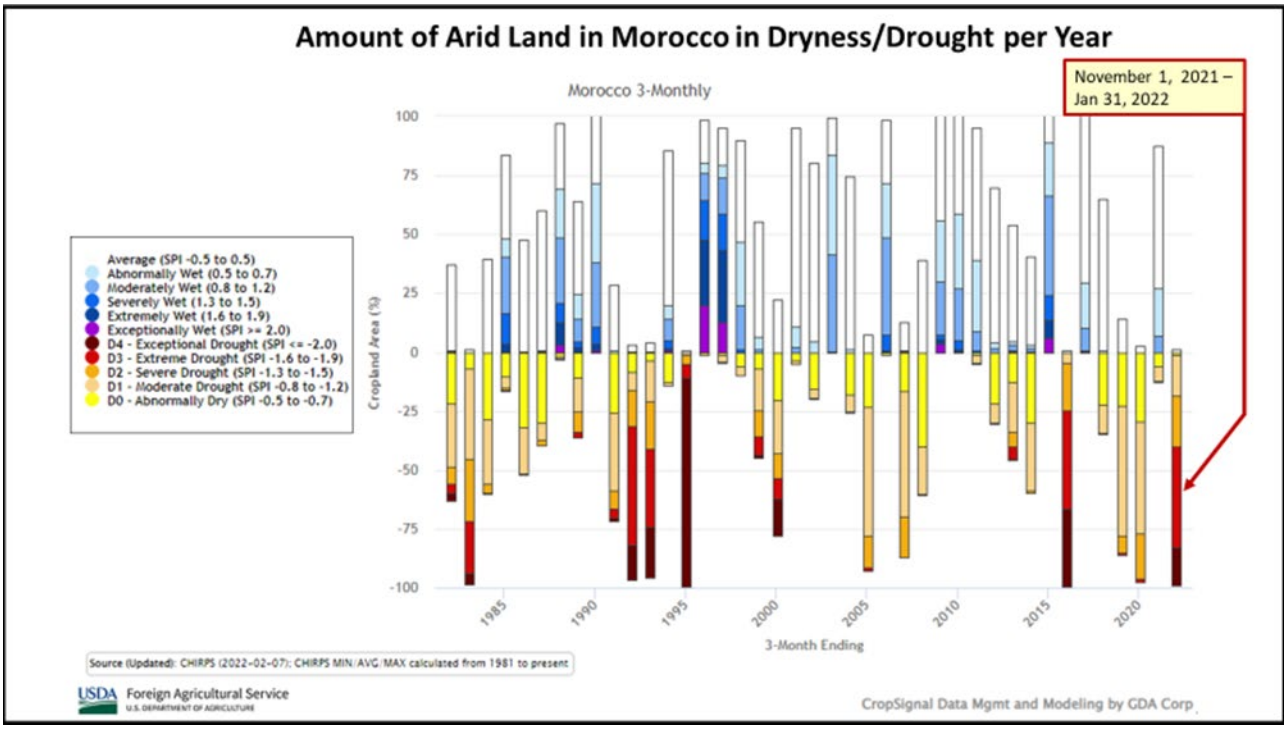


**Figure 11. Amount of Arid Land in Morocco in Dryness/Drought per year; Data only represents cropland areas; Source: CHIRPS, University of California Santa Barbara (UCSB), Climate Hazards Center (CHC)**

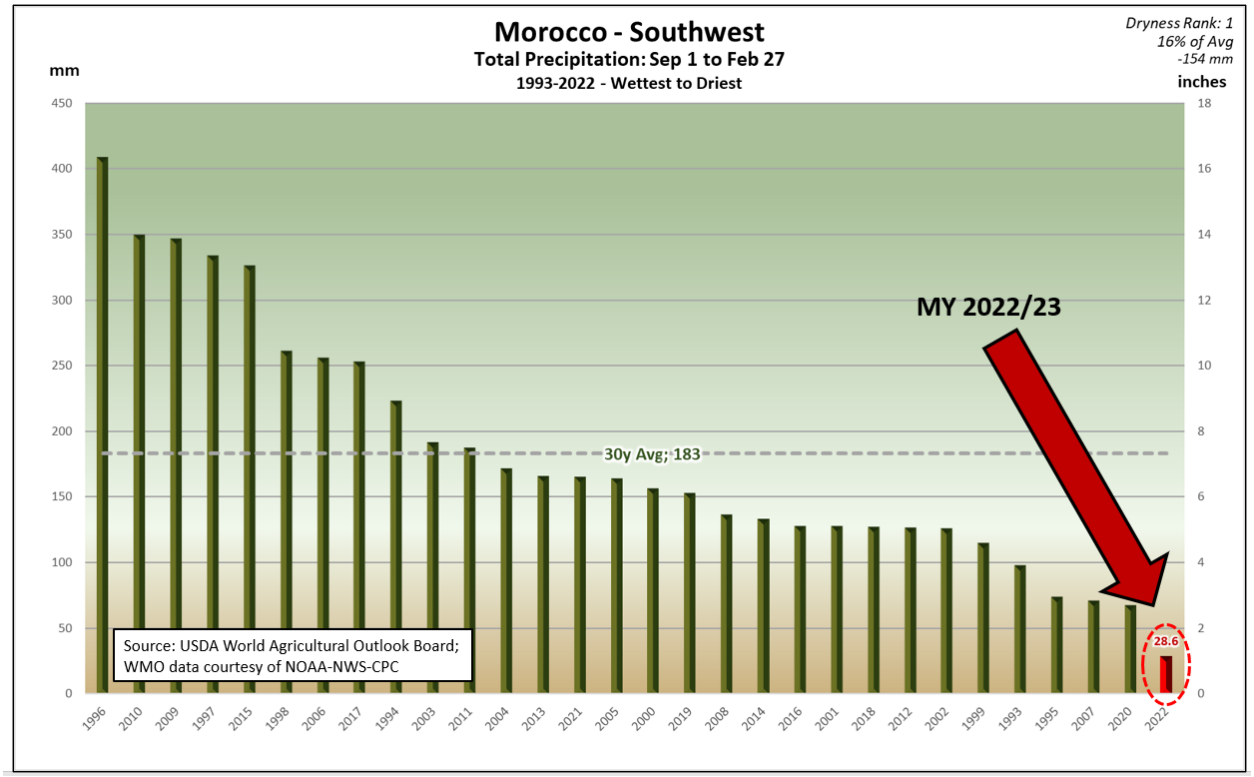


**Figure 12. Southwest Morocco: Last 30 Years, Ranked Precipitation for Sept 1 – February 27; Source: USDA World Agricultural Outlook Board; WMO data courtesy of NOAA-NWS-CPC**

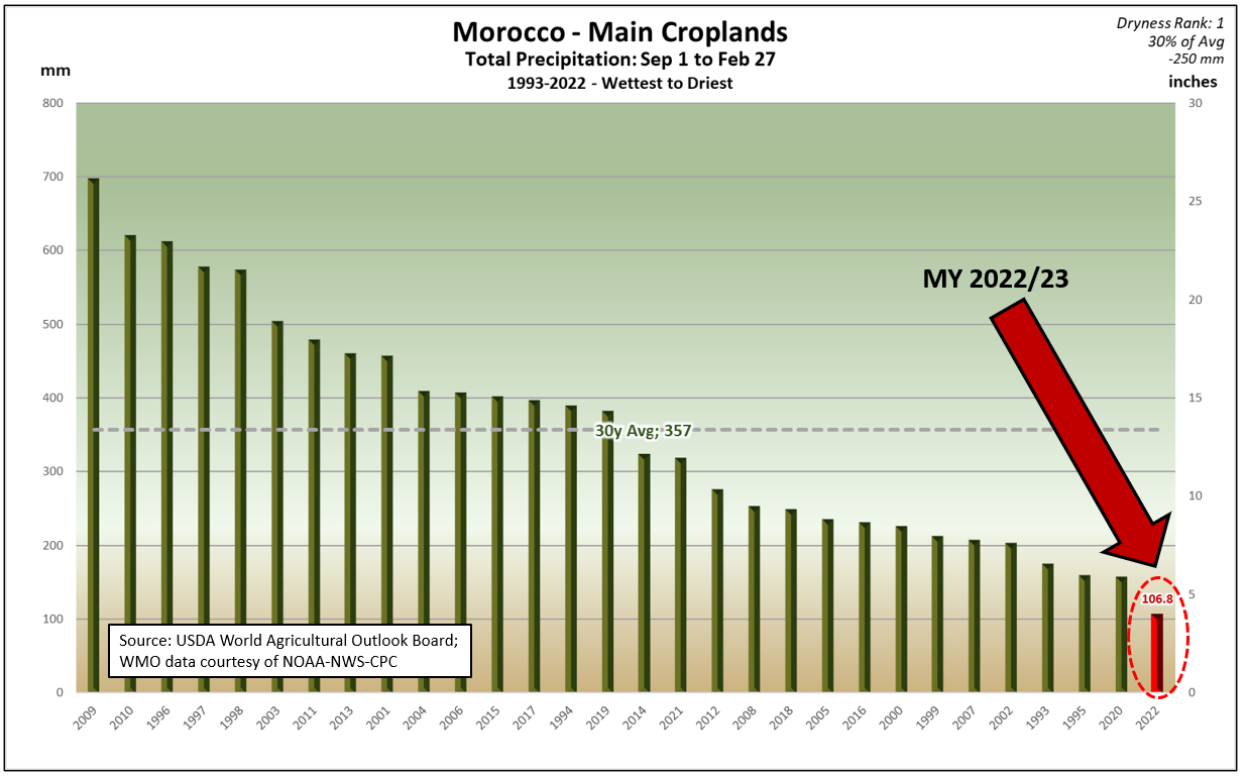


**Figure 13. Morocco – Main Croplands (Central and South): Last 30 Years, Ranked Precipitation for Sept 1 – February 27; USDA World Agricultural Outlook Board; WMO data courtesy of NOAA-NWS-CPC**

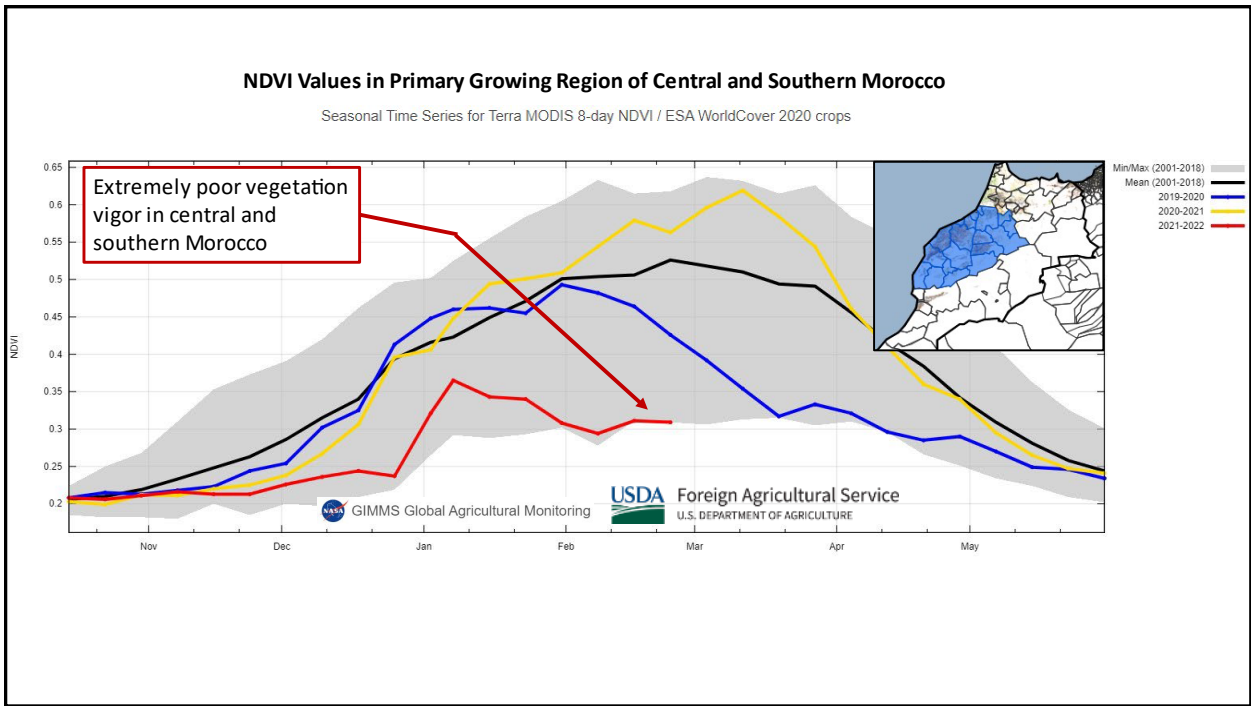


**Figure 14. NDVI Values in Primary Growing Region of Central and Southern Morocco; Source: USDA/NASA Global Agricultural Monitoring (GLAM) System**

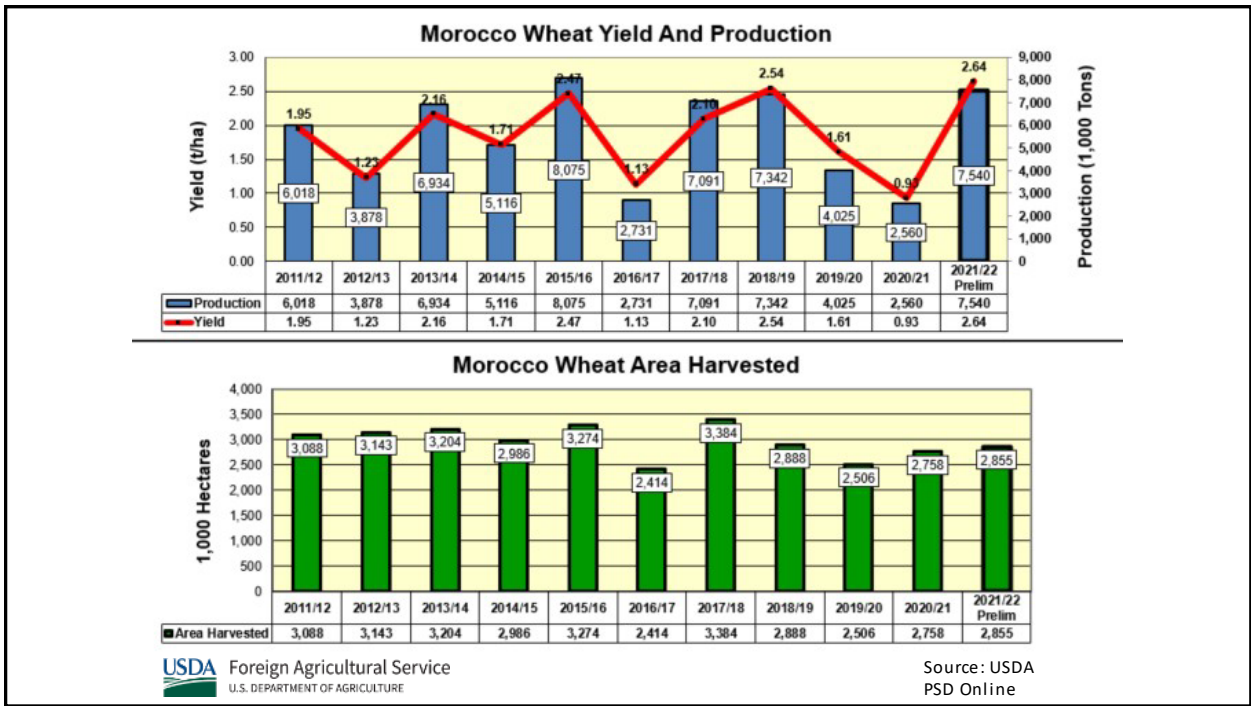


**Figure 15. Morocco Wheat: Area, Yield and Production; Source: USDA PSD Online**

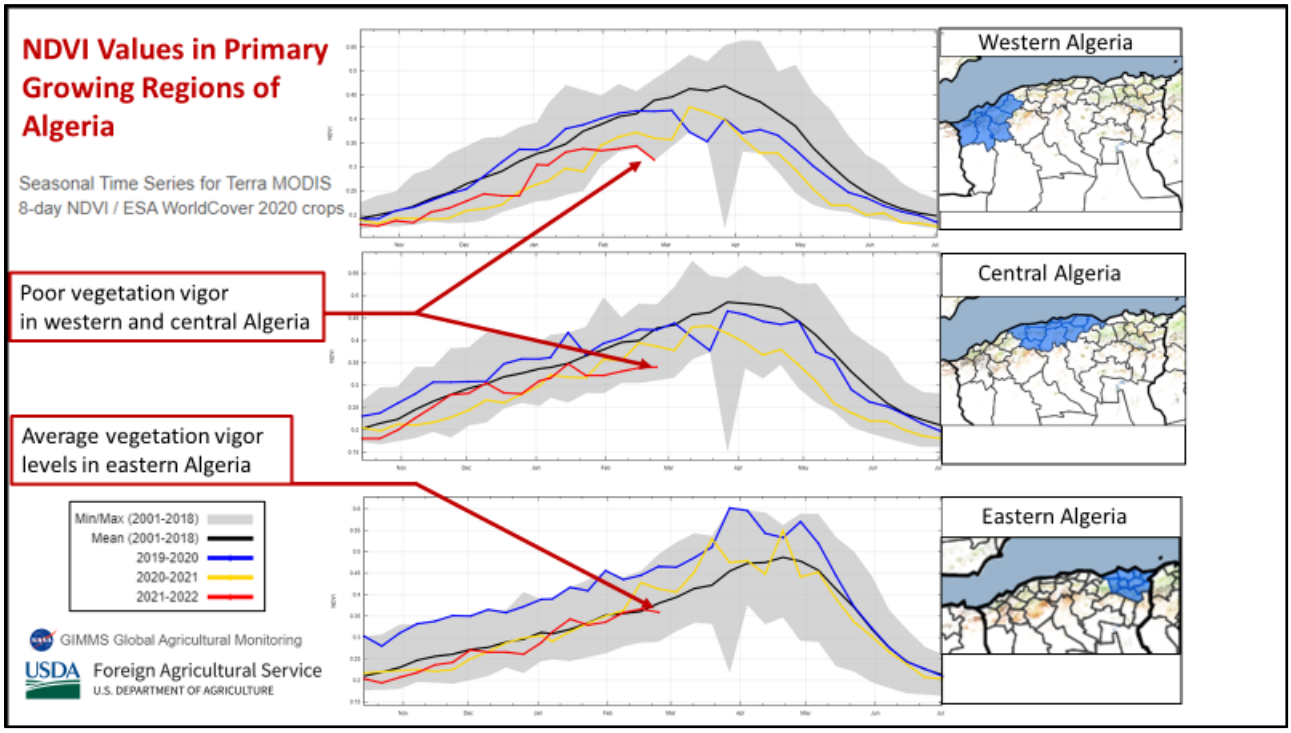


**Figure 16. NDVI Values in Primary Growing Regions of Algeria; Source: USDA/NASA Global Agricultural Monitoring (GLAM) System**

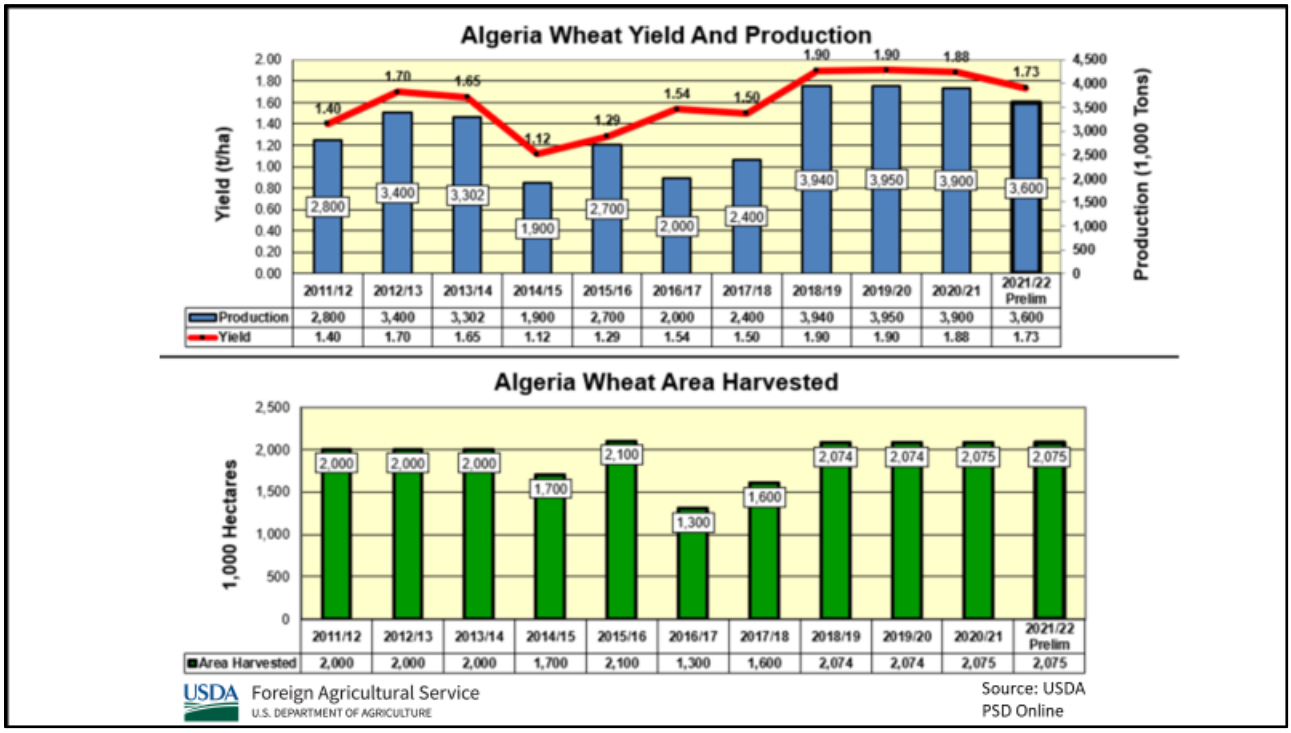


**Figure 17. Algeria Wheat: Area, Yield and Production; Source: USDA PSD Online**

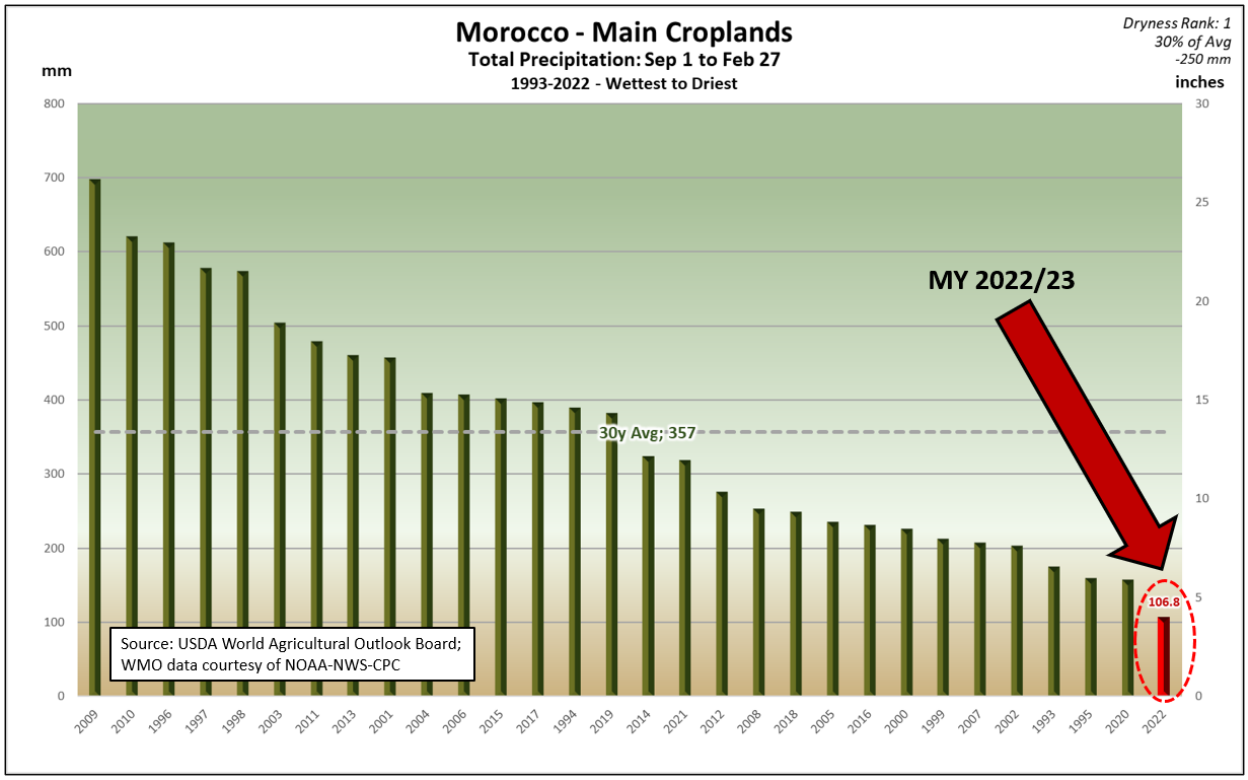


**Figure 18. Northern Tunisia: Last 30 Years, Ranked Precipitation for Sept 1 –February 27; Source: USDA World Agricultural Outlook Board; WMO data courtesy of NOAA-NWS-CPC**

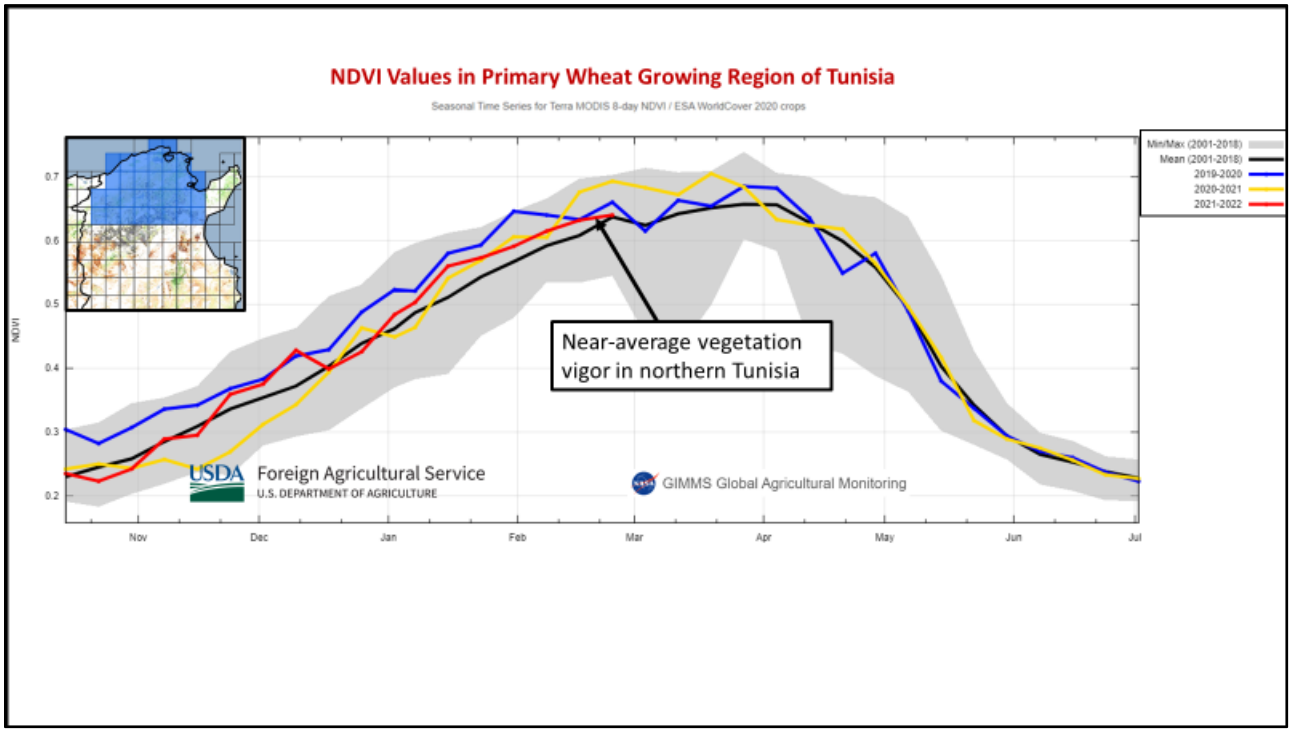


**Figure 19. NDVI Values in Primary Wheat Growing Region of Tunisia; Source: USDA/NASA Global Agricultural Monitoring (GLAM) System**

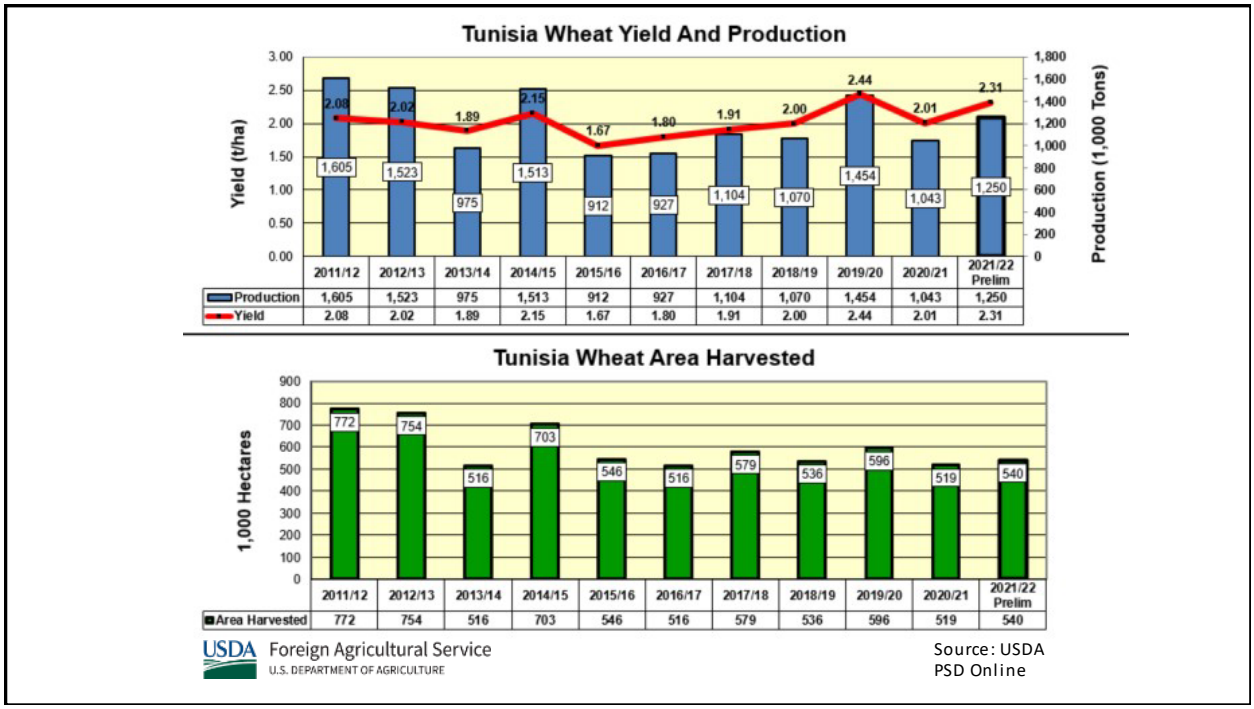


**Figure 20. Tunisia Wheat: Area, Yield and Production; Source: USDA PSD Online**

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