USDA Foreign Agricultural Service
U.S. DEPARTMENT OF AGRICULTURE

**Foreign Agricultural Service**
Global Market Analysis
International Production Assessment Division
Web: https://ipad.fas.usda.gov

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Commodity Intelligence Report

# Northwest Africa's MY 2023/24 Diminished Grain Harvest

During the 2023/24 marketing year (MY 2023/24), the Northwest Africa countries of Morocco, Algeria and Tunisia struggled with drought all season **(see figure 1)**. Their combined harvest was reduced for a second straight year due to water deficiencies. In Northwest Africa, Morocco typically produces the largest portion of the cereal crop, followed by Algeria and Tunisia. Tunisia, the smallest contributor, was the only country to have a bumper crop in 2022/23, while Morocco and Algeria suffered their second straight disappointing harvest. The entire region remains dependent on imported wheat to fill the gap. Harvest begins in May in Morocco and in June in Algeria and Tunisia.

Wheat and barley comprise nearly all of the region's cereal production. The combined 2023/24 wheat harvest for the three countries is forecast at 7.3 million tons, slightly lower than last year's disappointing 7.6 mmt crop. The 5-year average wheat production level is 9.5 mmt **(see figure 2)**. Barley is a secondary crop grown for animal consumption. Total barley production is forecast at 2.3 mmt, compared to last year's 2.8 mmt, and the 5-year average of 3.7 mmt. Northwest Africa typically imports wheat. While bumper seasons reduce their annual import demands, crop shortfalls such as in MY2023/24 and MY2022/23 increase their deficits and their need to import. All three countries are heavily reliant on rainfall for cereal production. There is limited irrigation (**see figure 3**), but much of it is diverted to cash crops like vegetables, citrus, olives, as well as seeds for planting. During FAS crop travel to Morocco and Tunisia in March 2023, farmers consistently mentioned that the climate has become harsher, and that water continues to be the limiting factor on yield. Without well-timed, adequate rainfall, rainfed crops face an uncertain future, according to local farmers. During March and April, a lack of widespread and sufficient rainfall in the growing regions further reduced yield prospects **(see figure 4)**. Low plant vigor dominates the satellite-derived, Normalized Difference Vegetation Index (NDVI) imagery taken in late April 2023 **(see figure 5)**.

Chickpeas, fava beans, lentils, and sugar beets are some of the more common non-grain crops being grown in Northwest Africa. Citrus, olives, and tree nuts are common orchard crops grown with drip irrigation. Rapeseed is now grown in small but increasing amounts and was observed in both Morocco and Tunisia as a new alternative crop, helping to enhance crop rotation.

## Morocco

Winter wheat and barley was planted later than normal in Morocco during the MY

2023/24 season. Autumn rains typically signal the beginning of fall planting, prompting farmers to sow winter wheat and barley in October and November. Under this preferred calendar, plants emerge in November or December, and after a brief semi-dormant period in January and early February, they green up and tiller; flowering occurs by late March. Harvest gets underway in May and June, proceeding from south to north. About one-third of wheat in Morocco is hard wheat or the durum variety. Morocco has a large area that is utilized primarily for wheat production **(see figure 6)**, and in years when rainfall is abundant, production jumps significantly.

In autumn 2022, little rain fell during October and November, so sowing was delayed until December when rains finally arrived. While planting of the MY 2023/24 crop was delayed, it is not unusual to postpone planting due to dryness. Morocco has a wide planting window due to its warm climate, enabling farmers to continue planting into January if necessary. After the December rains, farmers throughout central and northern Morocco rapidly sowed fields, making up for lost time in an attempt to maintain planting area intentions. Additional rain established the crops during the winter months, improving conditions and raising expectations. Morocco's winter recovery, however, was short-lived, and most regions fell into a sharp decline beginning in March when crops were in the critical flowering and grainfill stages. Vegetative conditions deteriorated rapidly and significantly as almost no rain fell for weeks.

Southern Morocco, climatically drier and hotter than central and northern Morocco, missed most of the infrequent but critical rain events that sustained northern and central regions during the winter. Conditions were dismal all season in the southern region. Satellite imagery and reports depict a failed crop in southern Morocco **(see figure 7)**, while further north, crops managed to sustain themselves on limited soil moisture until it dried out further in March.

Morocco's disappointing forecast for MY 2023/24 is compounded because this year's crop was preceded by one of Morocco's worst agricultural seasons in recent years. Similar to MY 2023/24, the MY 2022/23 harvest was short due to drought late in the season. USDA's forecast for MY 2023/24 is 3.8 mmt from 2.6 million hectares. Yield is forecast at 1.49 tons per hectare (t/ha) versus 2.7 mmt and a 1.08 t/ha yield last year **(see figure 8)**. NDVI for Morocco show the crop's late start, the increase in vegetation vigor until March when rain stopped, followed by a steep, downward curve corresponding to rapidly deteriorating vegetation health. This steep reduction drops the vegetation vigor below the 2022/23 level by early April **(see figure 9)**.

Morocco is currently following the Morocco Generation Green Plan that is a 10-year program lasting until 2030 to keep farmers on the farm, improve food prospects, all while sustaining the environment. The plan includes promoting no-till farming, increasing certified seeds usage, helping farmers access modern equipment, and subsidies for irrigation, among other things. The Moroccan government is assisting farmers that have access to water with subsidies for efficient drip irrigation systems. In areas around Beni Mellal in south-central Morocco, a lot of new drip irrigation was being

installed, as seen by FAS field visits in March 2023.

As farmers adjust and adapt to the new policies, they must make financial and cultural adjustments. For example, in conventional farming, farmers use the grain stubble for livestock, but by using it for field cover in no-till farming, it is lost as an in-farm use or as additional income. Interestingly, one farmer told the travel group that when he practiced no-till and left stalks in the field, someone trespassed and stole the stubble from his field for their own livestock.

**Morocco Crop Travel Pictures (March 2023)**

| Figure 10 | Figure 11 | Figure 12 |
|---|---|---|

## Algeria

Wheat and barley extend the length of Algeria's coast, stretching inland into the adjacent highlands **(see figure 13)**. The wide east-west expanse of its arable lands, along with the hilly inland topography, makes for a variable climatic profile. Usually, one side of the country does well while the opposite side does poorly. This season however, as shown by NDVI, both the western side adjacent to Morocco, the eastern side by Tunisia, and the central capital region were all in drought, significantly reducing national yield potential **(see figure 14)**. Wheat production is forecast at 2.7 mmt (3.7 mmt last year) with a yield of 1.30 t/ha (1.78 t/ha last year) **(see figure 15)**. While both last year and this year will have lower-than-average harvests, production this year will be even lower because all areas are in drought. Most wheat in Algeria is the durum variety. Barley is grown further inland and on more marginal lands. This year's barley production is estimated at 1.0 mmt and a 1.0 t/ha yield.

## Tunisia

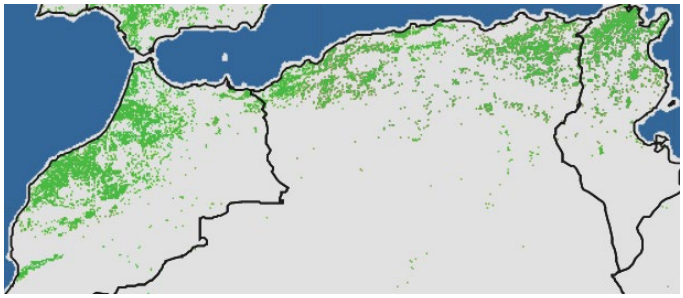
The country's arable lands for cereals are in northern Tunisia **(see figure 16)**. During the MY 2023/24 season, only the extreme northern coastal region of Tunisia experienced favorable conditions. Climatically, the northern-most region annually receives the most rainfall and usually has the most densely cultivated wheat fields. This season, however, it received almost all the rain, while almost no rain fell just further inland to the south. Because of this, the area this year with the best conditions has dramatically narrowed to just a thin sliver that stretches west to east, just inland from the Mediterranean Sea **(see figure 17)**. This small band can be clearly seen in the Percent Average Seasonal Greenness (PASG) image where the demarcation between the adequate rainfall and rainfall deficit is stark **(see figure 18)**. Rain was nearly non-existent in the grain belt just south of the most northern zone area. Tunisia's MY 2023/24 wheat production is forecast at 0.8 mmt, down 0.4 mmt from last year and with a 1.84 t/ha yield, versus 2.41 t/ha last year **(see figure 19)**. Barley, typically grown further south where rainfall was almost completely absent this season, is estimated at just 0.2 million tons, down from 0.5 mmt in MY 2022/2023. It is visually discernable in the two distinct NDVI selections that the northern coastal areas were doing well **(see figure 20),** while the areas further south of the coast were failing **(see figure 21)**.

In March 2023, travel by FAS/Washington and FAS/Tunis just prior to wheat flowering confirmed these differences during field stops and visits with farmers. About 85 percent of the wheat crop is durum. Harvesting in Tunisia takes place in June and can last into July, but much of the inland crop was beyond recovery, as observed during March crop travel. Farmers in the transitional zone – where conditions were not favorable, but the crop was not entirely lost – had to make tough decisions. Many of them realized that they would not be able to harvest grain from their thin crop. Their best outcome would be to collect seeds to store for next year's plantings or to have it grazed off for a small income.

Farmers reported that supplies of inputs, such as chemicals and fertilizer, were abundant this season. Compared to last year, when a bumper crop had expanded harvested area, farmers in the drier central regions were not purchasing inputs this year. Their combined actions resulted in decreased demand and thus increased supply for the farmers in the far north that needed them this year. In Tunisia and the rest of Northwest Africa, it is common, especially in the more marginal growing areas, to limit inputs when crops are struggling with poor weather. If the season is not going well, farmers won't incur additional expenses by applying expensive inputs on a crop that may not get harvested. The government is trying to encourage farmers to use certified seeds with incentives. Fuel tends to be one of the biggest expenses that farmers must incur to produce a crop.

**Crop Travel Photos Tunisia (March 2023)**

| Figure 22 | Figure 23 | Figure 24 | Figure 25 |
|---|---|---|---|



Cropland areas of Northwest Africa (ESRI Sentinel-2 Cropland 2020 (10m))

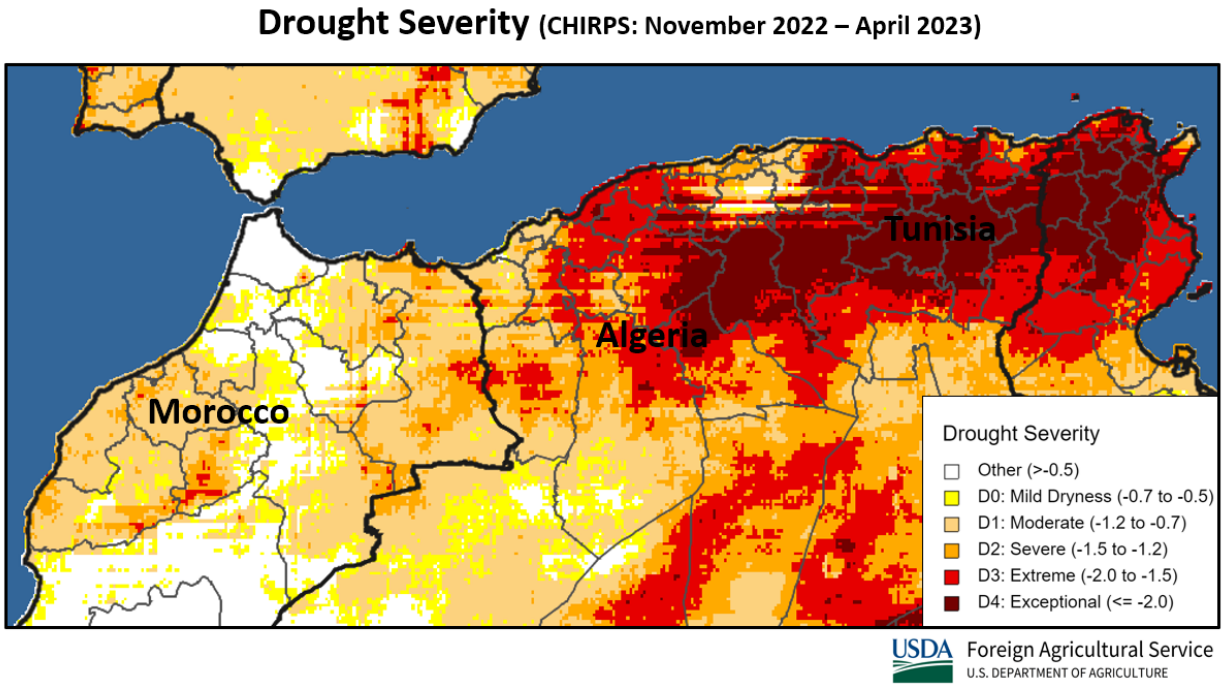
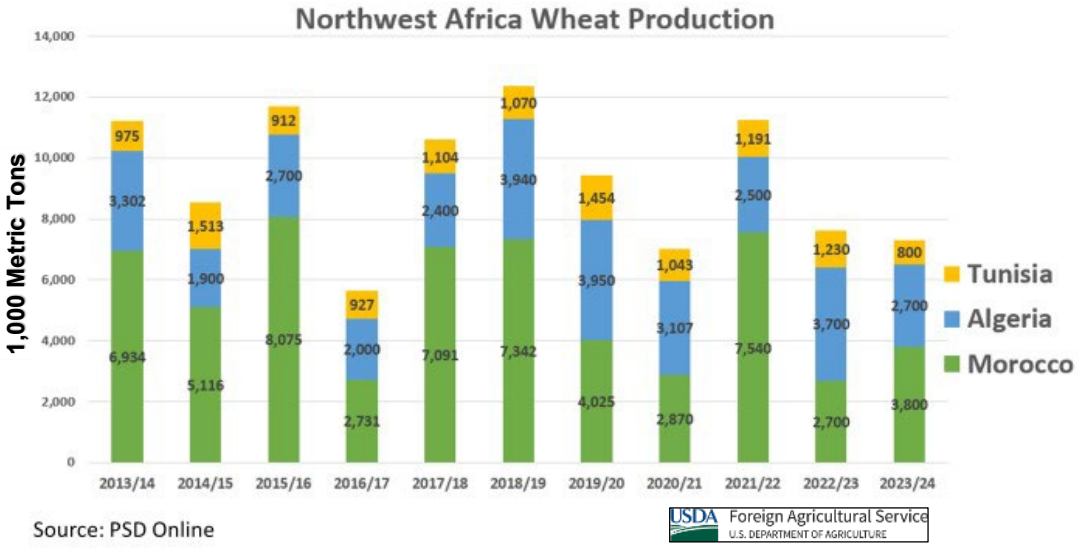
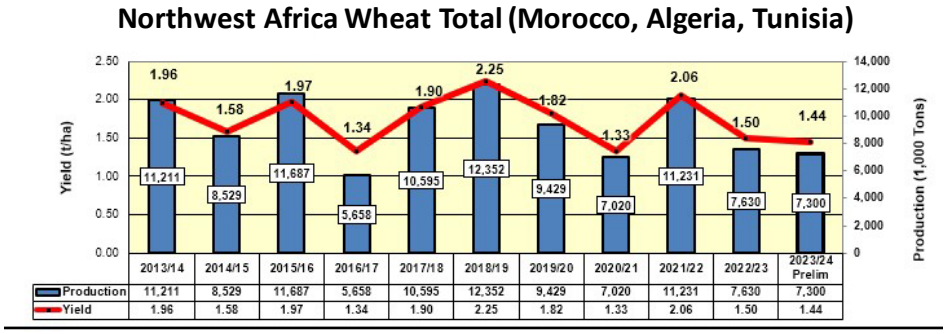



**Figure 1. Drought dominated Northwest Africa during the MY 2023/24 season.**



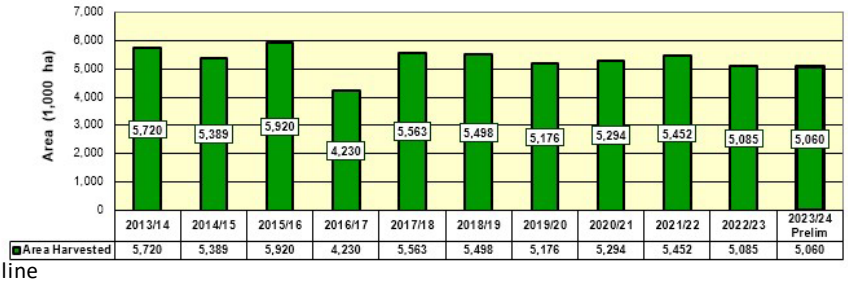




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**Figure 2. Northwest Africa wheat production charts. Total combined wheat production for the three countries of Morocco, Algeria and Tunisia are forecast to be low for the second year in a row. Drought has again limited the harvest. Annual production is variable, primarily dependent on the seasonal rainfall.**

**Figure 3. Irrigation in Morocco: Clockwise from top right: Gravity irrigation, Pivot irrigation, Drip irrigation. March 2023. Pictures by FAS Rabat and FAS Washington.**

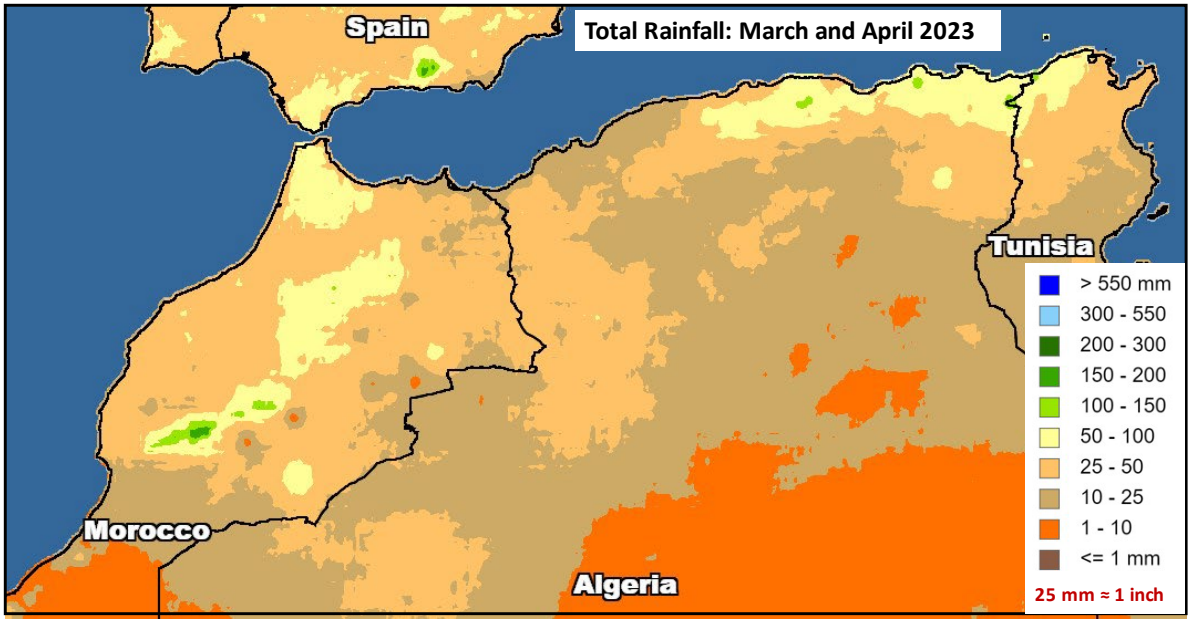



**Figure 4. Rainfall (CHIRPS) during March and April 2023 was scarce in Northwest Africa**

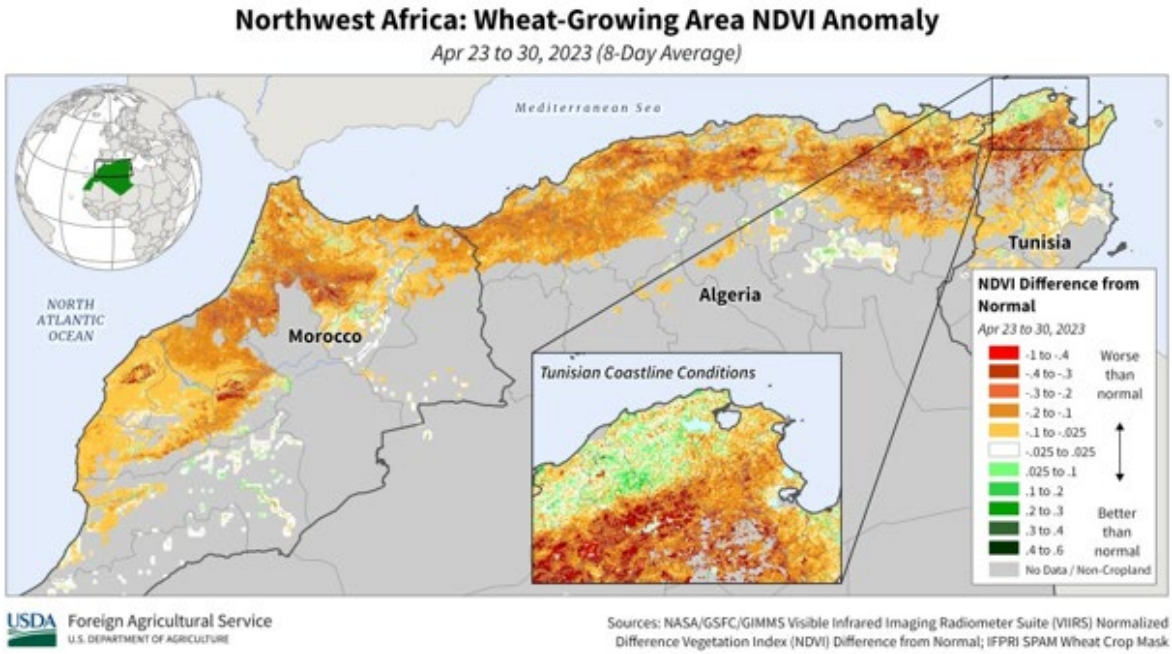



**Figure 5.** Satellite-derived NDVI anomaly from the end of April depicts vegetation vigor in the areas as being much below average across Northwest Africa, with the notable exception of far northern Tunisia.

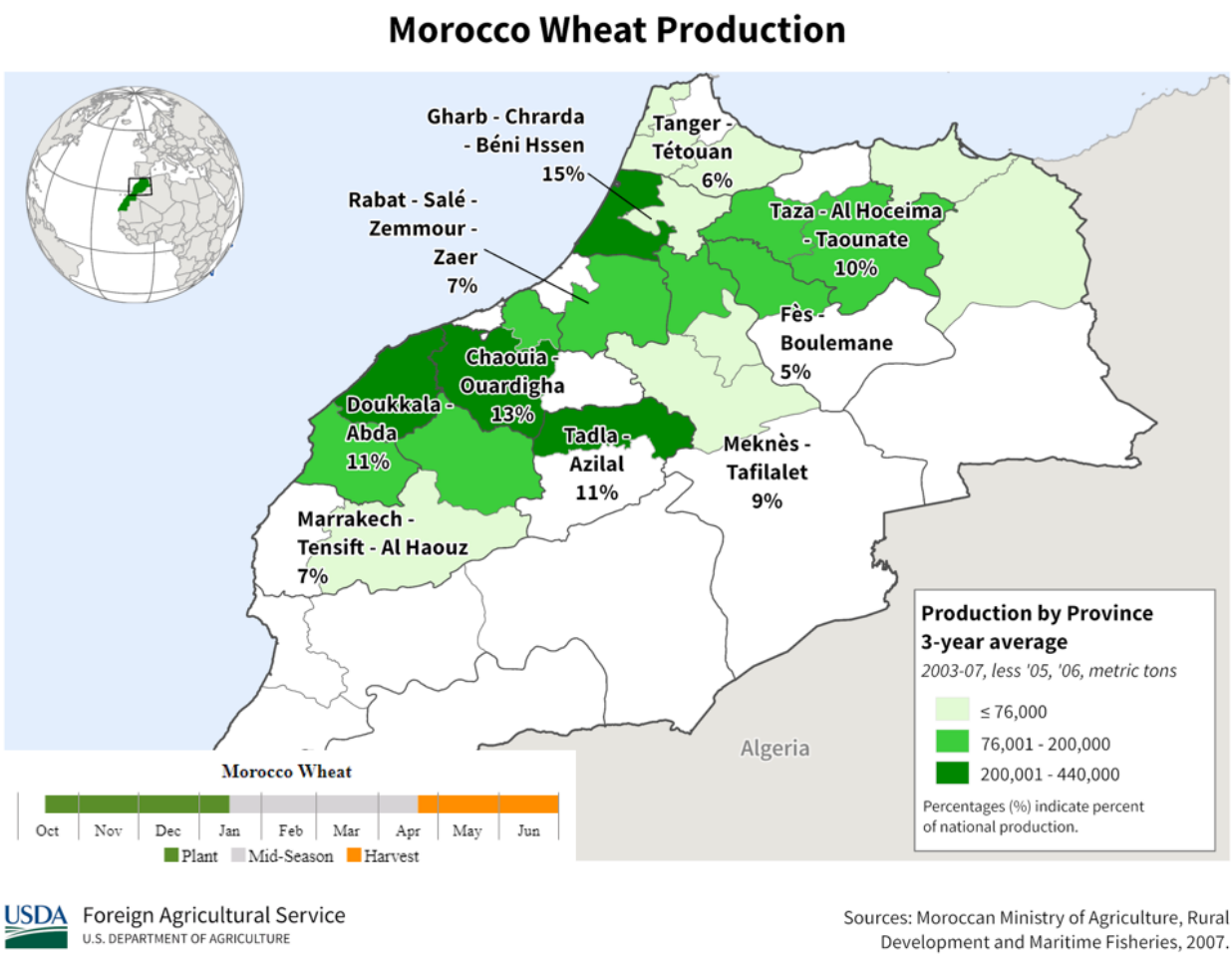



**Figure 6. Morocco Wheat Production by Province Map**

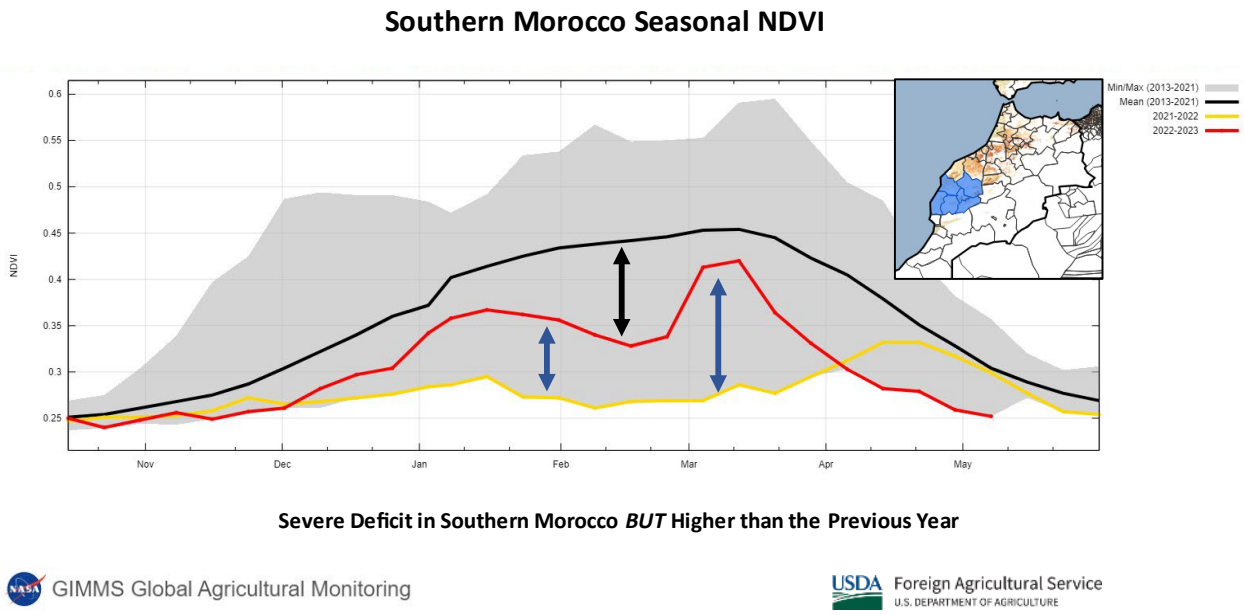
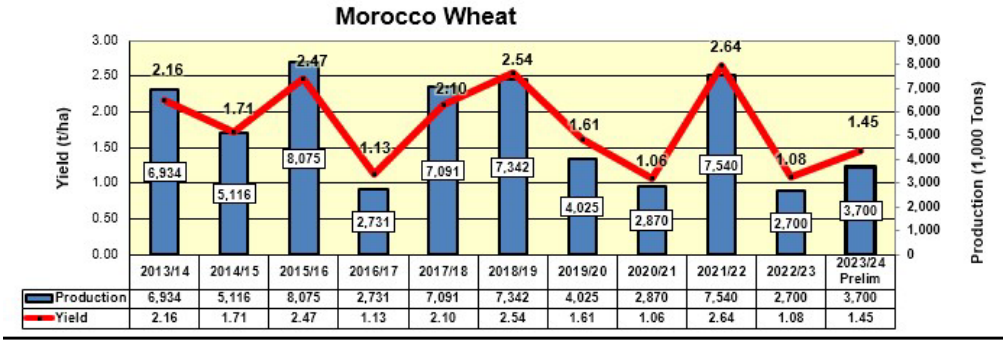



**Figure 7. Satellite-derived NDVI shows southern Morocco vegetation health to have been far below average, but better than last year.**



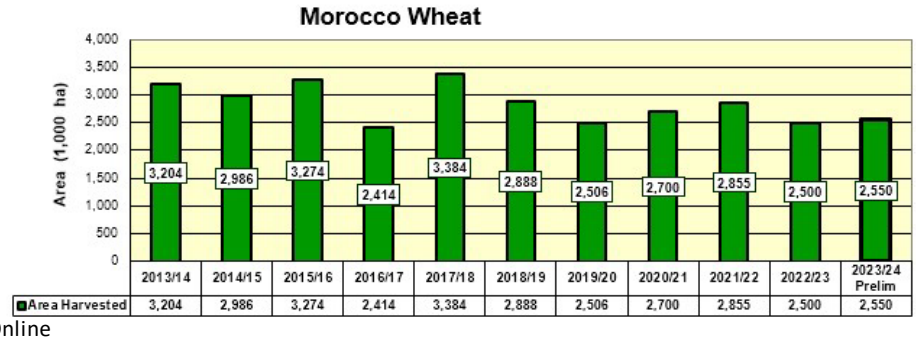




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**Figure 8. Morocco wheat production by year varies considerably. It is primarily dependent on rainfall timing and amount during the season. The last two harvests, both 2023 and 2022, will be significantly below average.**

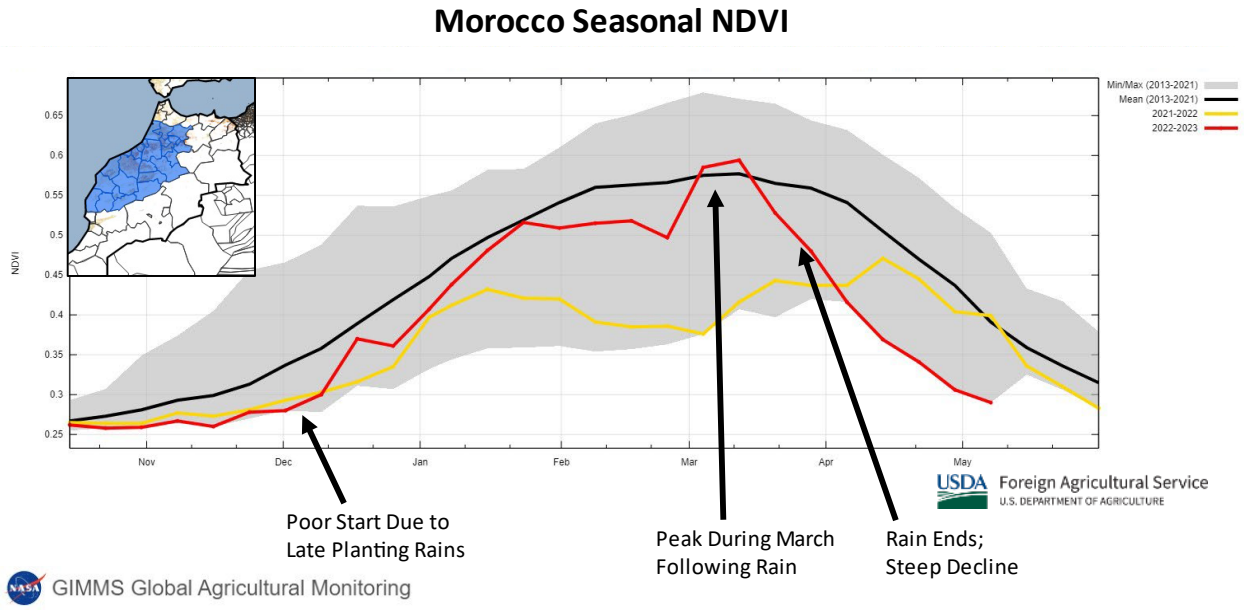



**Figure 9. Satellite-derived NDVI for Morocco reveals the late start of MY 2023/24 crops due to a lack of rainfall in early fall. The chart also shows the increase in vegetation vigor due to winter rains, but then a share drop in conditions results when rains end in early March.**


**Figure 10. Healthy wheat in central Morocco. Winter rains aided the crop. March 2023. Pictures by FAS Rabat and FAS Washington.**



**Figure 11. Vigorous wheat in Morocco. March 2023. Pictures by FAS Rabat and FAS Washington.**

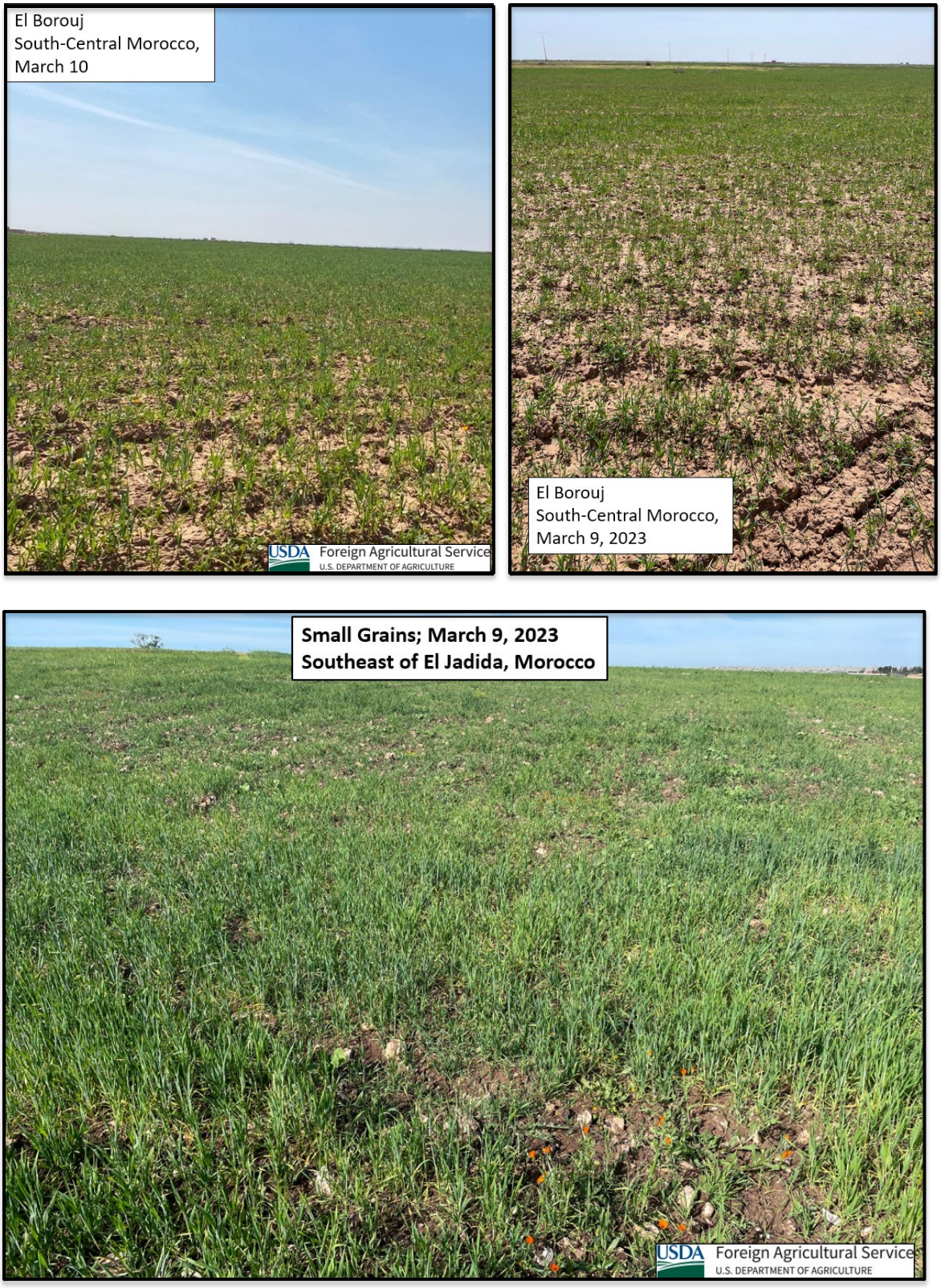



**Figure 12. Poor wheat crops in Morocco. Crops tended to be worse in the south. March 2023 Pictures by FAS Rabat and FAS Washington.**

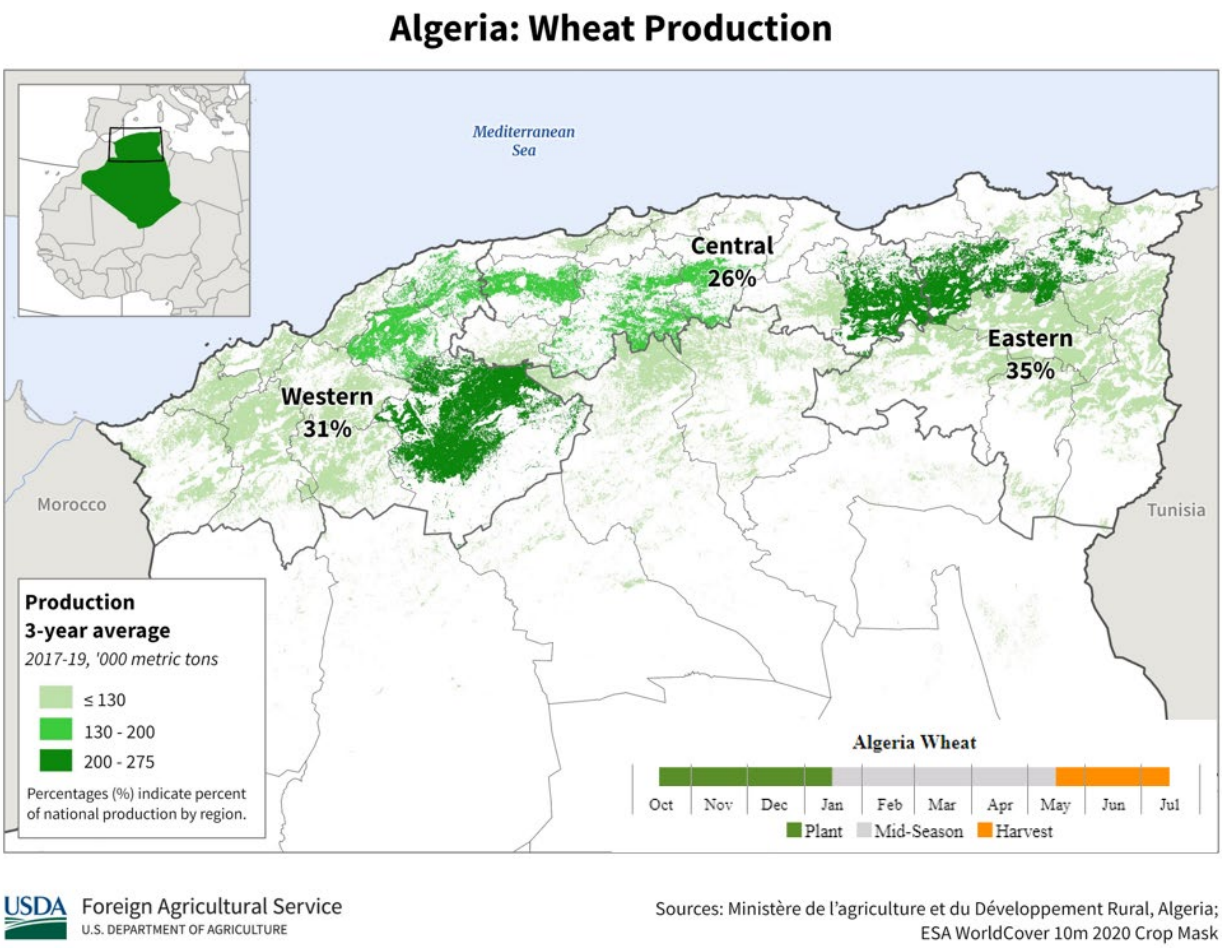



**Figure 13. Algeria wheat production map**

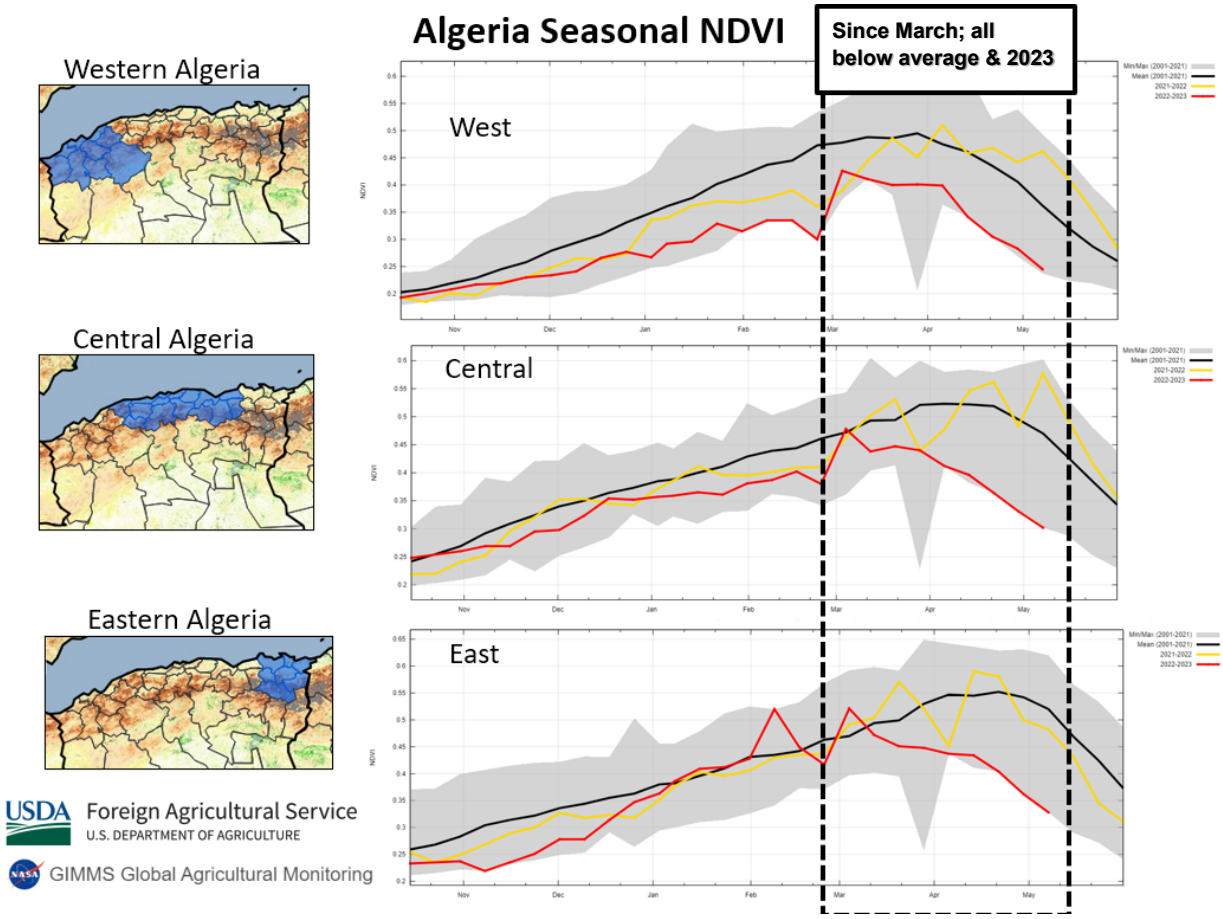
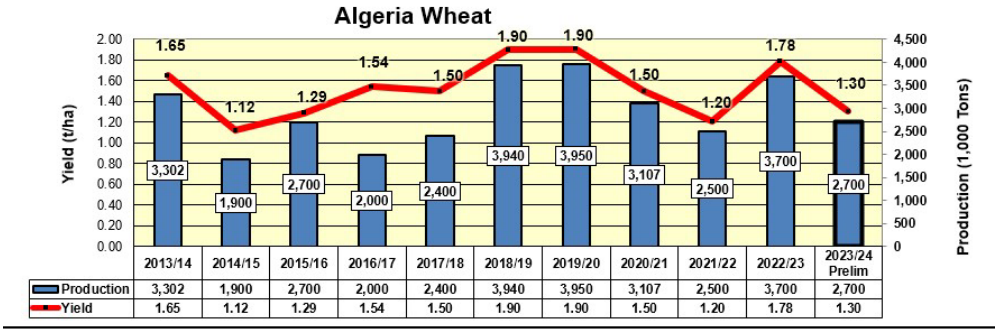



**Figure 14. Satellite-derived NDVI for Algeria shows a slow start to the growing season last autumn and winter, and most noticeably, an early and steep decline in vegetation vigor in early spring due to a lack of rain.**



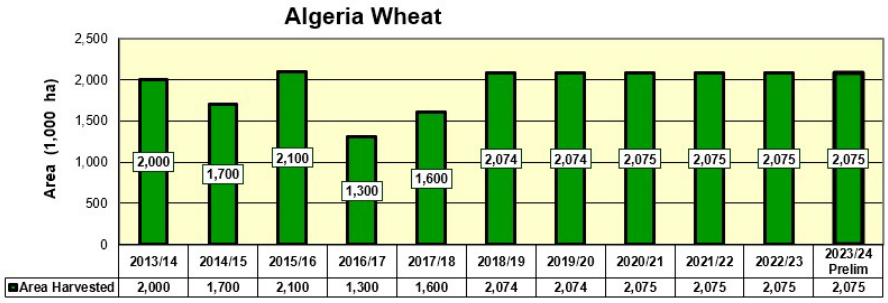




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**Figure 15. Algeria annual wheat production with a drop in yield and production in MY 2023/24.**

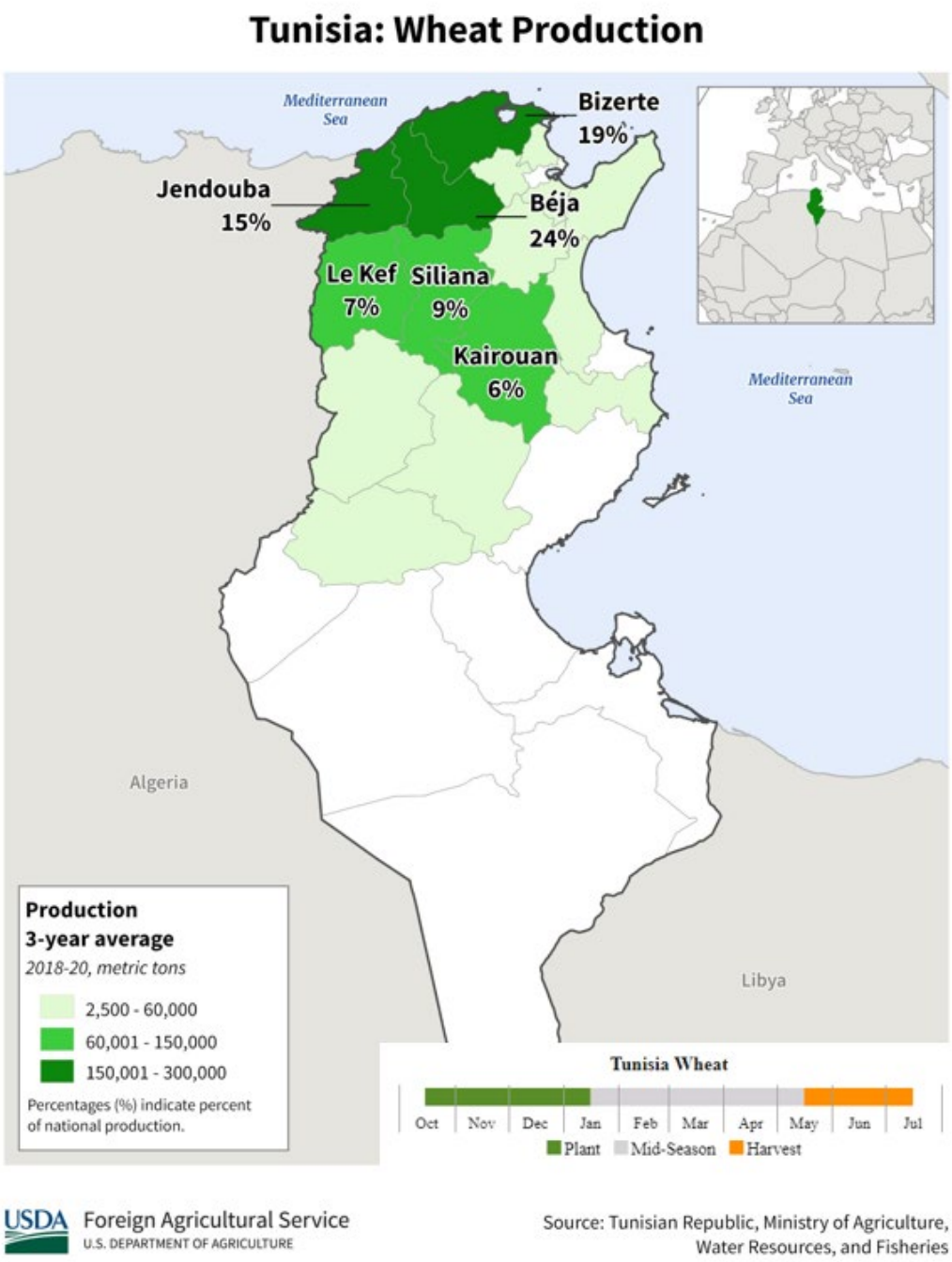
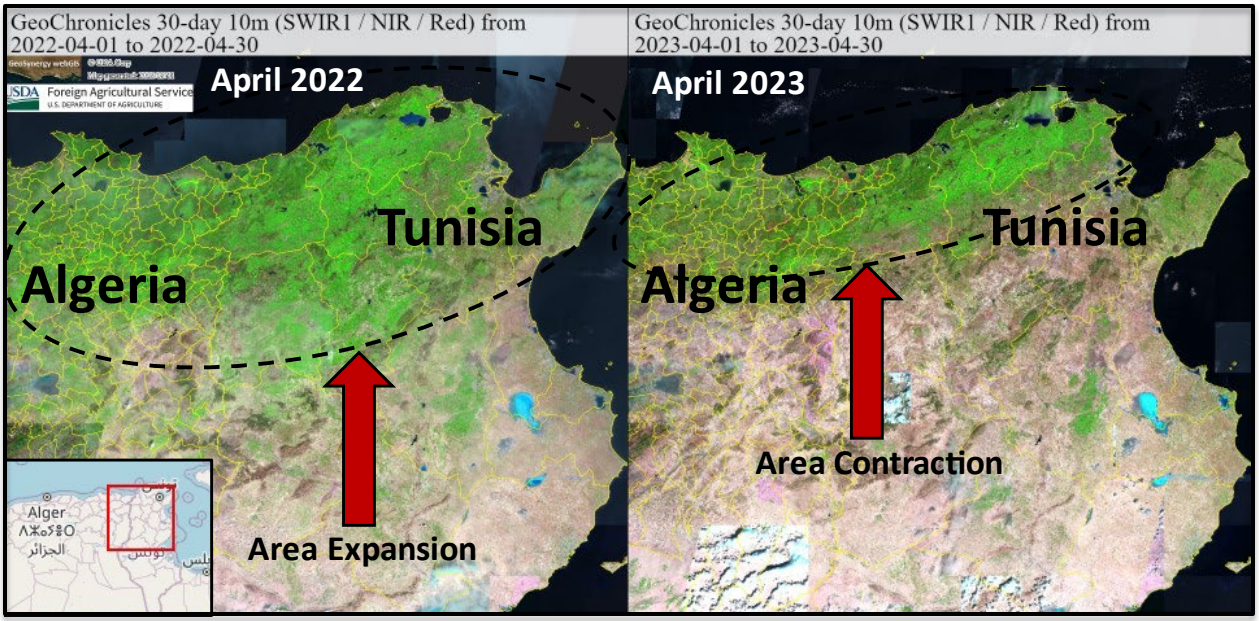



**Figure 16. Tunisia wheat production map**

**Satellite-Derived Greenness Comparison**




Year to Year Comparison in Tunisia shows the crop in April 2022 covering much more area than in April 2023

**Figure 17. Satellite Composite Comparison of Tunisia between April 2023 and April 2022 showing the contraction of area in the 2023 image due to drought.**

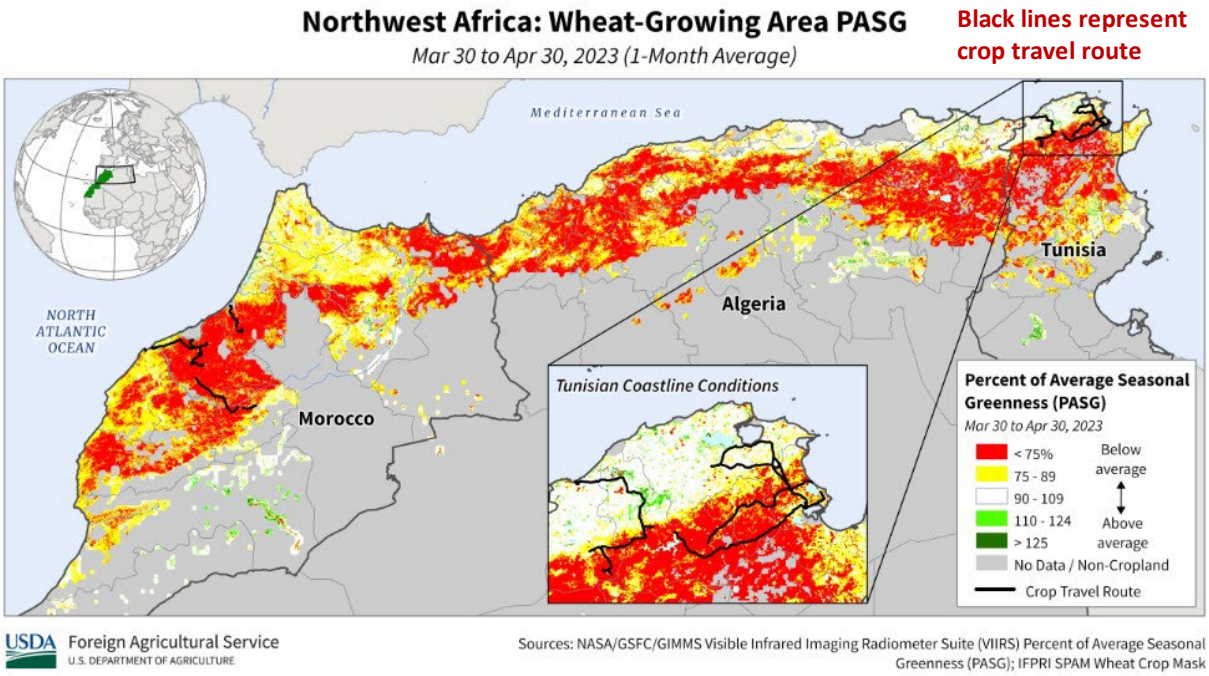
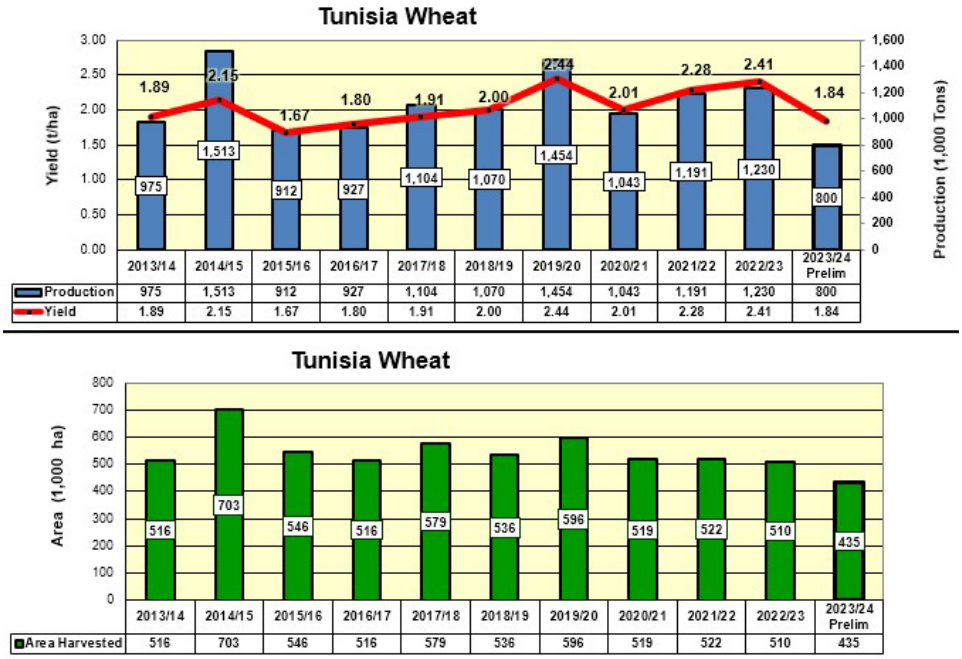



**Figure 18. Satellite-derived Percent Average Seasonal Greenness (PASG) overlayed with March 2023 field trip route**







Source:
USDA PSD Online

**Figure 19. Tunisia wheat production is down significantly in MY2023/24, below average and far below last year's bumper crop.**

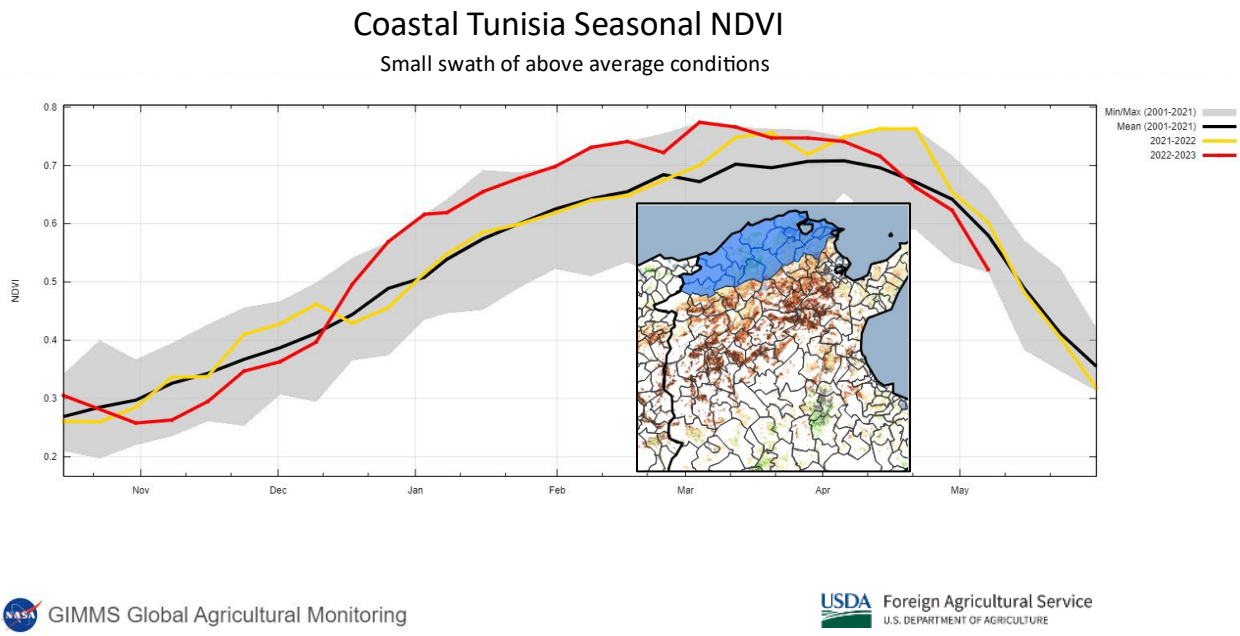



**Figure 20. MODIS NDVI; Along the extreme northern coast of Tunisia, the crops did well during 2023. The red line shows that this small sliver of cropland was above average for most of the season. Rainfall was adequate along the coast but further south the rain stopped.**

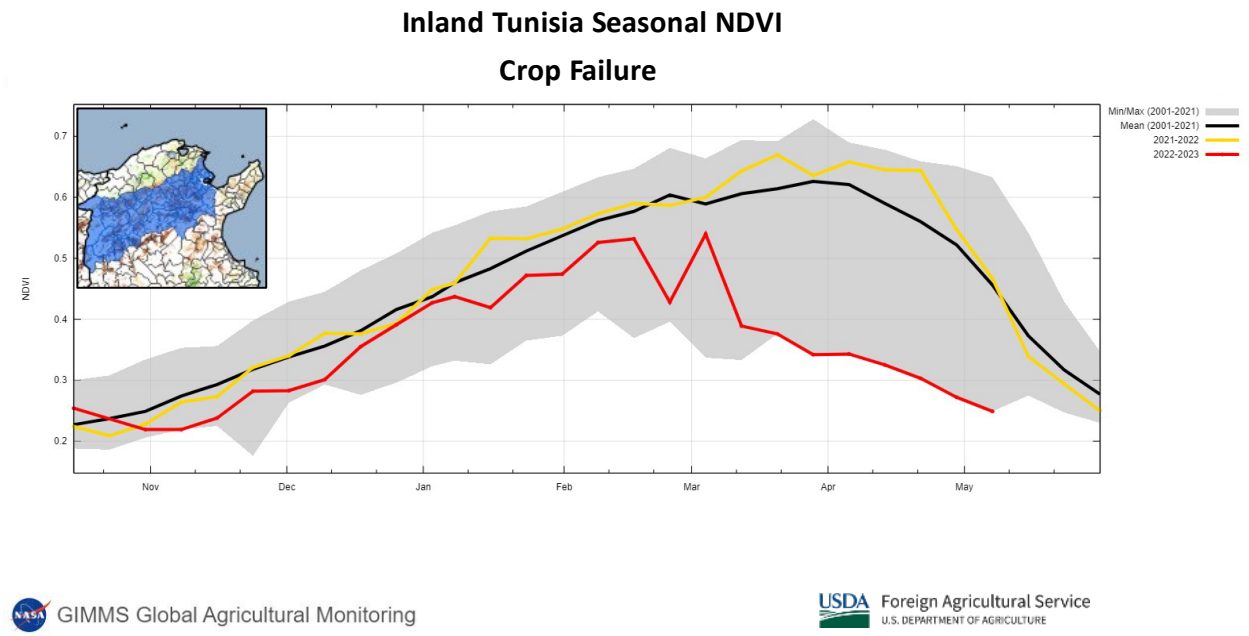
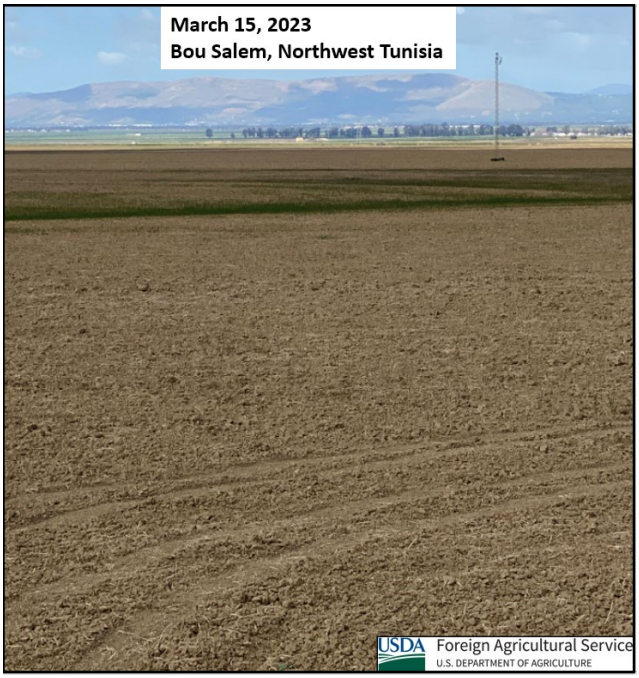
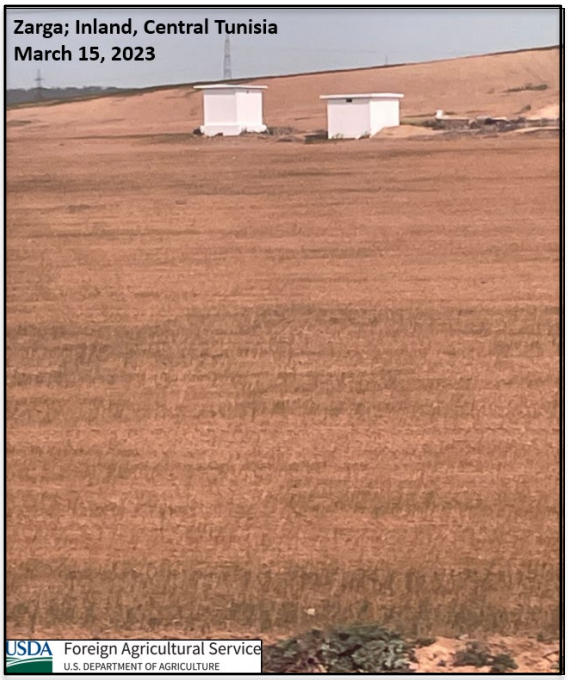



**Figure 21. MODIS Seasonal NDVI chart showing terrible conditions followed the 2023 Tunisian crops located just inland. The 2023 season is depicted in the red line, far below last year and the average.**


**Figure 22. Healthy crops in Northern Tunisia; March 2023, Pictures by FAS Tunis and FAS Washington.**


**Figure 23. Close-up of healthy crops in northern Tunisia. March 2023. Pictures by FAS Tunis and FAS Washington.**



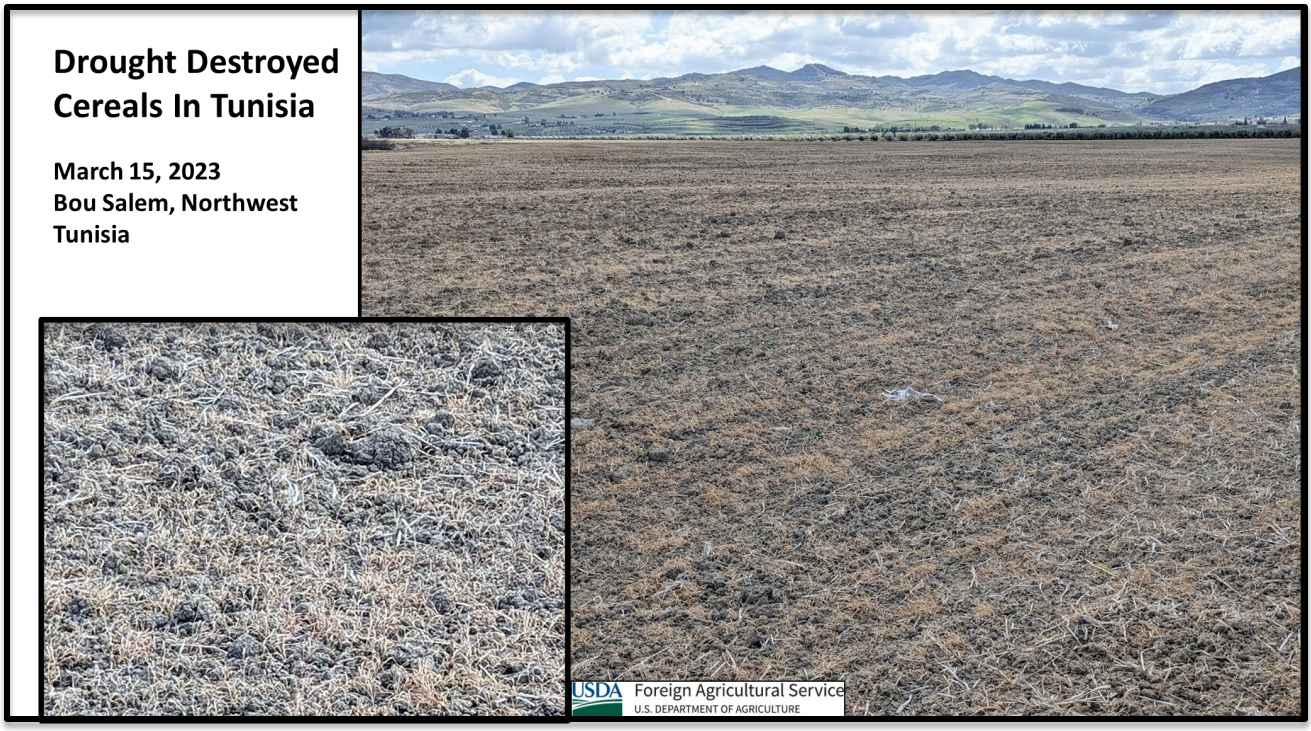




**Figure 24. Failed crops in farther inland areas, Tunisia, March 2023. Pictures by FAS Tuinis and FAS Washington.**


**Figure 25. Wheat field that will not be harvested for grain; will be grazed by livestock. March 2023. Pictures by FAS Tunis and FAS Washington.**

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