United States Department of Agriculture

Foreign Agricultural Service

July 16, 2019

Commodity Intelligence Report

Northwest Africa: Drought in Western Growing Areas, Favorable Conditions in the East

Diverse weather conditions in Northwest Africa (Morocco, Algeria and Tunisia) during marketing year (MY) 2019/2020 crop season led to different results across the region. Drought reduced yields in Morocco and western Algeria, but favorable conditions in eastern Algeria and Tunisia improved yields. Combined wheat production for these three countries is estimated at a near-average level of 9.9 million metric tons (mmt) (See Figure 1).

Total Northwest Africa wheat area is estimated at 5.5 million hectares (mha); yield is estimated at 1.81 tons per hectare (t/ha). Estimated 2019/20 wheat production is 20 percent below the 2018/19 total. The barley crop is estimated at 3.7 mmt, 28 percent below 2018/19. (See Figure 2). Wheat in Northwest Africa is concentrated along and near the coast, where soils are the most productive and precipitation is highest. Barley is grown on the more marginal land further inland and upland. A generalized croplands map shows the extent of both crops. (See Figure 3).

Abundant rainfall at planting during the fall of 2018 occurred in Morocco, Algeria and Tunisia. The heavy autumn rains provided adequate soil moisture, enticing farmers to increase planted area and encouraged optimism at the start of the new season. As the season progressed, however, rainfall diminished in Morocco and western Algeria. By the time rain returned to Morocco in late spring 2019, it was too late for significant recovery because crops had already begun to senesce. MODIS Normalized Difference Vegetation Index (NDVI), which detects vegetation vigor, fell quickly and sharply in Morocco and eastern Algeria after rainfall abruptly diminished. (See Figure 4). Both the vegetation declines and the diminished precipitation resulted in poor yields in Morocco and western Algeria.

In eastern Algeria and Tunisia, however, the abundant rainfall at planting was followed by timely and sufficient rainfall during the season. NDVI increased in Tunisia and central and western Algeria in March 2019 (See Figure 4), where favorable conditions included frequent and timely bursts of rain that kept crops growing throughout the season. Bumper crops have been harvested in eastern Algeria and Tunisia

The 2019/20 harvest of wheat in Northwest Africa began in Morocco in May and finished in June 2019 in Algeria and Tunisia. Morocco typically produces about 60 percent of the region's total wheat crop, but it can drop substantially in years like 2019/20 when there is drought. Morocco's 2019/20 production is down significantly from last season (down 40 percent), while Algeria's production is largely unchanged (up 2 percent), and Tunisia's crop is higher than 2018/19 (up 40 percent).

Morocco: Drought Cuts Expectations

USDA estimates 2019/20 Morocco wheat production at 4.4 mmt, down 2.9 mmt (40 percent) from last year and 28 percent below the 5-year average. Harvested area is estimated down 0.1 mha (4 percent) from last year and 7 percent below the 5-year average. Yield is estimated at 1.60 t/ha, down 38 percent from last year and down 20 percent from the 5-year average (See Figure 5).

Autumn rainfall aided crop emergence and early development of wheat last autumn, leading to optimistic early expectations. Rainfall ended in mid-November however, and was negligible until mid-March, when the crop had already begun to senesce. The lack of almost any late fall, winter, and early spring precipitation significantly damaged the crop during the vegetative stage (See Figure 6). USDA's Agricultural Affairs Office in Rabat reported in GAIN Report MO1912 that fields turned yellow prematurely and were underdeveloped due to the lack of soil moisture. The central region, which is Morocco's primary wheat area (See Figure 7), received less than half the normal seasonal rainfall.

The rapid decline in the vegetation canopy can be seen by comparing the 4 months of December, January, February and March using MODIS NDVI anomaly maps (See Figure 8). Even more striking is the comparison of the 2019/20 crop to last year's good crop (See Figure 9). Wheat in Morocco typically flowers in March and is harvested in May and June. MODIS Normalized Difference Vegetation Index (NDVI) depicts a crop that was most vibrant (typically correlating to flowering and reproduction stages) two and a half months before normal.

The rapid acceleration in crop dry-down can be seen in the NDVI graph as the current 2019/20 crop (seen in the graph as 2018-19 because of its growing season) falls below the normal in mid-February (See Figure 10). Increased rainfall finally arrived in March and April, but it was too late to substantially boost yields. After farmers realized yields were going to be down significantly, it's reported that input applications were minimal, leading to a significant amount of planted area diverted for livestock grazing.

Algeria: Drought in West; Favorable in Center; Record in East

USDA estimates 2019/20 Algeria wheat production at a record 4.0 mmt, just clipping last year's record by 0.1 mmt or 2 percent, and 55 percent above the moving 5-year average. Area is estimated at 2.1 mha, slightly higher than last year, and 20 percent above the 5-year average. Record yield is forecast at 1.90 t/ha, slightly higher than last year, and 30 percent above the 5-year moving average (See Figure 11).

The 2019/20 crop conditions in Algeria varied greatly east to west. During autumn 2018, all regions started planting with ample precipitation and soil moisture. In the east, where wheat is most heavily concentrated, conditions remained excellent, with timely rainfall occurring throughout the growing season. Conversely, western Algeria experienced a severe drought during late fall of 2018 and early 2019 which diminished yields (See Figure 12).

Central Algeria benefited from good rainfall at planting and frequent, but below-average rainfall later in the season (See Figure 13). MODIS Normalized Difference Vegetation Index (NDVI) shows exceptionally high vegetation vigor in eastern areas, above-average conditions in the central region, but poor conditions in the west (See Figure 14). Algeria's west is a relatively small wheat producing area when compared to its east. Like Morocco, NDVI in eastern Algeria, which was taken over a 4-month period, depicts a rapid decline in

vegetation health (See Figure 15). Additionally, a comparison to 2018/19 shows much lower vegetation vigor (See Figure 16). The larger areas to the east, however, are more influential for total Algeria wheat output.

For a map showing average wheat production by province in Algeria please see Figure 17. The combination of exceptional conditions in the east, along with good conditions in central areas around the capital Algiers, should allow the national total to reach a record, despite the poor conditions in the west. Irrigation of cereals is minimal and is estimated at 0.3 mha. Most of the wheat crop is durum.

Tunisia Wheat: Frequent Rains Drive Record Yield

USDA estimates 2019/20 Tunisia wheat production at a bumper 1.5 mmt, up 0.4 mmt (40 percent) from last year and 36 percent above the 5-year average. Area is estimated at 0.6 mha, 16 percent above last year and 8 percent above the 5-year average. Yield is estimated at a record 2.42 t/ha, up 21 percent from last year and 27 percent above the 5-year average. (See Figure 18).

The season in Tunisia began with above average precipitation in the country's main northern growing regions (See Figure 19). Favorable conditions encouraged early planting and increased area. Rainfall remained abundant and frequent throughout the growing period. Season-long soil moisture allowed for proper fall emergence, strong development, good spring growth, and beneficial flowering conditions. Rainfall continued to be favorable into June with small but frequent bouts of rain. The harvest began in June and can last into July. MODIS NDVI depicts above-average vegetation conditions all season (See Figure 20). The crop is predominantly rainfed but includes an estimated 70,000 hectares of irrigated cereals. For a map showing wheat production regions in Tunisia, please see Figure 21.

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Current area and production estimates for grains and other agricultural commodities are available on IPAD's Agricultural Production page:
Crop Explorer https://ipad.fas.usda.gov/cropexplorer/or
Production, Supply and Distribution Database (PSD Online):
http://apps.fas.usda.gov/psdonline/psdHome.aspx
U. S. Department of Agriculture
Foreign Agricultural Service
Office of Global Analysis
International Production Assessment Division Ag Box 1051, Room 4630, South Building
Washington, DC 20250-1051
Telephone: (202) 720-1662 Fax: (202) 720-1158

Figure 1

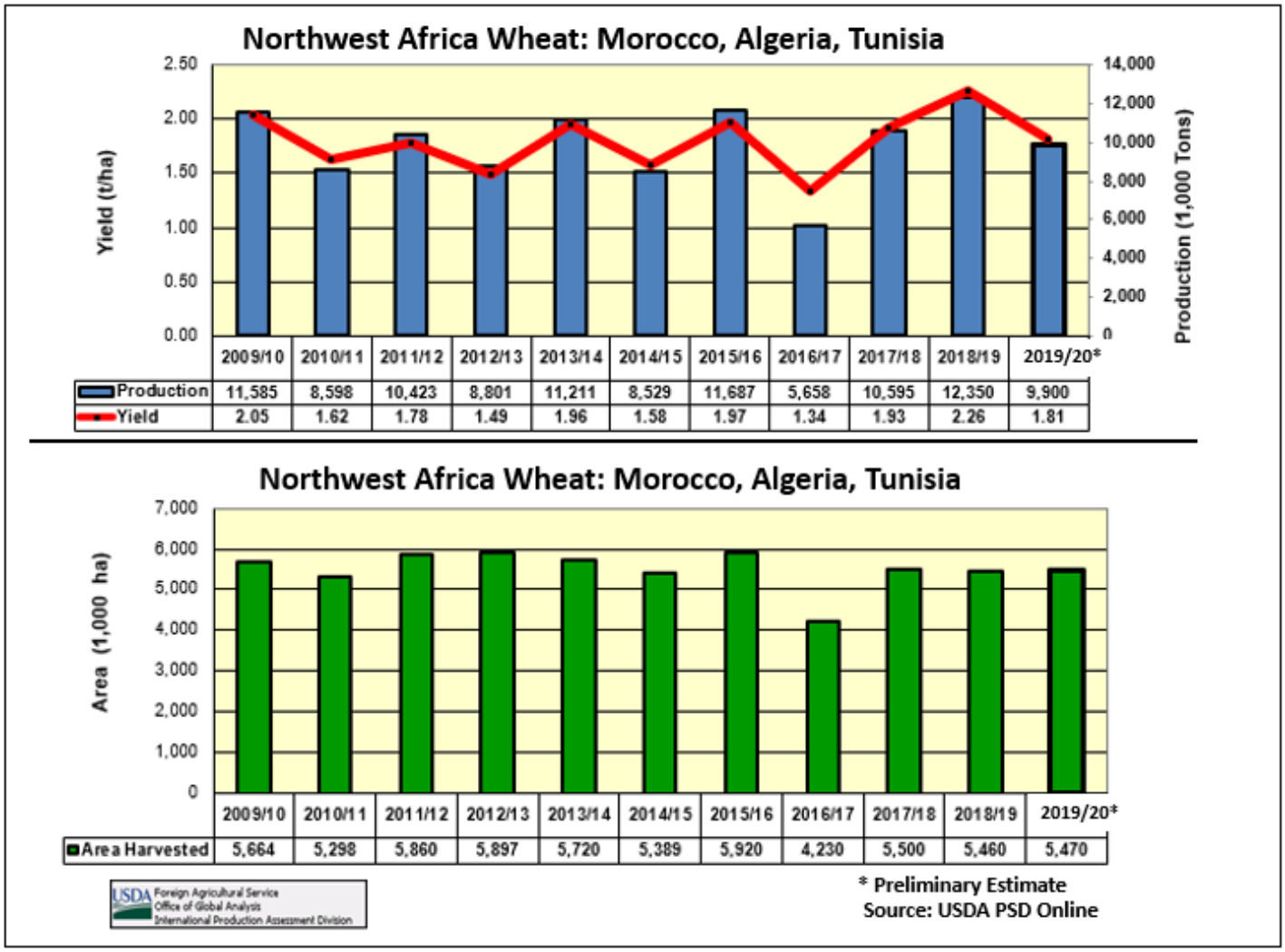

Northwest Africa Wheat: Morocco, Algeria, Tunisia
Yield (t/ha)
Production (1,000 Tons)
2.50
2.00
1.50
1.00
0.50
0.00
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
2009/10 2010/11 2011/12 2012/13 2013/14 2014/15 2015/16 2016/17 2017/18 2018/19 2019/20*
Production 11,585 8,598 10,423 8,801 11,211 8,529 11,687 5,658 10,595 12,350 9,900
Yield 2.05 1.62 1.78 1.49 1.96 1.58 1.97 1.34 1.93 2.26 1.81
Northwest Africa Wheat: Morocco, Algeria, Tunisia
Area (1,000 ha)
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
2009/10 2010/11 2011/12 2012/13 2013/14 2014/15 2015/16 2016/17 2017/18 2018/19 2019/20*
Area Harvested 5,664 5,298 5,860 5,897 5,720 5,389 5,920 4,230 5,500 5,460 5,470
USDA Foreign Agricultural Service
Office of Global Analysis
International Production Assessment Division
* Preliminary Estimate
Source: USDA PSD Online

Figure 2

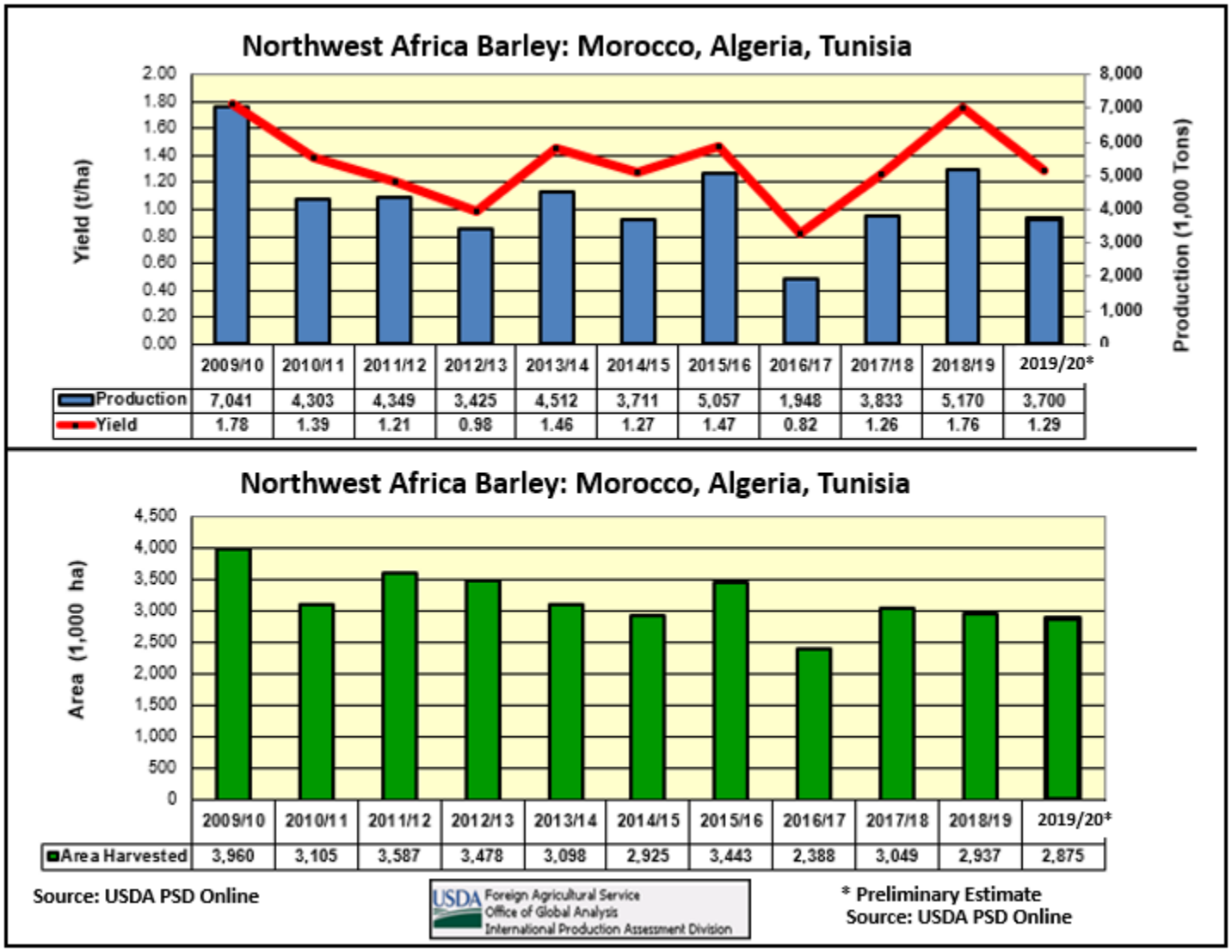

Northwest Africa Barley: Morocco, Algeria, Tunisia
Yield (t/ha)
Production (1,000 Tons)
2.00
1.80
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
2009/10 2010/11 2011/12 2012/13 2013/14 2014/15 2015/16 2016/17 2017/18 2018/19 2019/20*
Production 7,041 4,303 4,349 3,425 4,512 3,711 5,057 1,948 3,833 5,170 3,700
Yield 1.78 1.39 1.21 0.98 1.46 1.27 1.47 0.82 1.26 1.76 1.29
Northwest Africa Barley: Morocco, Algeria, Tunisia
Area (1,000 ha)
4,500
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0
2009/10 2010/11 2011/12 2012/13 2013/14 2014/15 2015/16 2016/17 2017/18 2018/19 2019/20*
Area Harvested 3,960 3,105 3,587 3,478 3,098 2,925 3,443 2,388 3,049 2,937 2,875
Source: USDA PSD Online
USDA Foreign Agricultural Service
Office of Global Analysis
International Production Assessment Division
* Preliminary Estimate
Source: USDA PSD Online

Figure 3

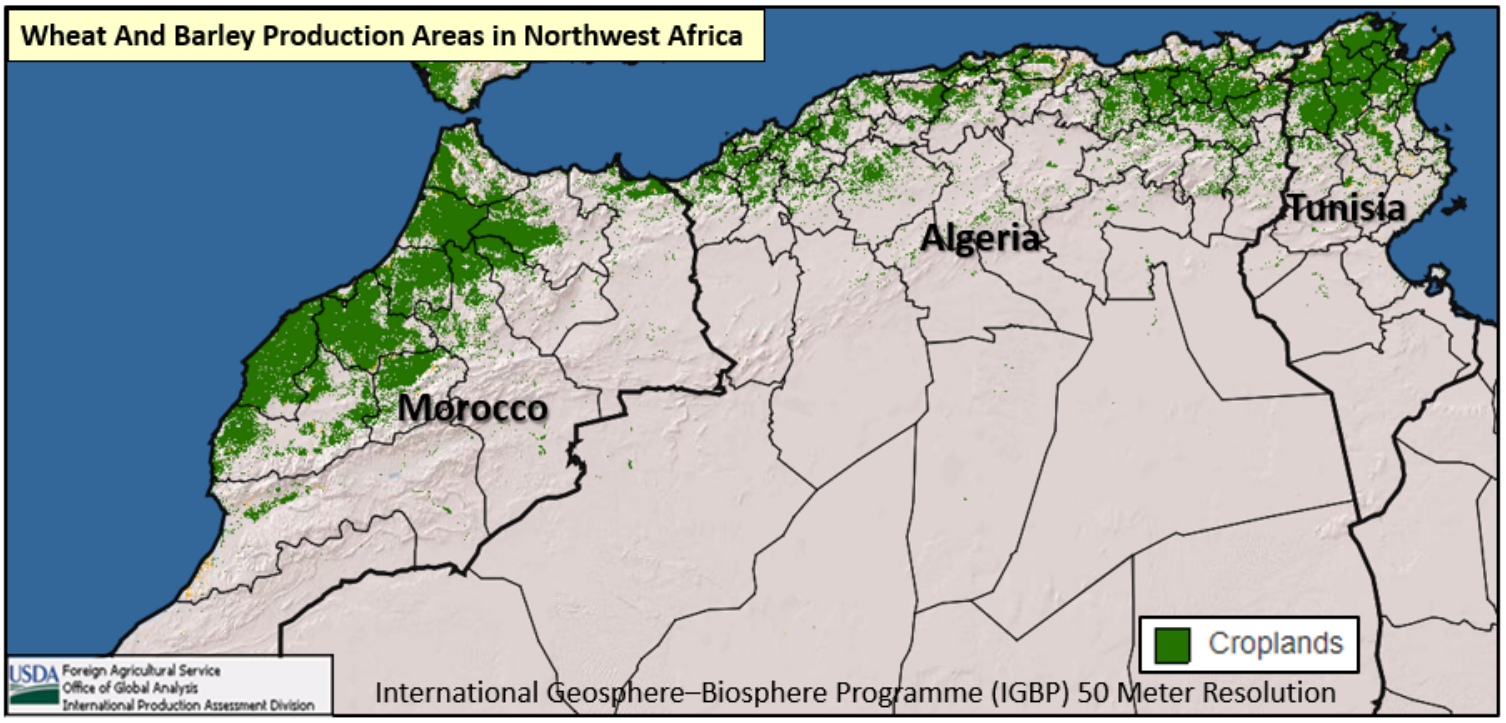

Wheat And Barley Production Areas in Northwest Africa
Algeria
Tunisia
Morocco
Croplands
USDA Foreign Agricultural Service
Office of Global Analysis
International Production Assessment Division
International Geosphere–Biosphere Programme (IGBP) 50 Meter Resolution

Figure 4

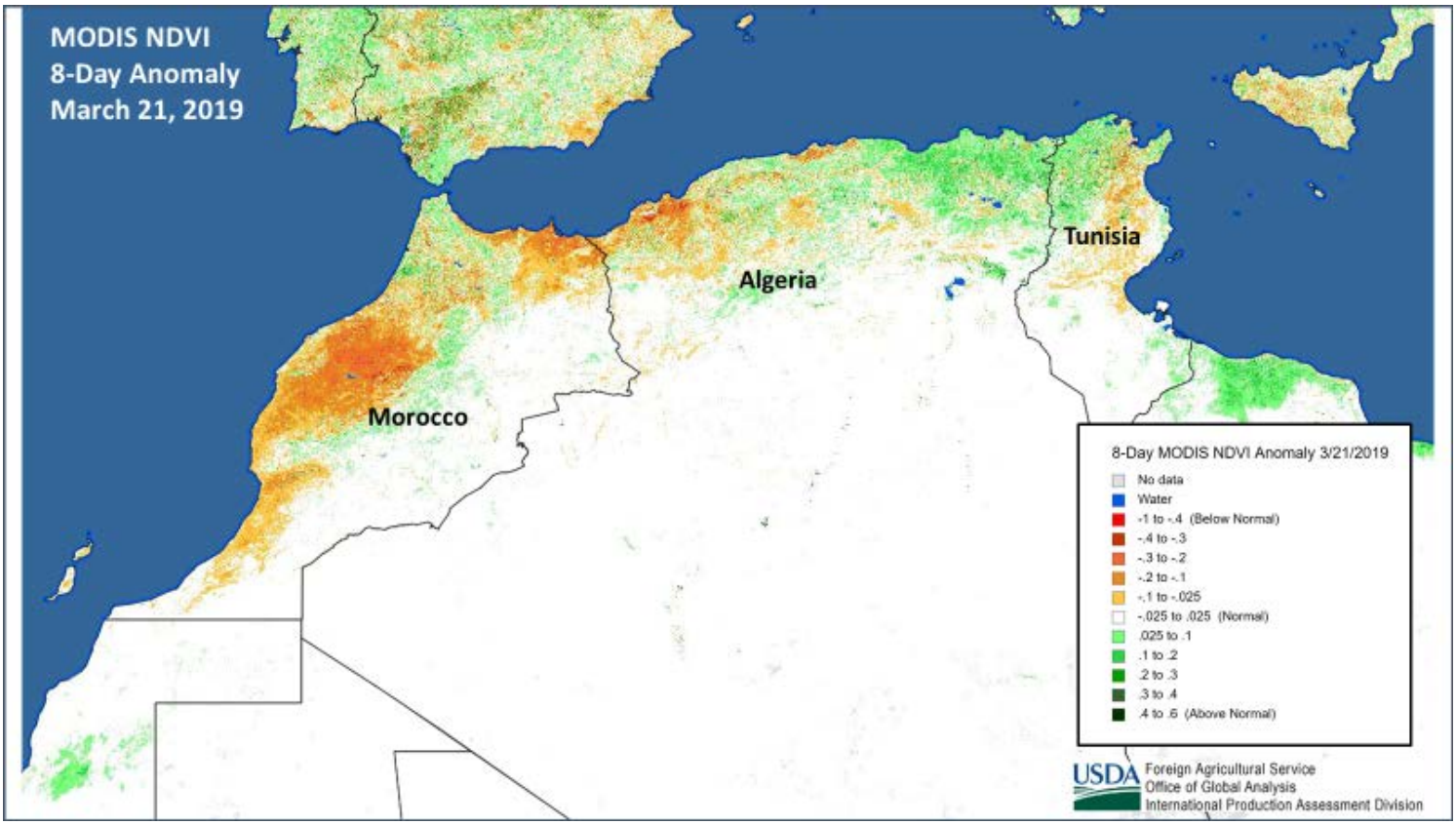

MODIS NDVI
8-Day Anomaly
March 21, 2019
Tunisia
Algeria
Morocco
8-Day MODIS NDVI Anomaly 3/21/2019
No data
Water
-1 to -.4 (Below Normal)
-.4 to -.3
-.3 to -.2
-.2 to -.1
-.1 to -.025
-.025 to .025 (Normal)
.025 to .1
.1 to .2
.2 to .3
.3 to .4
.4 to .6 (Above Normal)
USDA Foreign Agricultural Service
Office of Global Analysis
International Production Assessment Division

Figure 5

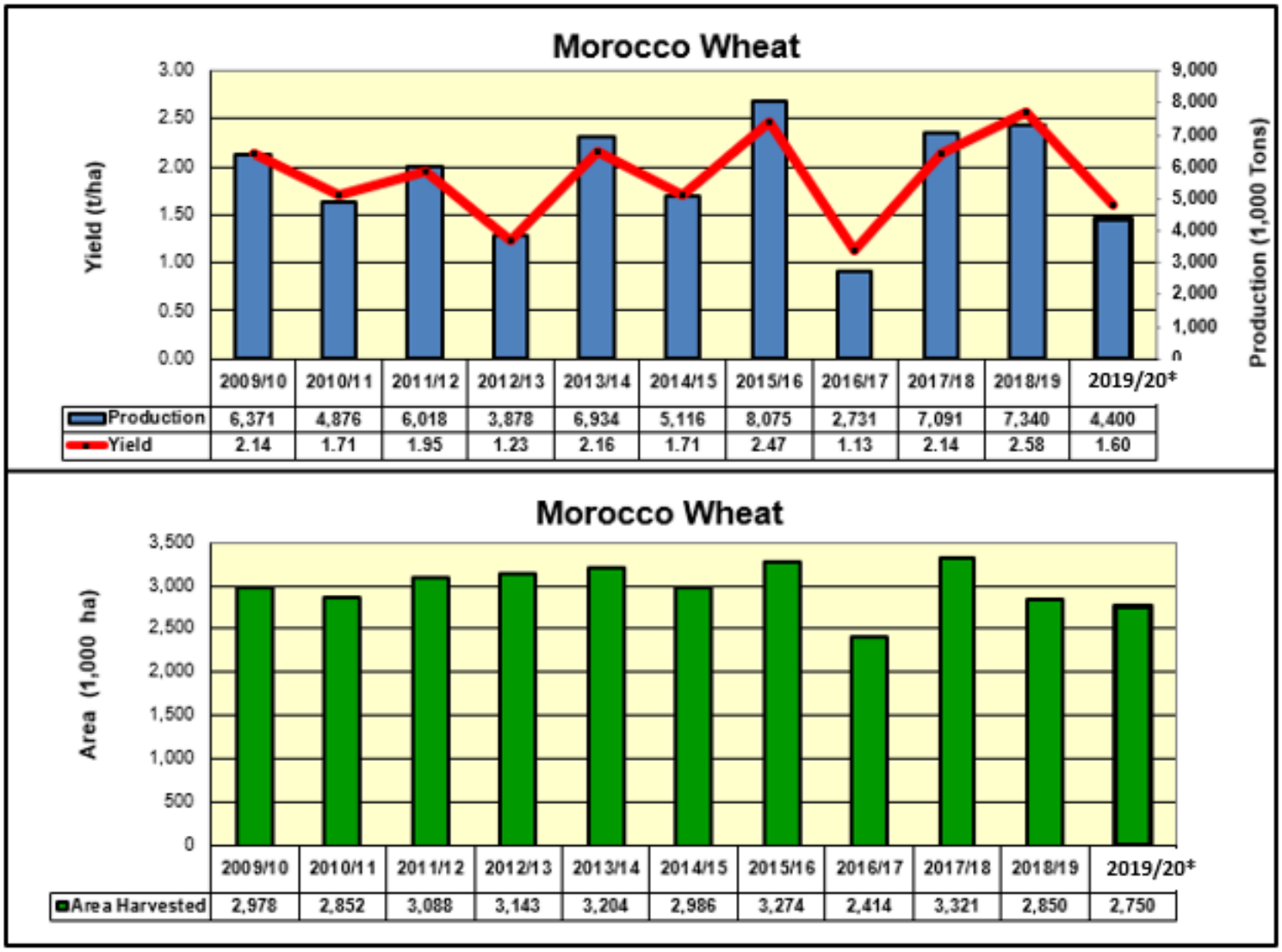

Morocco Wheat
Yield (t/ha)
Production (1,000 Tons)
3.00
2.50
2.00
1.50
1.00
0.50
0.00
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
2009/10 2010/11 2011/12 2012/13 2013/14 2014/15 2015/16 2016/17 2017/18 2018/19 2019/20*
Production 6,371 4,876 6,018 3,878 6,934 5,116 8,075 2,731 7,091 7,340 4,400
Yield 2.14 1.71 1.95 1.23 2.16 1.71 2.47 1.13 2.14 2.58 1.60
Morocco Wheat
Area (1,000 ha)
3,500
3,000
2,500
2,000
1,500
1,000
500
0
2009/10 2010/11 2011/12 2012/13 2013/14 2014/15 2015/16 2016/17 2017/18 2018/19 2019/20*
Area Harvested 2,978 2,852 3,088 3,143 3,204 2,986 3,274 2,414 3,321 2,850 2,750
USDA Foreign Agricultural Service
Office of Global Analysis
International Production Assessment Division
* Preliminary Estimate
Source: USDA PSD Online

Figure 6

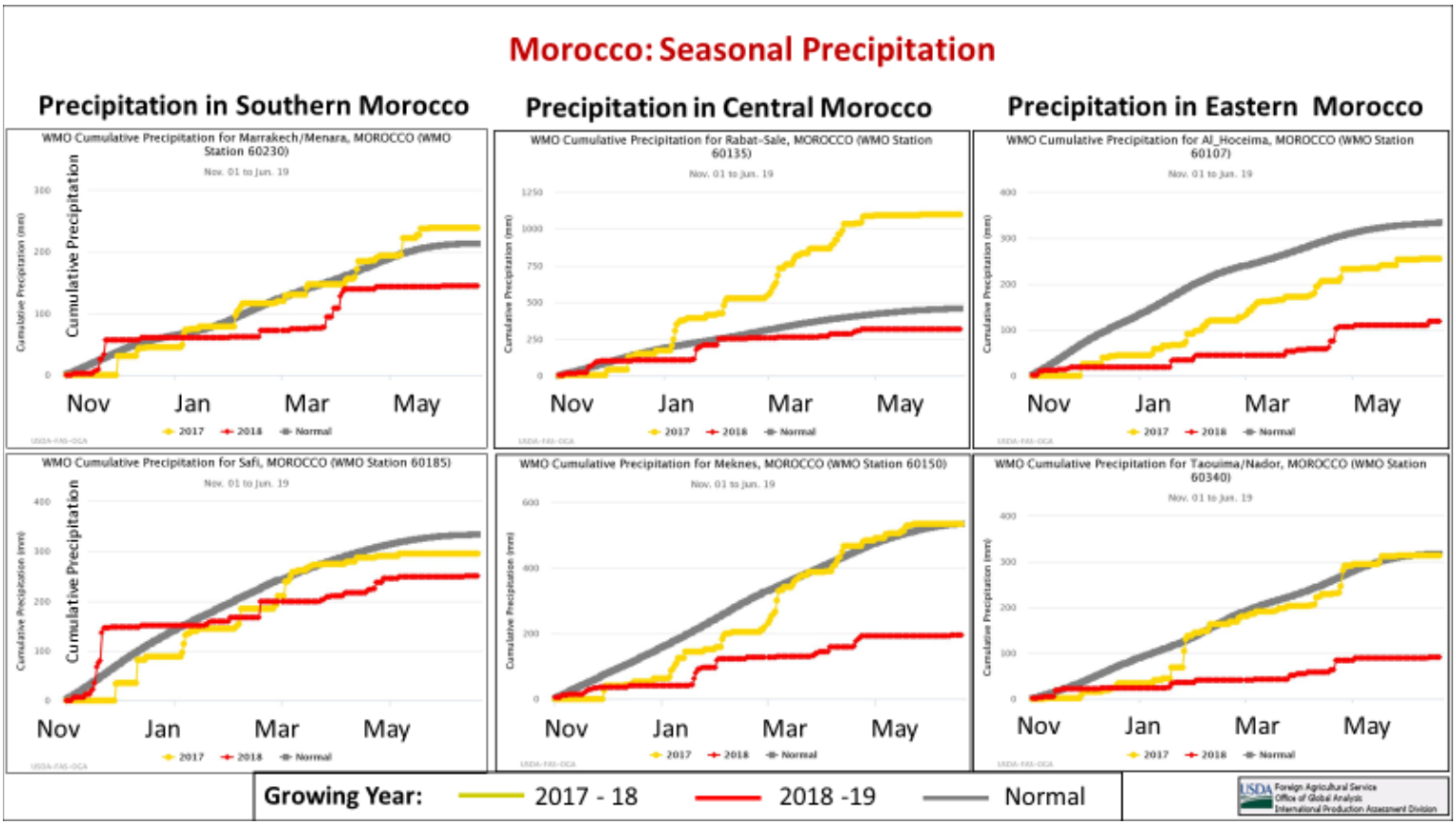

Morocco: Seasonal Precipitation
Precipitation in Southern Morocco
Precipitation in Central Morocco
Precipitation in Eastern Morocco
WMO Cumulative Precipitation for Marrakech/Menara, MOROCCO (WMO Station 60230)
WMO Cumulative Precipitation for Rabat-Sale, MOROCCO (WMO Station 60135)
WMO Cumulative Precipitation for Al_Hoceima, MOROCCO (WMO Station 60107)
WMO Cumulative Precipitation for Safi, MOROCCO (WMO Station 60185)
WMO Cumulative Precipitation for Meknes, MOROCCO (WMO Station 60150)
WMO Cumulative Precipitation for Taouima/Nador, MOROCCO (WMO Station 60340)
Nov. 01 to Jun. 19
Cumulative Precipitation (mm)
Nov
Jan
Mar
May
2017
2018
Normal
Growing Year:
2017 - 18
2018 -19
Normal
USDA Foreign Agricultural Service
Office of Global Analysis
International Production Assessment Division

Figure 7

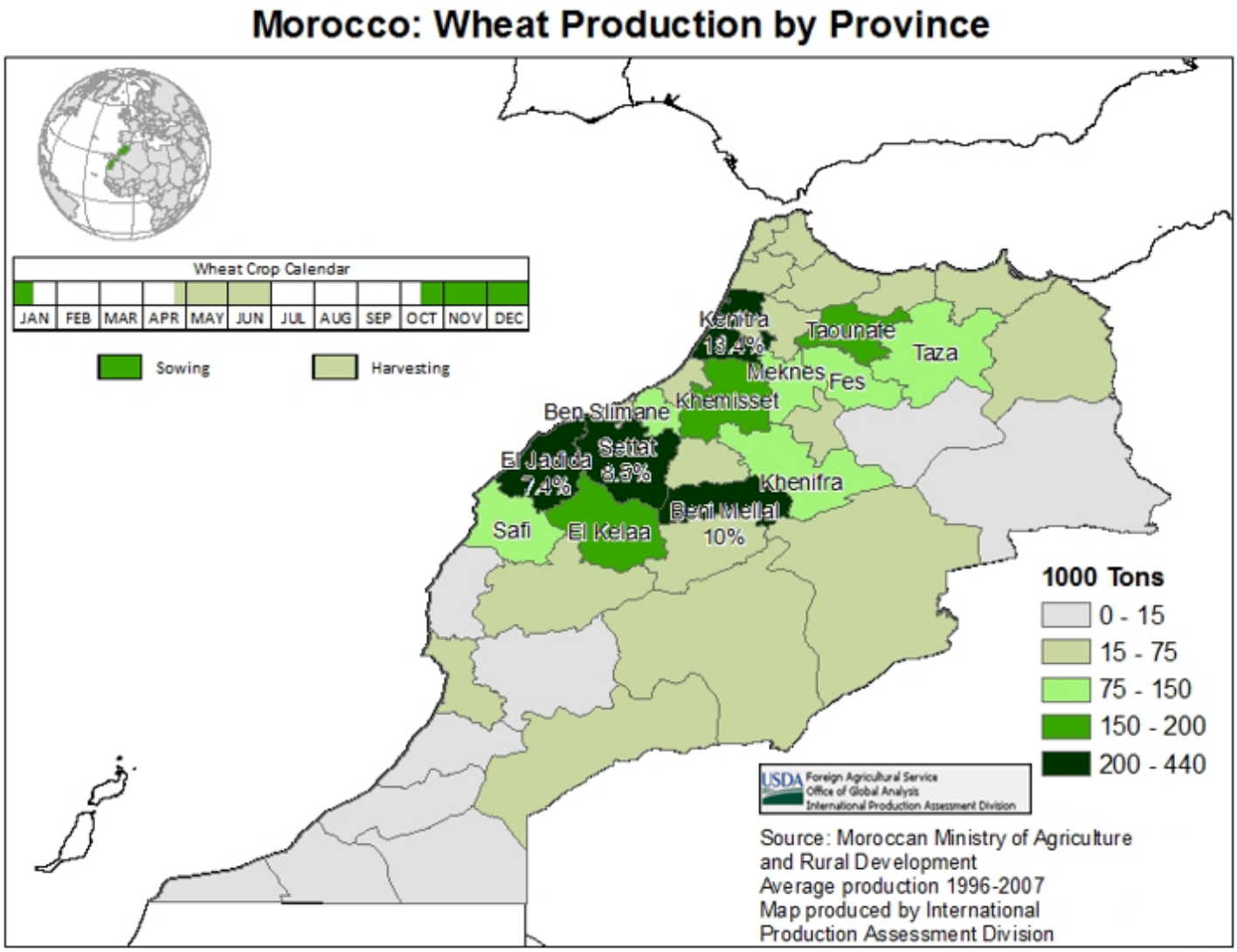

Morocco: Wheat Production by Province
Wheat Crop Calendar
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
Sowing
Harvesting
Kenitra 13.4%
Taounate
Taza
Meknes
Fes
Khemisset
Ben Slimane
Settat 8.3%
El Jadida 7.4%
Khenifra
Beni Mellal 10%
Safi
El Kelaa
1000 Tons
0 - 15
15 - 75
75 - 150
150 - 200
200 - 440
USDA Foreign Agricultural Service
Office of Global Analysis
International Production Assessment Division
Source: Moroccan Ministry of Agriculture and Rural Development
Average production 1996-2007
Map produced by International Production Assessment Division

Figure 8

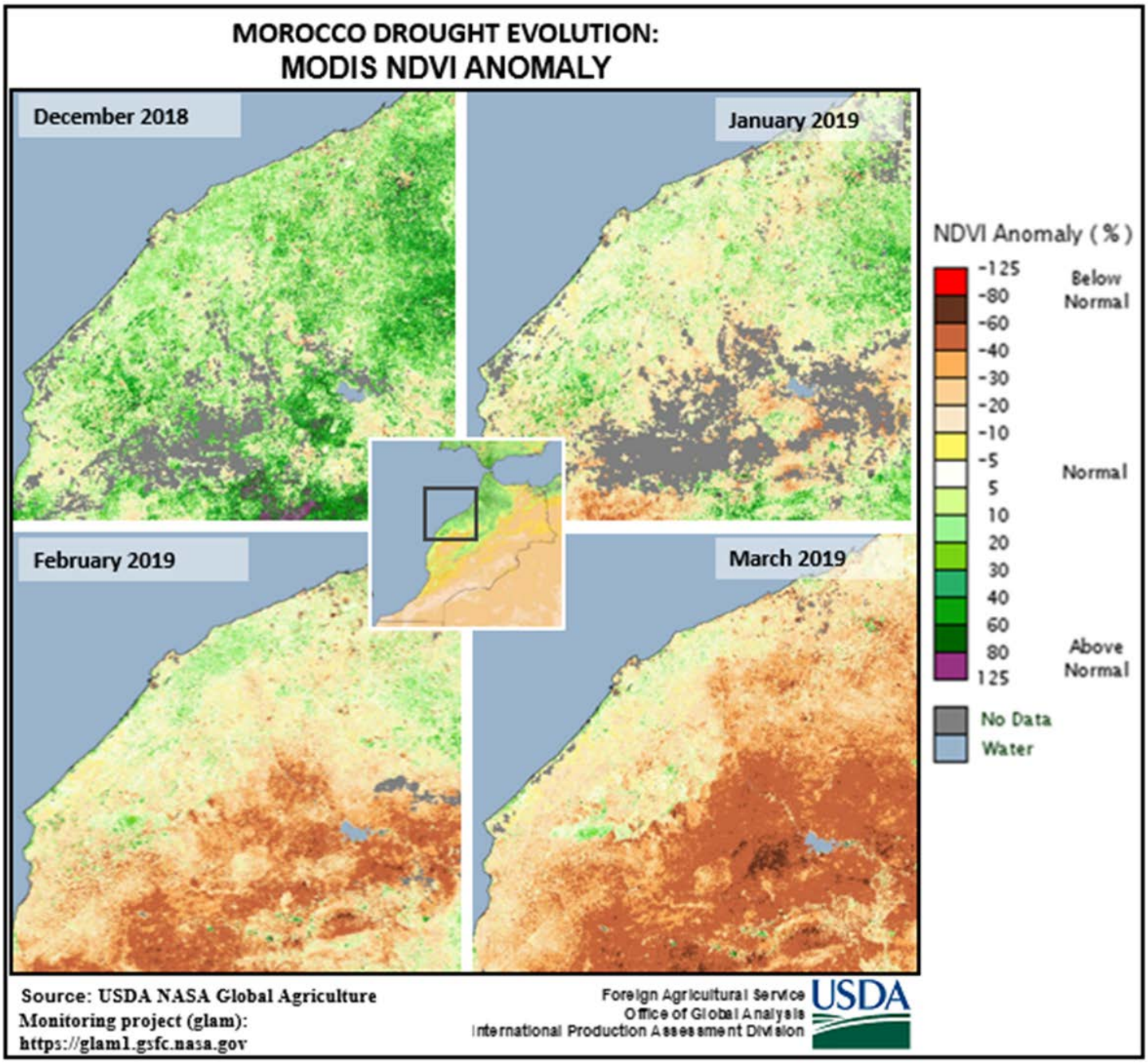

MOROCCO DROUGHT EVOLUTION:
MODIS NDVI ANOMALY
December 2018
January 2019
February 2019
March 2019
NDVI Anomaly (%)
-125
-80
-60
-40
-30
-20
-10
-5
5
10
20
30
40
60
80
125
Below Normal
Normal
Above Normal
No Data
Water
Source: USDA NASA Global Agriculture Monitoring project (glam): https://glam1.gsfc.nasa.gov
Foreign Agricultural Service
Office of Global Analysis
International Production Assessment Division
USDA

Figure 9

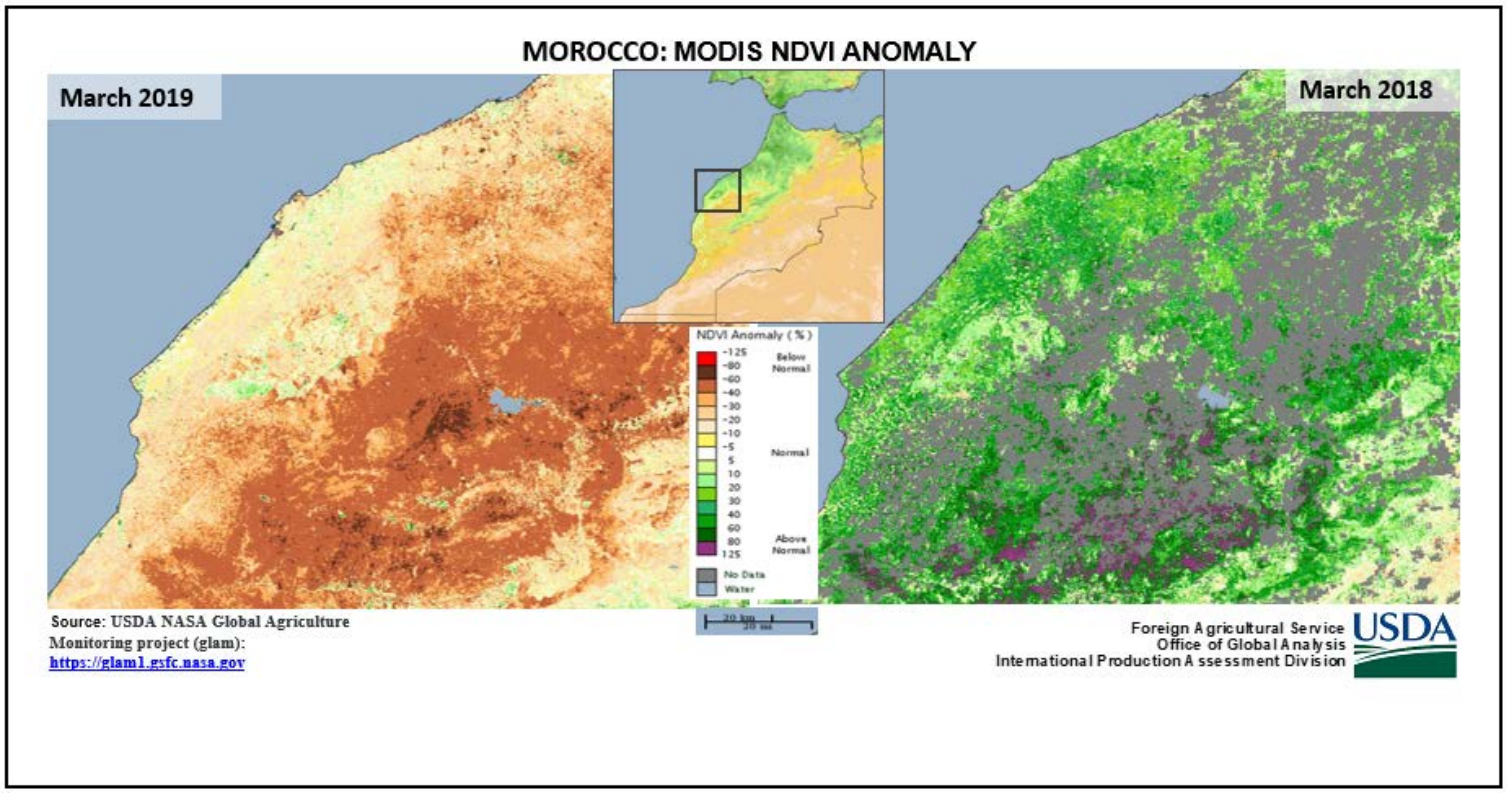

MOROCCO: MODIS NDVI ANOMALY
March 2019
March 2018
NDVI Anomaly (%)
-125
-80
-60
-40
-30
-20
-10
-5
5
10
20
30
40
60
80
125
Below Normal
Normal
Above Normal
No Data
Water
Source: USDA NASA Global Agriculture Monitoring project (glam):
https://glam1.gsfc.nasa.gov
Foreign Agricultural Service
Office of Global Analysis
International Production Assessment Division
USDA

Figure 10

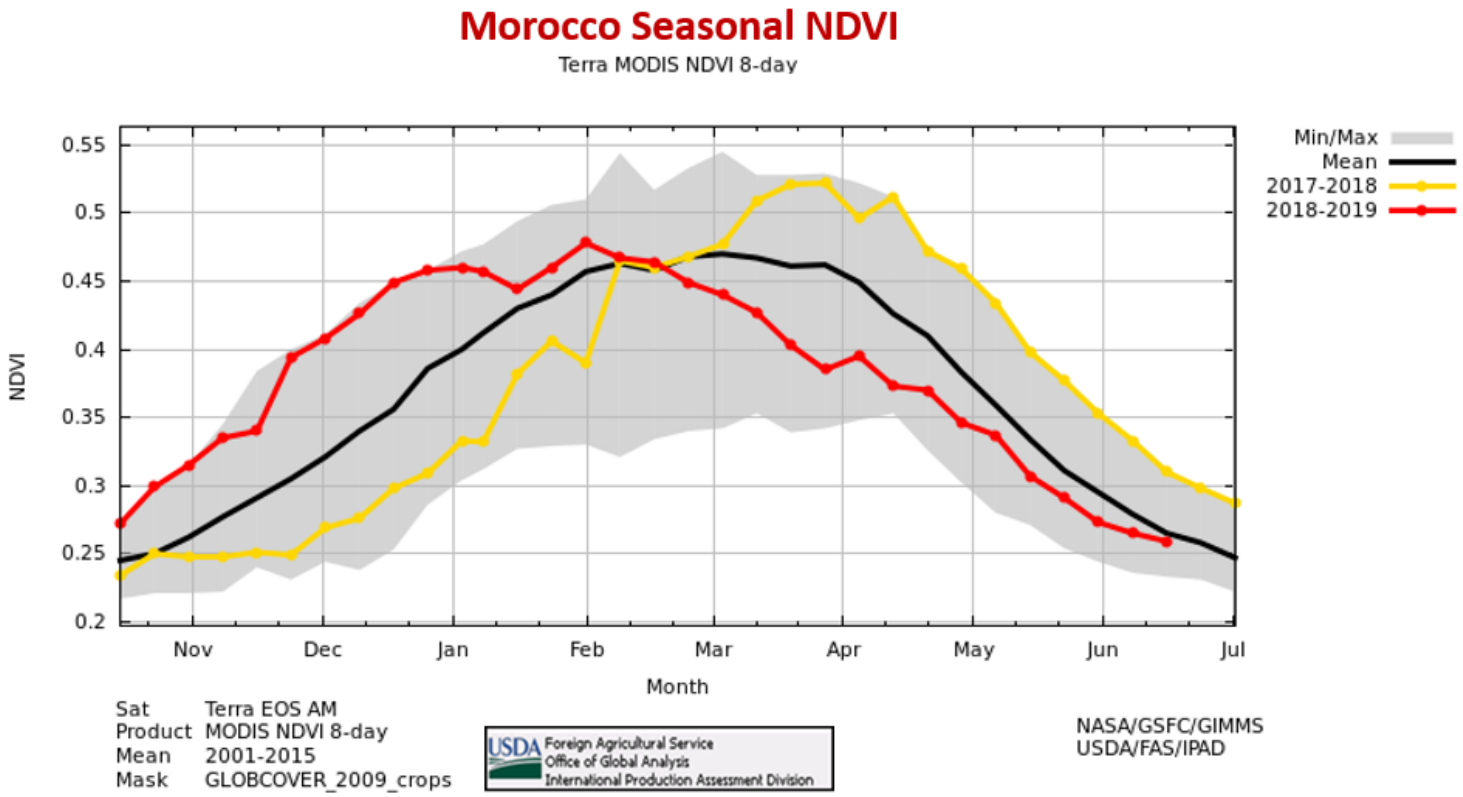
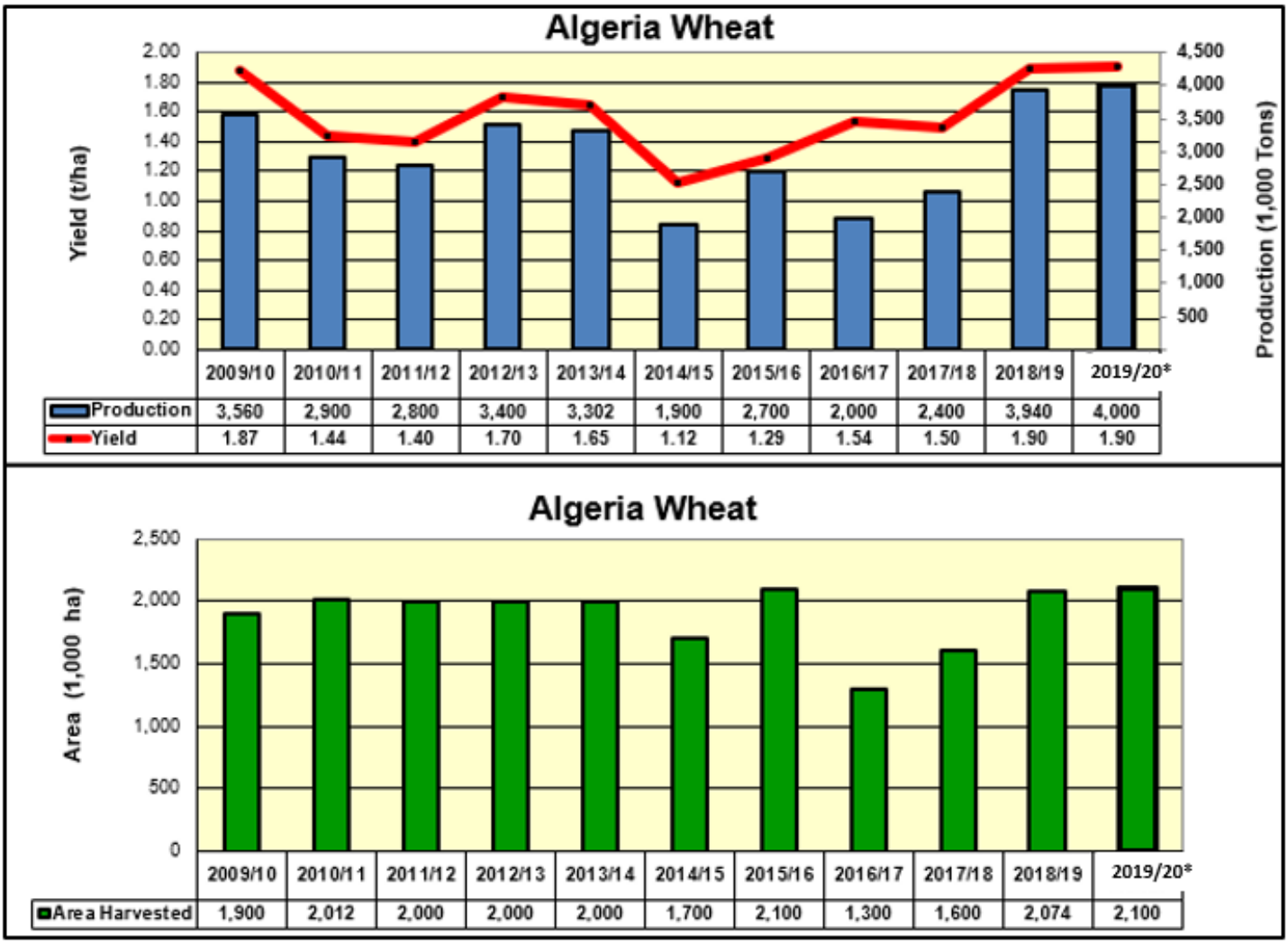

Morocco Seasonal NDVI
Terra MODIS NDVI 8-day
NDVI
0.55
0.5
0.45
0.4
0.35
0.3
0.25
0.2
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Month
Min/Max
Mean
2017-2018
2018-2019
Sat Terra EOS AM
Product MODIS NDVI 8-day
Mean 2001-2015
Mask GLOBCOVER_2009_crops
USDA Foreign Agricultural Service
Office of Global Analysis
International Production Assessment Division
NASA/GSFC/GIMMS
USDA/FAS/IPAD

Figure 11



USDA Foreign Agricultural Service
Office of Global Analysis
International Production Assessment Division

* Preliminary Estimate
Source: USDA PSD Online

Figure 12

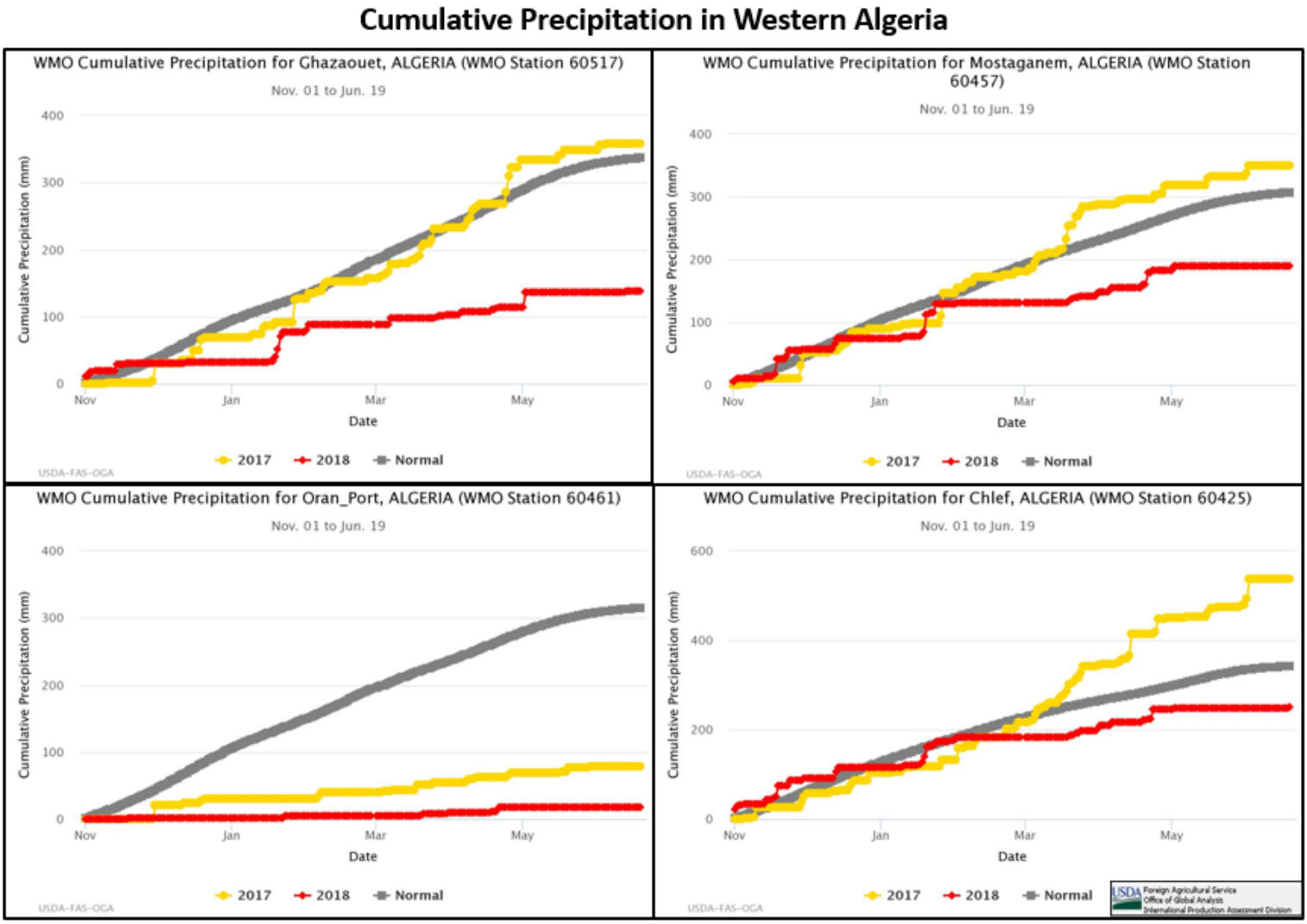
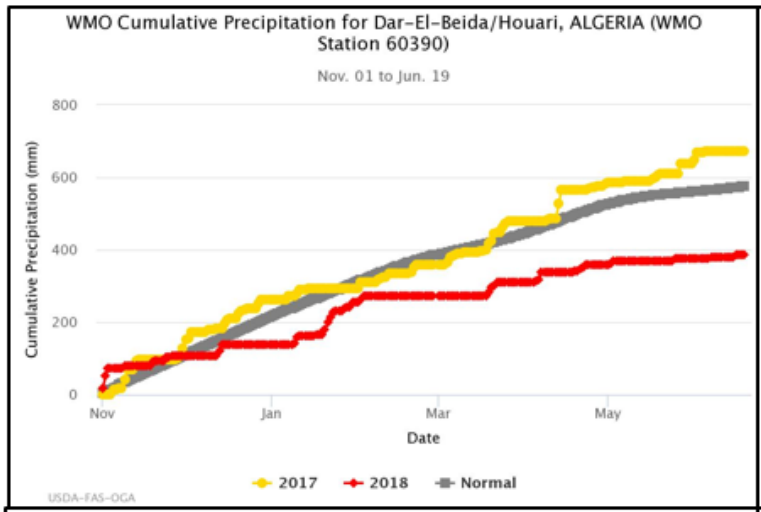
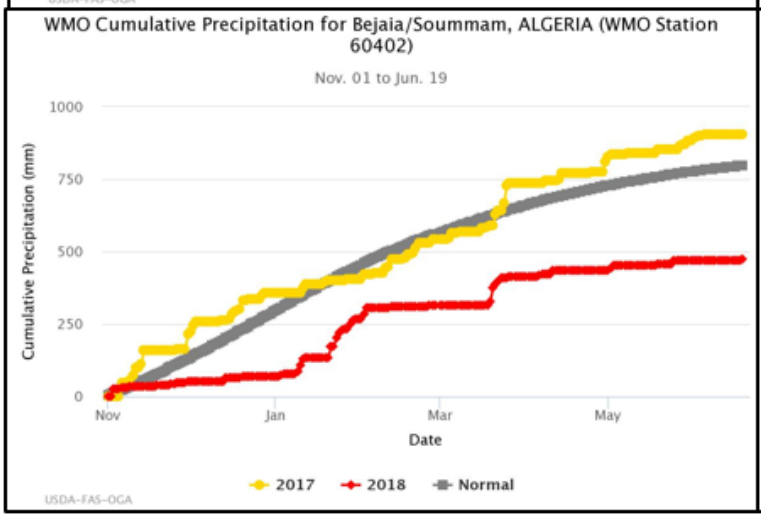

Cumulative Precipitation in Western Algeria
WMO Cumulative Precipitation for Ghazaouet, ALGERIA (WMO Station 60517)
Nov. 01 to Jun. 19
WMO Cumulative Precipitation for Mostaganem, ALGERIA (WMO Station 60457)
Nov. 01 to Jun. 19
WMO Cumulative Precipitation for Oran_Port, ALGERIA (WMO Station 60461)
Nov. 01 to Jun. 19
WMO Cumulative Precipitation for Chlef, ALGERIA (WMO Station 60425)
Nov. 01 to Jun. 19
Cumulative Precipitation (mm)
Date
Nov
Jan
Mar
May
2017
2018
Normal
USDA-FAS-OGA
Foreign Agricultural Service
Office of Global Analysis
International Production Assessment Division

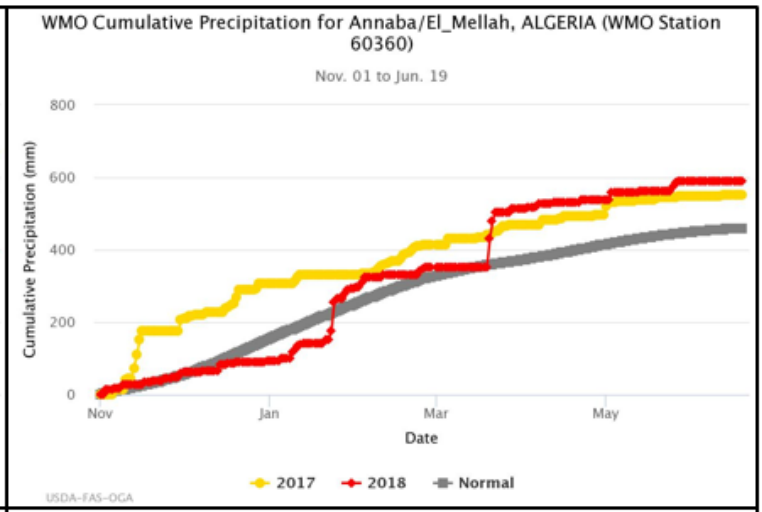
Figure 13

Cumulative Precipitation in Central Algeria





Cumulative Precipitation in Eastern Algeria



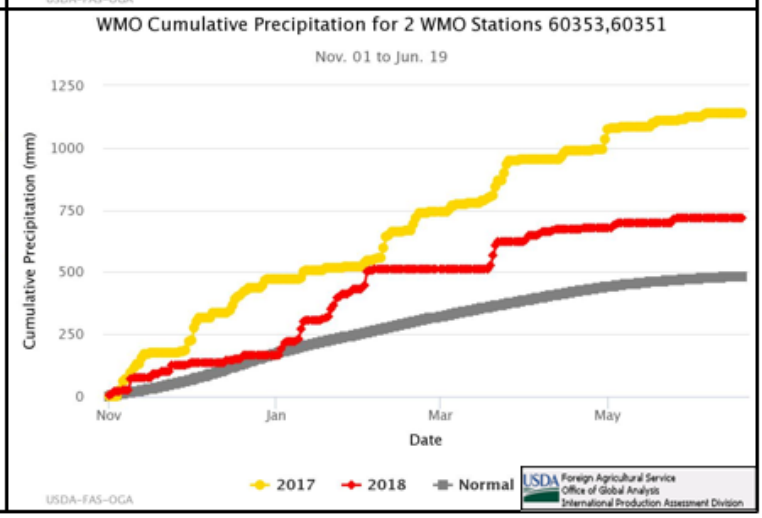
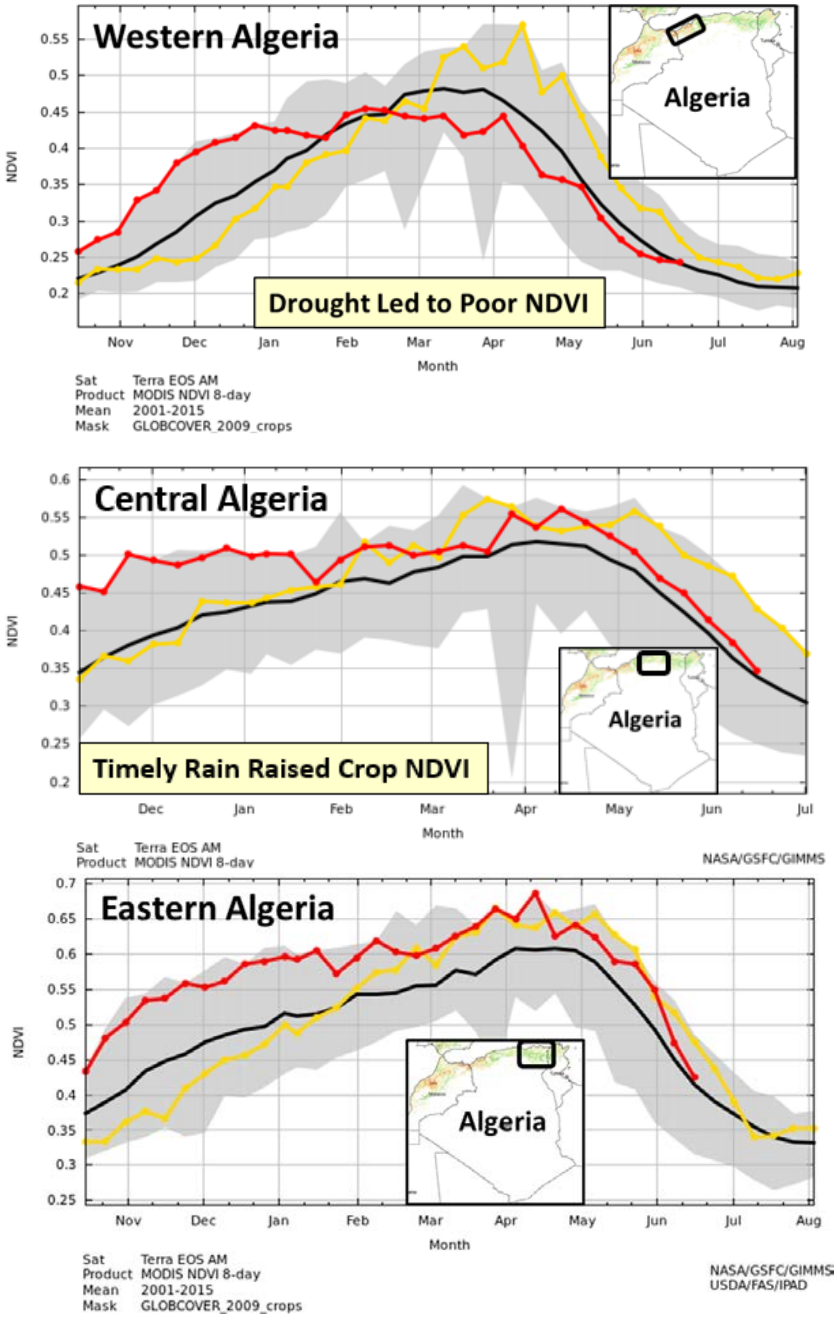


Figure 14

MODIS NDVI Conditions in Algeria Vary by Location:



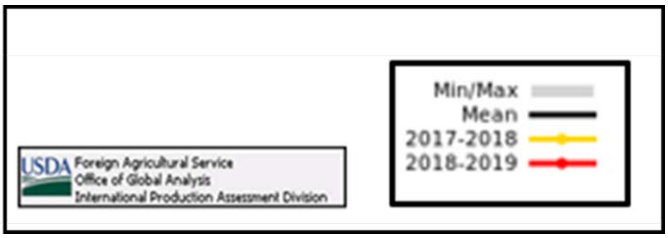

Min/Max
Mean
2017-2018
2018-2019
USDA Foreign Agricultural Service
Office of Global Analysis
International Production Assessment Division

Figure 15

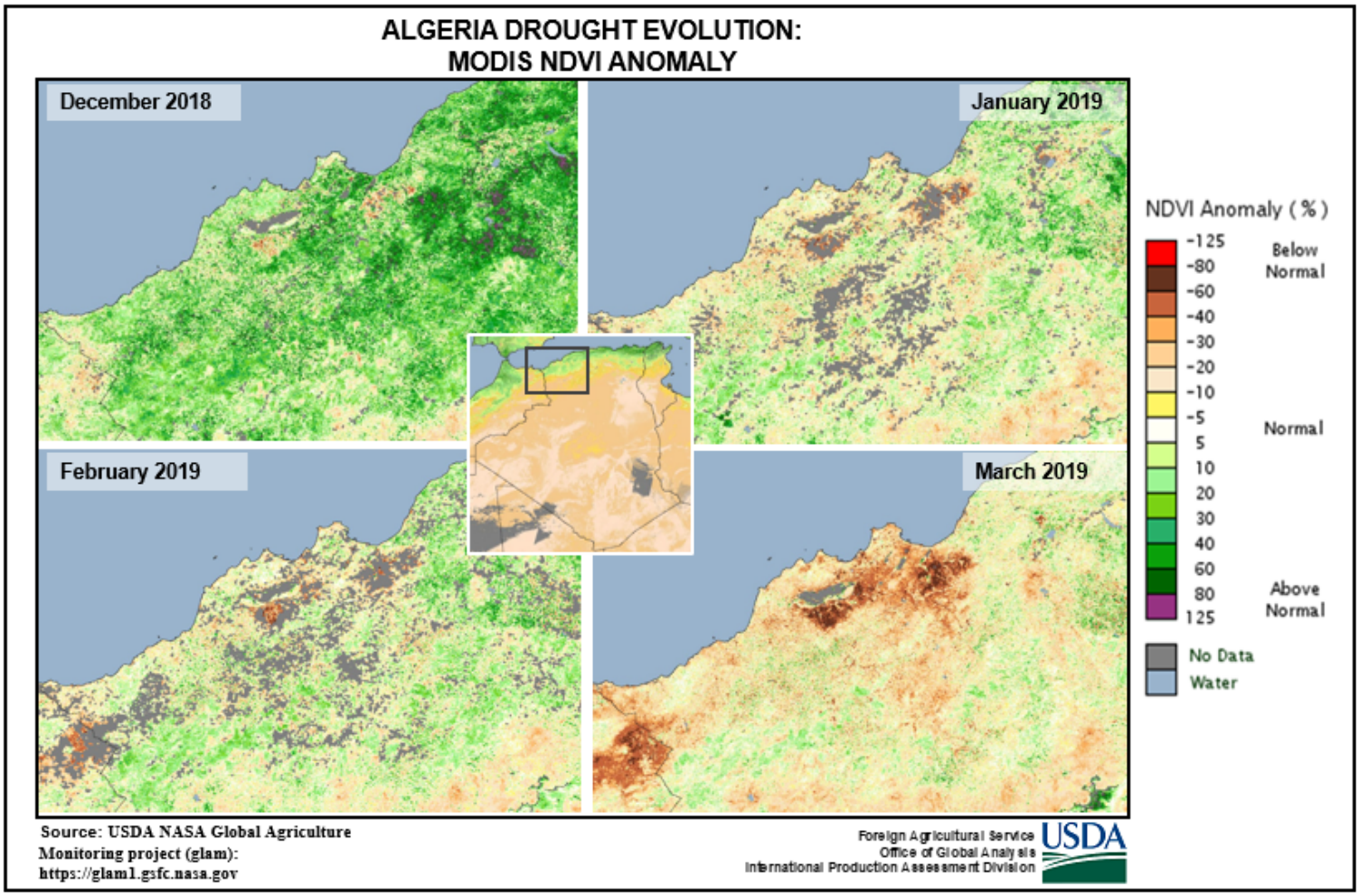

ALGERIA DROUGHT EVOLUTION:
MODIS NDVI ANOMALY
December 2018
January 2019
February 2019
March 2019
NDVI Anomaly (%)
-125
-80
-60
-40
-30
-20
-10
-5
5
10
20
30
40
60
80
125
Below Normal
Normal
Above Normal
No Data
Water
Source: USDA NASA Global Agriculture Monitoring project (glam): https://glam1.gsfc.nasa.gov
Foreign Agricultural Service
Office of Global Analysis
International Production Assessment Division
USDA

Figure 16

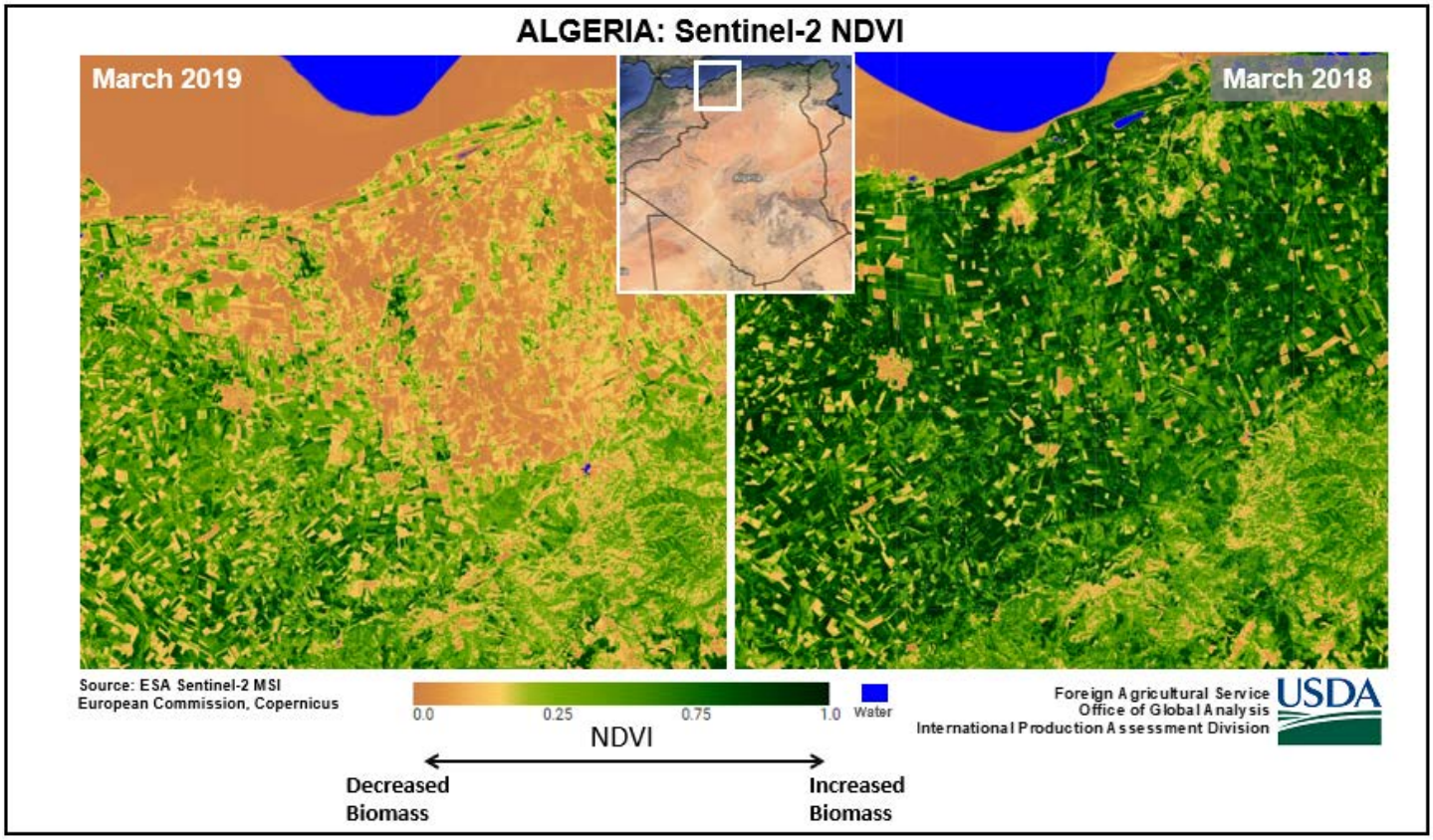

ALGERIA: Sentinel-2 NDVI
March 2019
March 2018
Source: ESA Sentinel-2 MSI
European Commission, Copernicus
0.0
0.25
0.75
1.0
Water
NDVI
Decreased Biomass
Increased Biomass
Foreign Agricultural Service
Office of Global Analysis
International Production Assessment Division
USDA

Figure 17

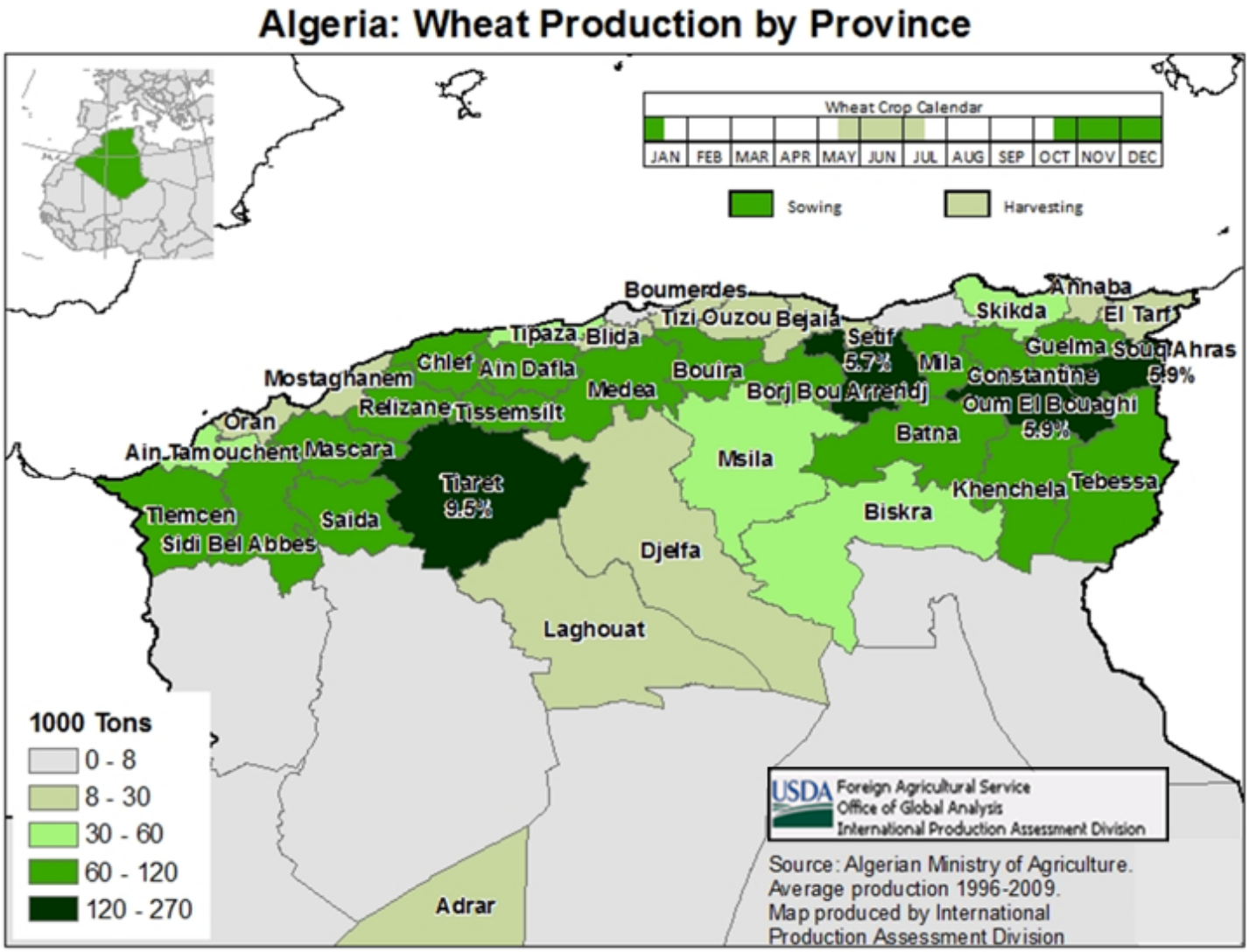

Algeria: Wheat Production by Province
Wheat Crop Calendar
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
Sowing
Harvesting
Boumerdes
Tizi Ouzou
Bejaia
Annaba
Skikda
El Tarf
Tipaza
Blida
Setif
5.7%
Guelma
Souk Ahras
5.9%
Chlef
Ain Dafla
Mila
Mostaghanem
Bouira
Constantine
Medea
Borj Bou Arreridj
Relizane
Tissemsilt
Oum El Bouaghi
5.9%
Oran
Batna
Ain Tamouchent
Mascara
Msila
Tiaret
9.5%
Khenchela
Tebessa
Tlemcen
Saida
Biskra
Sidi Bel Abbes
Djelfa
Laghouat
1000 Tons
0 - 8
8 - 30
30 - 60
60 - 120
120 - 270
USDA Foreign Agricultural Service
Office of Global Analysis
International Production Assessment Division
Source: Algerian Ministry of Agriculture.
Average production 1996-2009.
Map produced by International
Production Assessment Division
Adrar

Figure 18

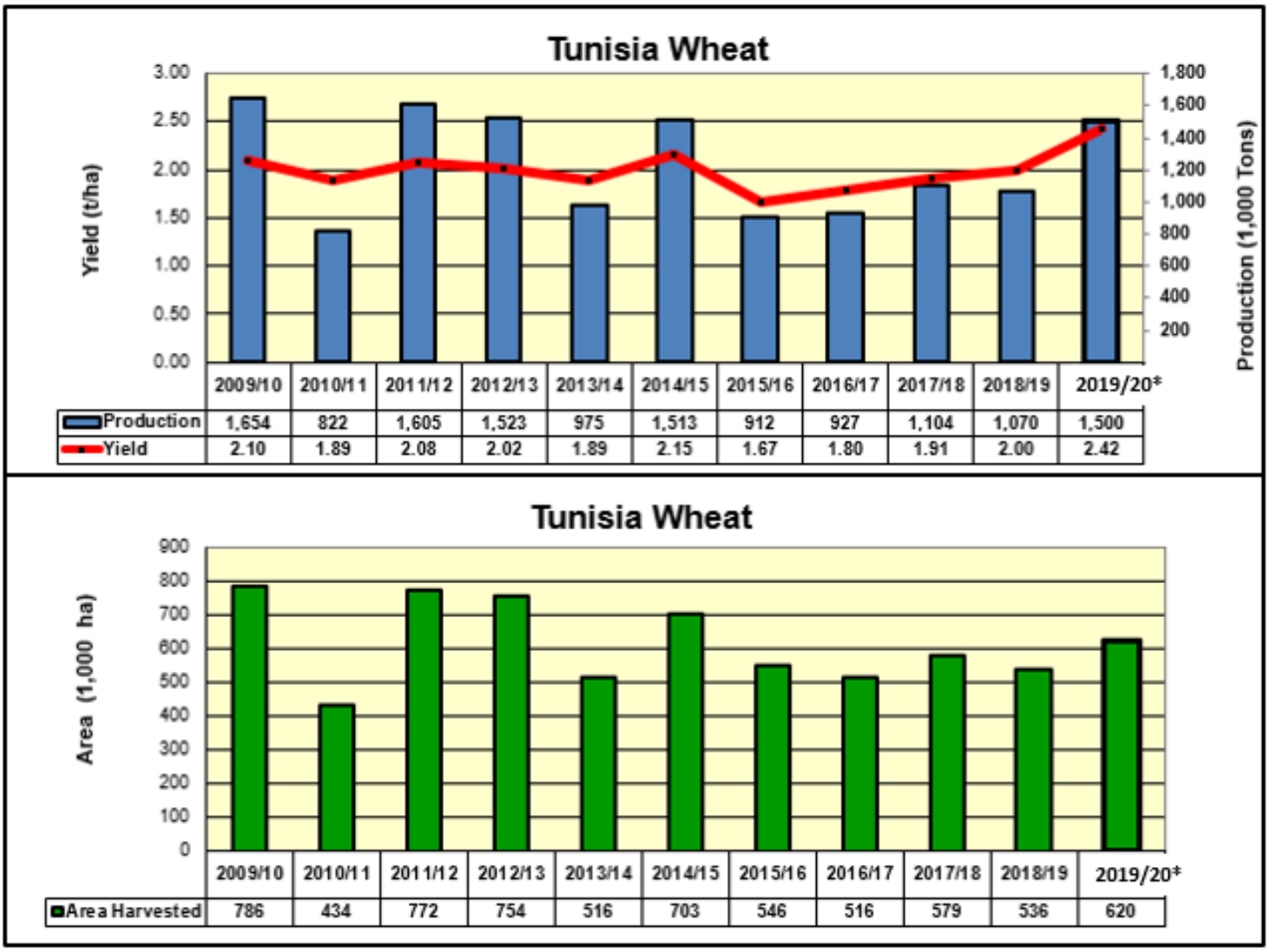

Tunisia Wheat
Yield (t/ha)
Production (1,000 Tons)
3.00
2.50
2.00
1.50
1.00
0.50
0.00
1,800
1,600
1,400
1,200
1,000
800
600
400
200
2009/10 2010/11 2011/12 2012/13 2013/14 2014/15 2015/16 2016/17 2017/18 2018/19 2019/20*
Production 1,654 822 1,605 1,523 975 1,513 912 927 1,104 1,070 1,500
Yield 2.10 1.89 2.08 2.02 1.89 2.15 1.67 1.80 1.91 2.00 2.42
Tunisia Wheat
Area (1,000 ha)
900
800
700
600
500
400
300
200
100
0
2009/10 2010/11 2011/12 2012/13 2013/14 2014/15 2015/16 2016/17 2017/18 2018/19 2019/20*
Area Harvested 786 434 772 754 516 703 546 516 579 536 620
USDA Foreign Agricultural Service
Office of Global Analysis
International Production Assessment Division
* Preliminary Estimate
Source: USDA PSD Online

Figure 19

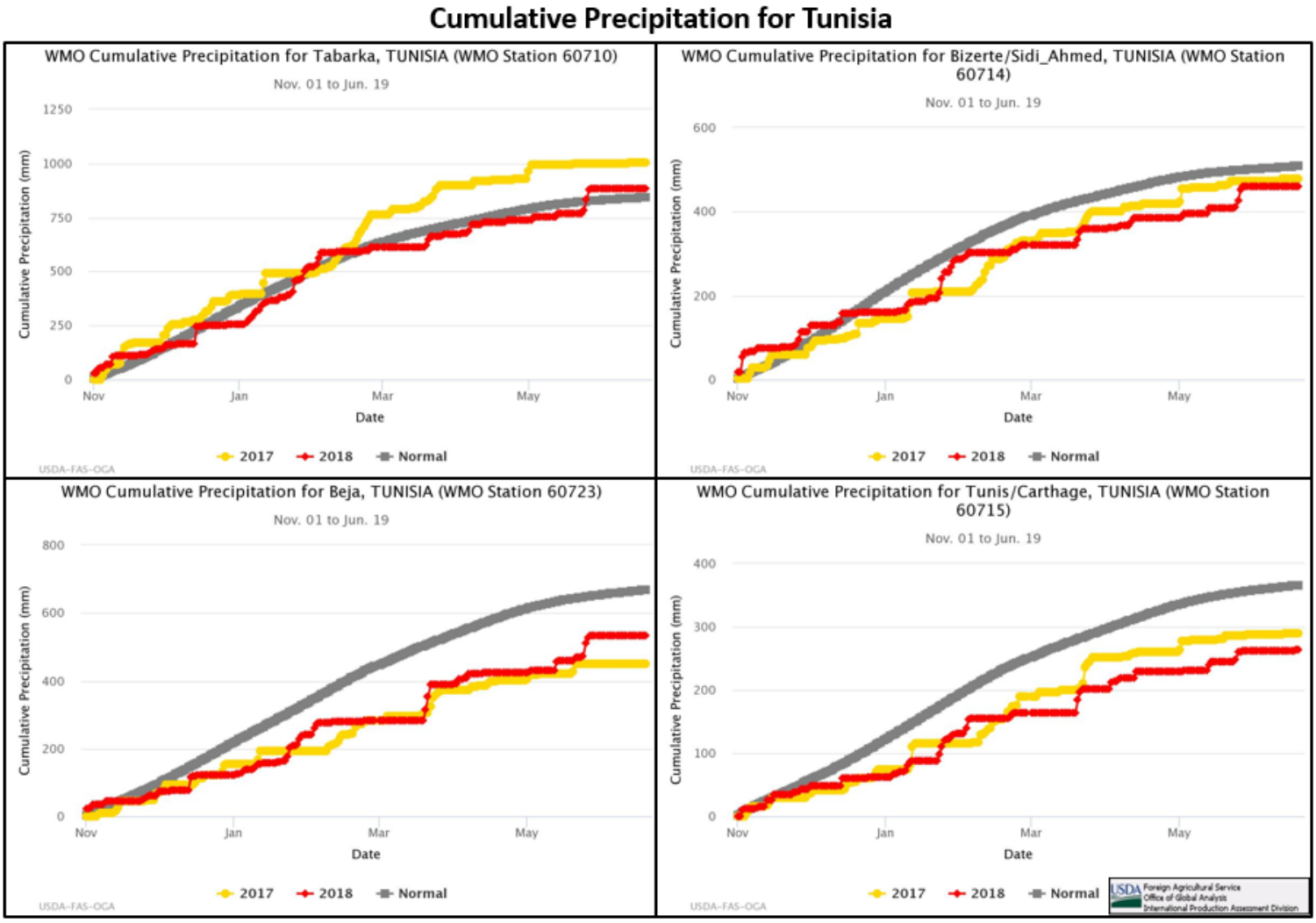

Cumulative Precipitation for Tunisia
WMO Cumulative Precipitation for Tabarka, TUNISIA (WMO Station 60710)
Nov. 01 to Jun. 19
Cumulative Precipitation (mm)
Date
Nov
Jan
Mar
May
2017
2018
Normal
USDA-FAS-OGA
WMO Cumulative Precipitation for Bizerte/Sidi_Ahmed, TUNISIA (WMO Station 60714)
Nov. 01 to Jun. 19
WMO Cumulative Precipitation for Beja, TUNISIA (WMO Station 60723)
Nov. 01 to Jun. 19
WMO Cumulative Precipitation for Tunis/Carthage, TUNISIA (WMO Station 60715)
Nov. 01 to Jun. 19
Foreign Agricultural Service
Office of Global Analysis
International Production Assessment Division

Figure 20

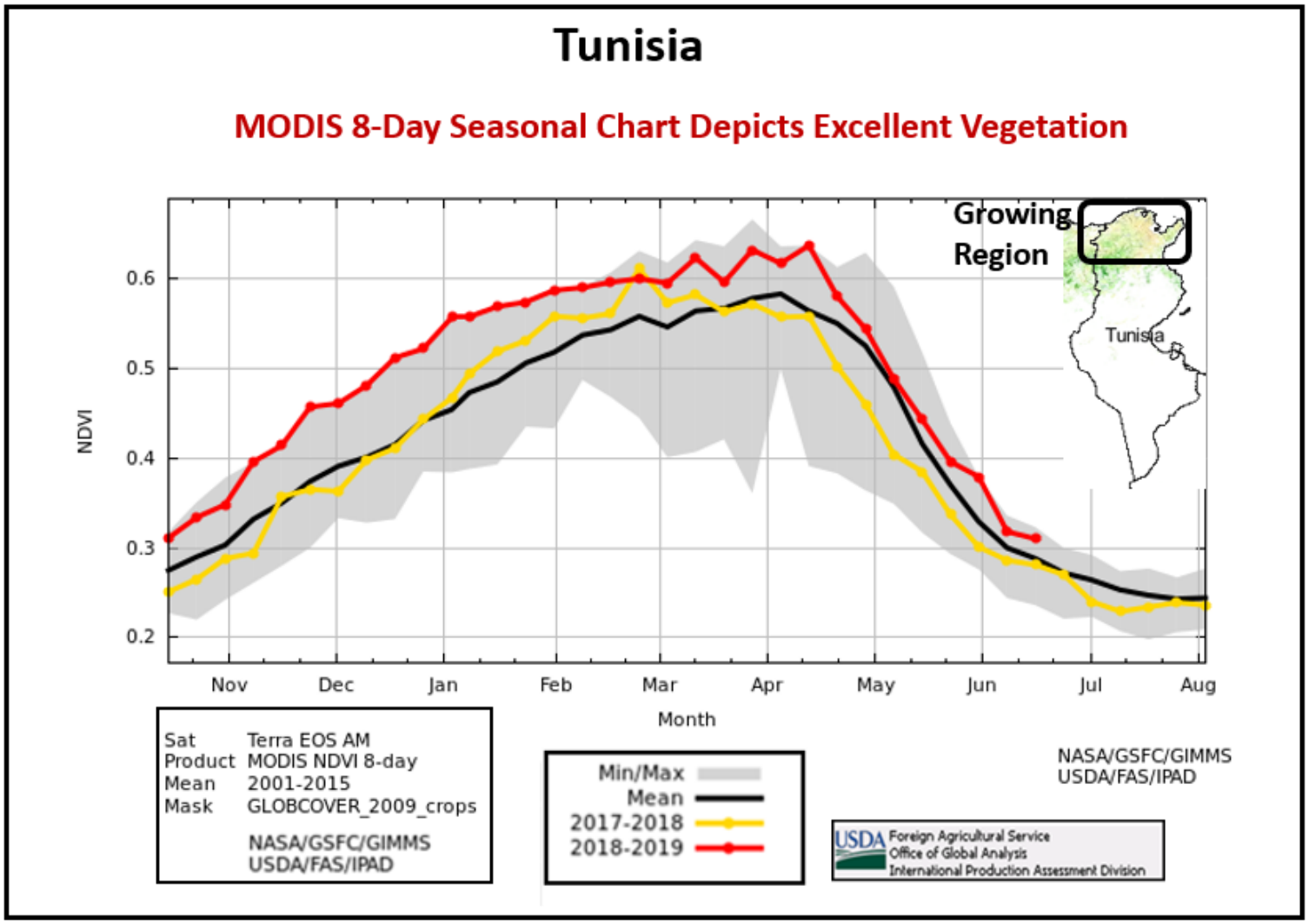
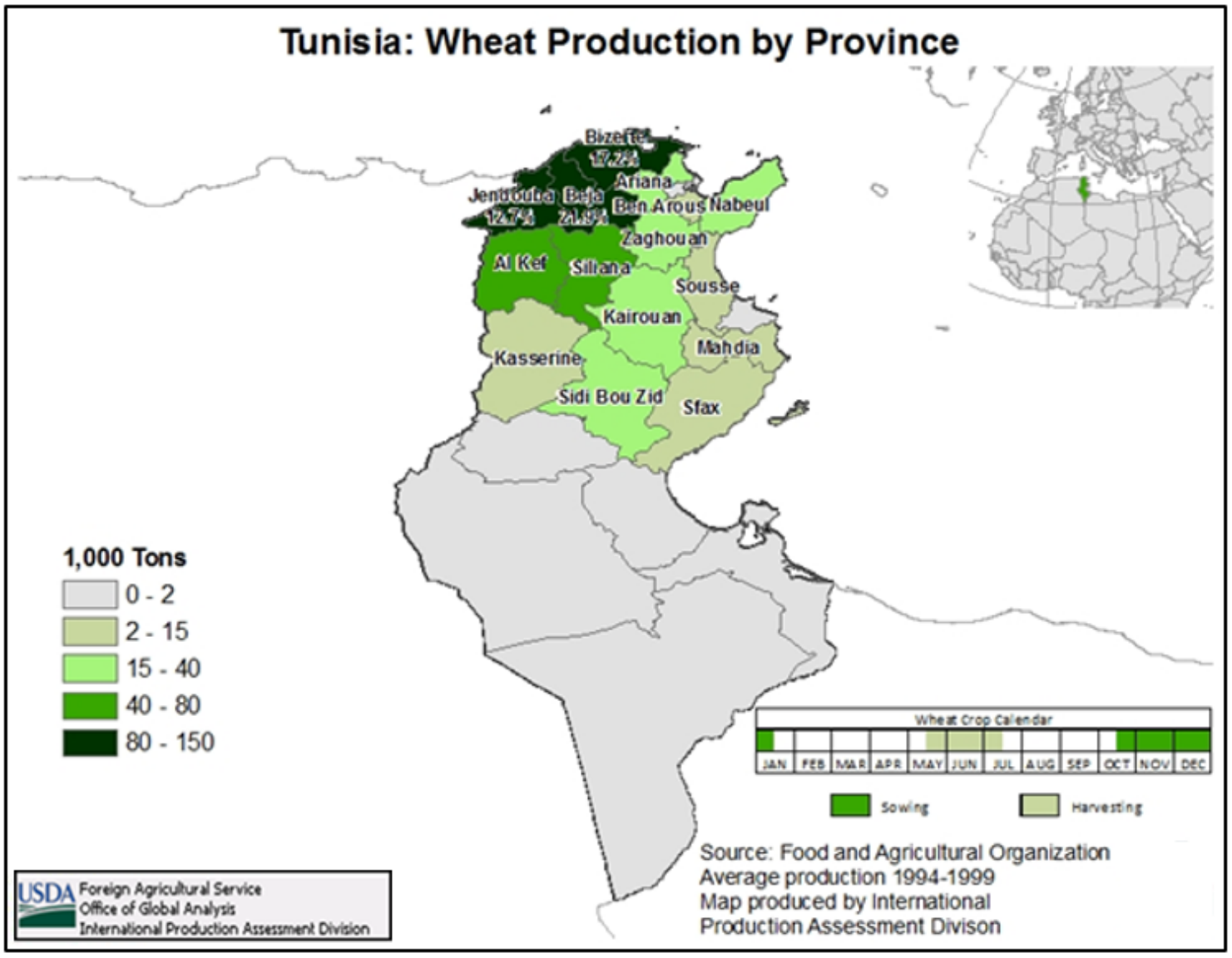

Tunisia
MODIS 8-Day Seasonal Chart Depicts Excellent Vegetation
Growing Region
Tunisia
NDVI
0.6
0.5
0.4
0.3
0.2
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Month
Sat Terra EOS AM
Product MODIS NDVI 8-day
Mean 2001-2015
Mask GLOBCOVER_2009_crops
NASA/GSFC/GIMMS
USDA/FAS/IPAD
Min/Max
Mean
2017-2018
2018-2019
NASA/GSFC/GIMMS
USDA/FAS/IPAD
USDA Foreign Agricultural Service
Office of Global Analysis
International Production Assessment Division

Figure 21


Tunisia: Wheat Production by Province
Bizerte
17.2%
Ariana
Jendouba
12.7%
Beja
21.8%
Ben Arous
Nabeul
Zaghouan
Al Kef
Siliana
Sousse
Kairouan
Mahdia
Kasserine
Sidi Bou Zid
Sfax
1,000 Tons
0 - 2
2 - 15
15 - 40
40 - 80
80 - 150
Wheat Crop Calendar
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
Sowing
Harvesting
USDA Foreign Agricultural Service
Office of Global Analysis
International Production Assessment Division
Source: Food and Agricultural Organization
Average production 1994-1999
Map produced by International
Production Assessment Divison