

# JRC MARS Bulletin - Global outlook

## Crop monitoring European neighbourhood

### Morocco, Algeria, Tunisia, Libya and Egypt

May 2023

## Long lasting drought led to crop failures in the Maghreb

*The Maghreb is facing the worst seasonal drought in recent decades. In comparison with the previous outlook, this resulted in a downward revision of our yield forecasts, to well-below average levels. Drought became particularly intense in March, negatively affecting photosynthesis of winter cereals since flowering, and accelerating ripening in April at the expense of primary production. Crop failures are most likely to occur in several regions, including Oriental (MA), Mascara, Saida, Oum El Bouaghi, Khenchela and Tebessa (DZ) Le Kef, Siliana and Zaghouan (TN). Average to above-average production is expected in Libya and Egypt, where weather conditions have been more favourable and most of the crops are irrigated.*

**Morocco (MA):** negative outlook for cereal production. Barley and wheat performed badly in most of the main regions. Cereals are in advanced ripening stage.

**Algeria (DZ):** well below-average crop growth in most of the main cereal-producing regions. Drought was most pronounced during flowering and grain filling. Cereals are in advanced ripening stage.

**Tunisia (TN):** a compromised season is confirmed. High probabilities of crop failure are faced in the northern inland regions.

**Libya (LY):** average to positive growing conditions due to moderate fluctuations of daily temperatures despite below-average rainfall. Cereals are ready for harvesting.

**Egypt (EG):** average to above-average expectations for cereal production. Crops are faring well thanks to the predominately irrigated arable land. Harvesting is about to begin.

North-Africa yield forecasts - May 2023 Bulletin

Country	Crop	Yield (t/ha)				
		Avg 5yrs	2022	MARS 2023 forecasts	%23/5yrs	%23/22
DZ	wheat	1.70	N/A	<b>1.28</b>	-24	N/A
	barley	1.22	N/A	<b>1.06</b>	-14	N/A
EG	wheat	6.53	N/A	<b>6.73</b>	+3	N/A
	barley	3.79	N/A	<b>3.91</b>	+3	N/A
LY	wheat	0.77	N/A	<b>0.76</b>	-1	N/A
	barley	0.51	N/A	<b>0.53</b>	+4	N/A
MA	wheat	1.79	1.11	<b>1.48</b>	-17	+34
	barley	1.21	0.62	<b>0.99</b>	-18	+60
TN	wheat	2.00	2.42	<b>1.62</b>	-19	-33
	barley	1.05	1.72	<b>0.74</b>	-30	-57

NB: Yields are forecast for crops with more than 10000 ha/country.

Sources: 2018-2022 data come from FAO, INRA Maroc, ONICL Maroc, Ministère de l'agriculture des ressources hydrauliques et de la pêche Tunisie, MED-Amin baseline DB, DSASI-MADR Algeria and the Egyptian Arab Republic - Ministry of Agriculture and Land Reclamation.

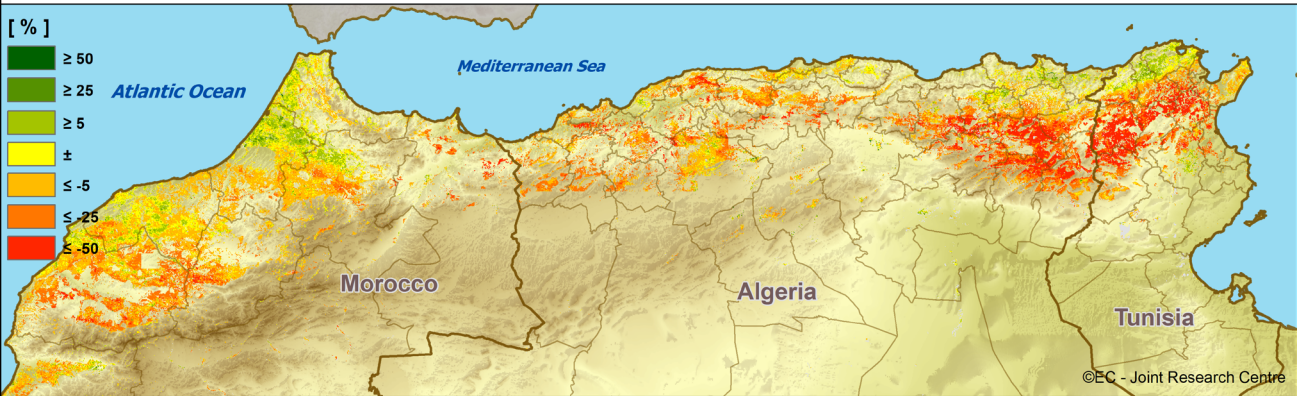
The column header '%23/5yrs' stands for the 2023 change with respect to the 5-year average (%). Similarly, '%23/22' stands for the 2023 change with respect to 2022 (%).

N/A = Data not available.

# Country highlights

## Cumulated fAPAR relative anomalies for Morocco, Algeria and Tunisia

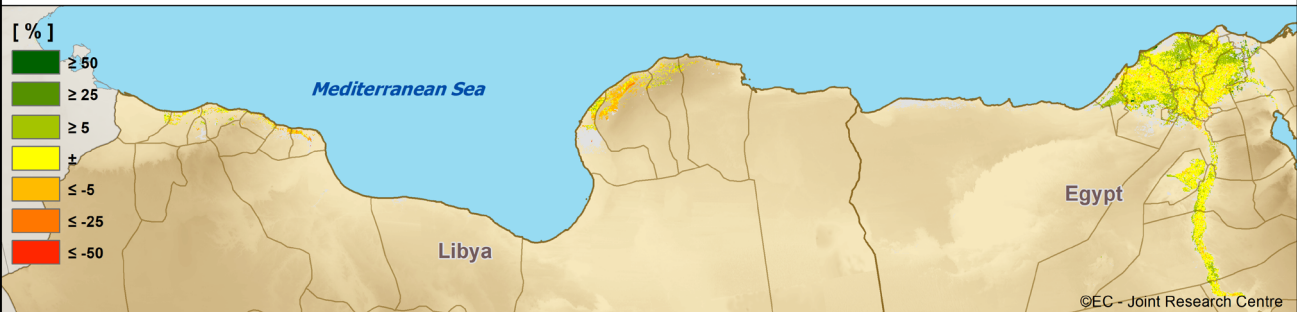
Considered period:  
11 February 2023 – 10 May 2023 / Medium Term Average (MTA / 2013 – 2022)



Data source: MARS remote sensing database / NDVI - METOP-AVHRR product  
Mask: arable land based on Globeland30, GeoNetwork (Pérez-Hoyos, et al. 2017)

## Cumulated fAPAR relative anomalies for Libya and Egypt

Considered period:  
11 February 2023 – 10 May 2023 / Medium Term Average (MTA / 2013 – 2022)



Data source: MARS remote sensing database / NDVI - METOP-AVHRR product  
Mask: arable land based on Globeland30, GeoNetwork (Pérez-Hoyos, et al. 2017)

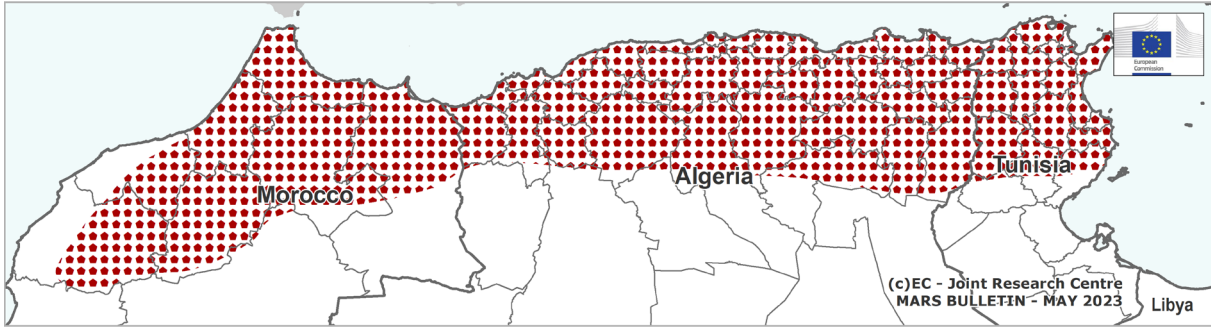
The maps display – for arable land – the relative differences between the Fraction of Absorbed Photosynthetically Active Radiation (fAPAR) computed from remote sensing imagery between 11 February 2023 to 10 May 2023, and the medium-term average (MTA, 2013–2022) for the same period. Positive anomalies (in green) reflect above-average canopy density while negative anomalies (in red) reflect below-average canopy density.

Seasonal drought conditions in almost the entire Maghreb region became particularly intense in March, negatively affecting photosynthesis of winter crops since flowering, and accelerating ripening in April, at the expense of primary production as reflected in the fAPAR maps below. Negative biomass accumulation anomalies in the agricultural districts of south-western, central and north-eastern **Morocco** have resulted from an overall adverse growing season, characterised by scarce rainfall since early autumn. The impacts of persisting drought conditions on winter cereals in **Algeria**, are reflected in the map by a large belt of negative fAPAR anomalies along the inland regions of the country, across many important western (e.g. *Tlemcen, Sidi Bel Abbas* and

*Tiaret*), central (e.g. *Medea* and *Bouira*) and particularly eastern (e.g. *Oum El Bouaghi, Khenchela* and *Tebessa*) agricultural regions. A marked negative anomaly is also shown for the agricultural regions of central **Tunisia** (e.g. *Le Kef* and *Siliana*), where dry conditions and exceptionally high temperatures hampered crop growth during the vegetative and flowering stages. Mixed positive and negative fAPAR anomalies along the coast of eastern **Libya** (*Cyrenaica*), are a result of relative dry weather compensated to a large extent by a higher presence of irrigation systems. In **Egypt**, crops experience an average to positive season, the latter particularly in the outer areas of the Nile delta and along the western Nile bank.

### AREAS OF CONCERN - EXTREME WEATHER EVENTS

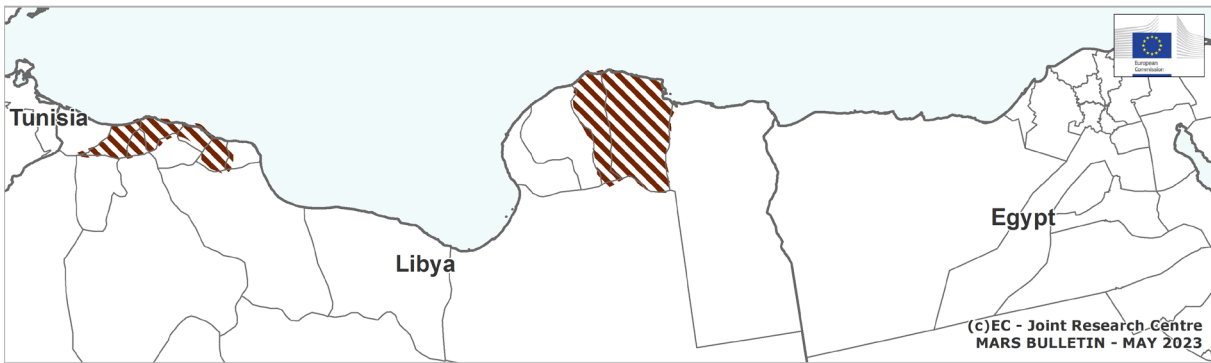
Based on observed data from 11 February 2023 until 10 May 2023




 Drought

### AREAS OF CONCERN - EXTREME WEATHER EVENTS

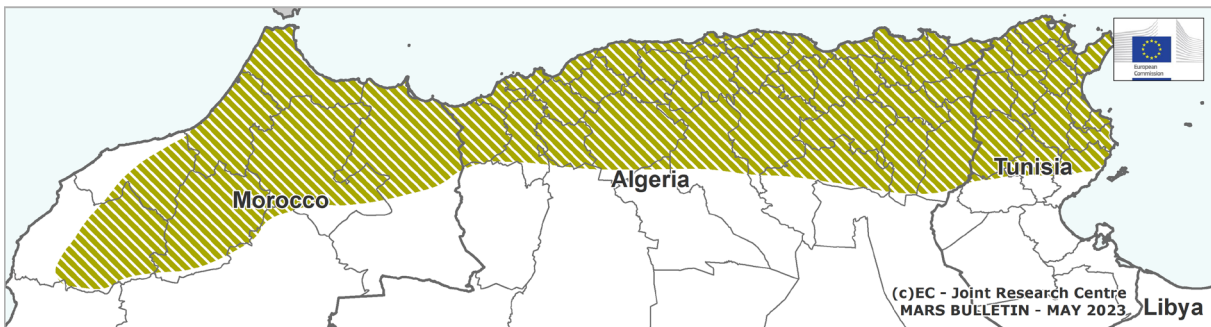
Based on observed data from 11 February 2023 until 10 May 2023




 Dry conditions

### AREAS OF CONCERN - CROP IMPACT

Based on observed data from 11 February 2023 until 10 May 2023



 Storage organs impacted

# Morocco (MA)

## The negative yield outlook for winter cereals is confirmed

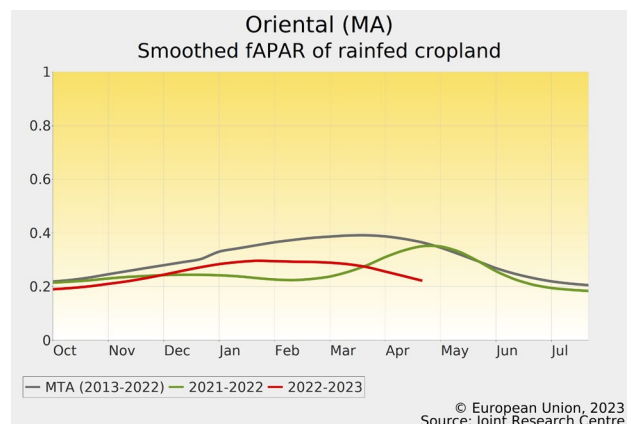
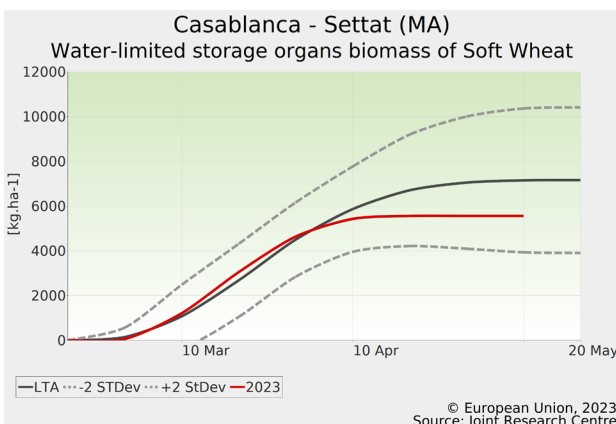
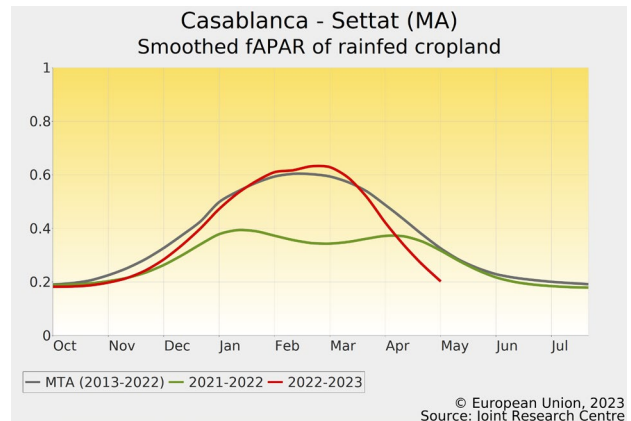
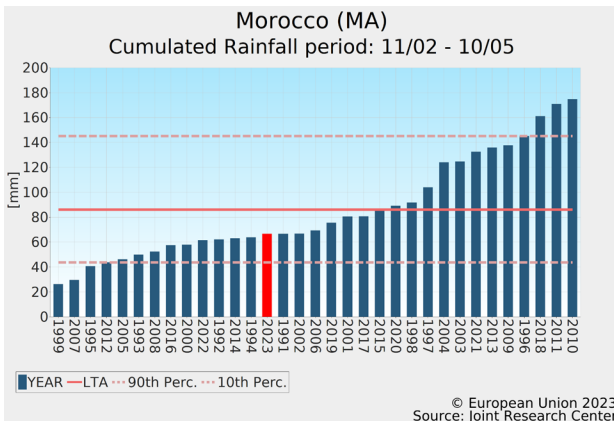
*The yield outlook for both wheat and barley remains negative. The combined effect of seasonal drought and high temperatures hampered crops during vegetative and reproductive stages and accelerated crop senescence.*

The review period (11 February - 10 May) presented scarce and unevenly distributed rain events until the beginning of March and almost no rain at all in the March-May period, thus worsening an already very poor agricultural campaign. Total rainfall over the review period ranged from 30% in Casablanca and Béni-Mellal to 70-80% in Rabat, Fez, Tangier and the Oriental region below the LTA.

Temperatures remained consistently warmer than usual, with average daily temperature typically 2-3°C above the LTA. A heatwave occurred from 25 to 30 April, with maximum daily temperatures reaching > 35°C in the central and northern regions.

Remote sensing analyses depicted a steep decrease of vegetation indicator values during crop senescence. This is usually coupled with damage to crops due to hot and dry conditions in the flowering period. Below-average crop biomass accumulation is observed in all of the main cereal-growing regions of the country. Conditions for crops are most critical in the Oriental region, where a crop failure is most likely to occur this season.

Winter cereals in Morocco are now in advanced ripening stages and the harvest is about to begin. The overall yield and production prospects are poor, but not as bad as the previous season, which was one of the worst of the past 15 years. Our forecasts are in line with the values presented in the February outlook and are well below the 5-year average for both wheat and barley.



# Algeria (DZ)

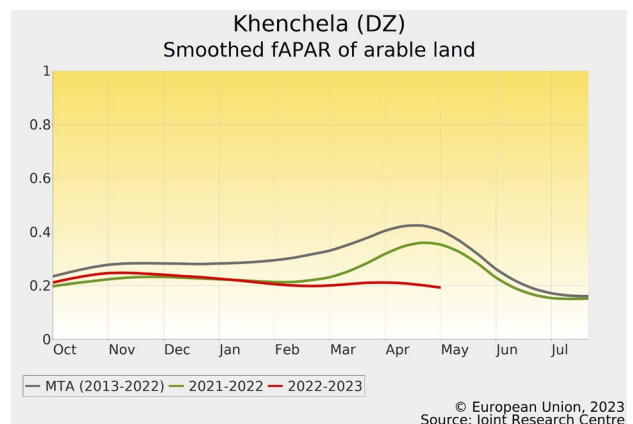
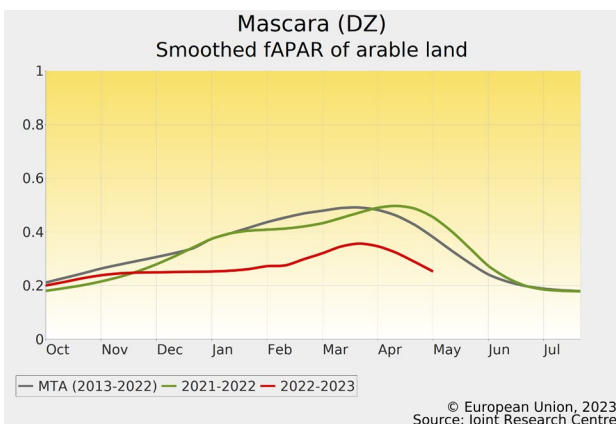
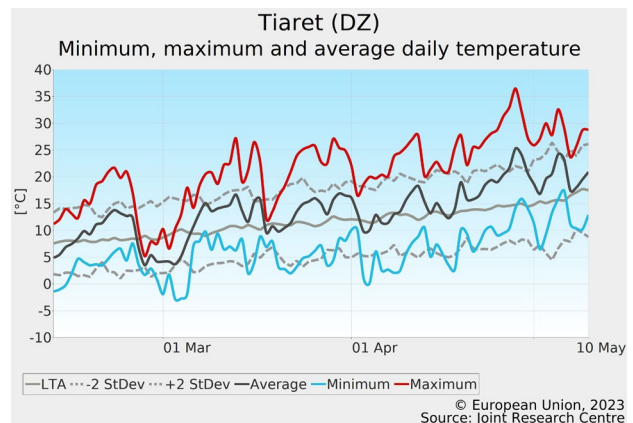
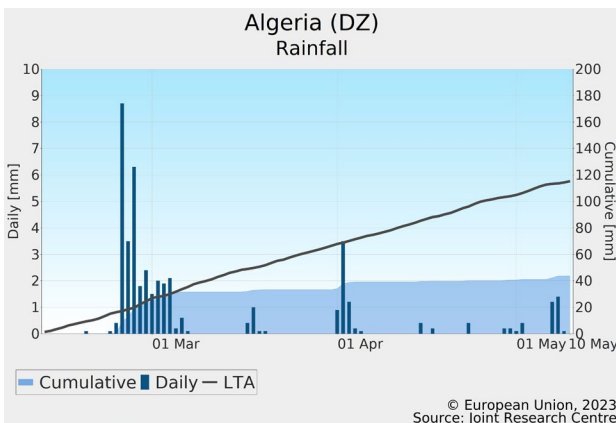
## The yield outlook for cereals has worsened

The yield outlook remains negative for both wheat and barley. The combined effect of a long-lasting drought and hot temperatures in most of the country's cereal producing areas, hampered crops during flowering and grain-filling, thus deteriorating an already unfavourable season.

The period under review was characterised by severe drought conditions affecting the country in a large belt from the northwest to the northeast, where almost all cereal production takes place. There has been no rain since the beginning of March, and in most regions, rainfall cumulates during the review period set the lowest records in our archive (since 1979). For example, the rain deficit was 62% in *Tiaret*, in the northwest of the country (36 mm against an LTA value of 87 mm); 87% in *Batna* (central Algeria - 8 mm against an LTA value of 76 mm); and 85% in *Oum El Bouaghi* in the north-east of the country (8 mm against an LTA value of 75 mm). Temperature sums (Tbase 0°C) remained 10%-20% above the LTA

throughout the country. Daily average temperatures were 2-4°C above the LTA in the northwest and nearly 2°C above the LTA in the rest of the country. Exceptionally high temperatures were recorded in the last ten days of April in the western parts of the country (e.g. *Tlemcen*, *Sidi Bel Abbès*, *Saida* and *Tiaret*), with maximum daily temperatures reaching up to 37°C.

The above-described weather conditions hampered the cereal crops during the second part of vegetative growth (which resulted stunted), during flowering (causing flower sterility), and during the grain filling and ripening phases (accelerating senescence). A significant possibility of complete crop failure is observed in the regions of *Mascara*, *Saida*, *Oum El Bouaghi*, *Khenchela* and *Tebessa*. Our yield forecasts for the country are revised further down and are far below the 5-year average for both wheat and barley.



# Tunisia (TN)

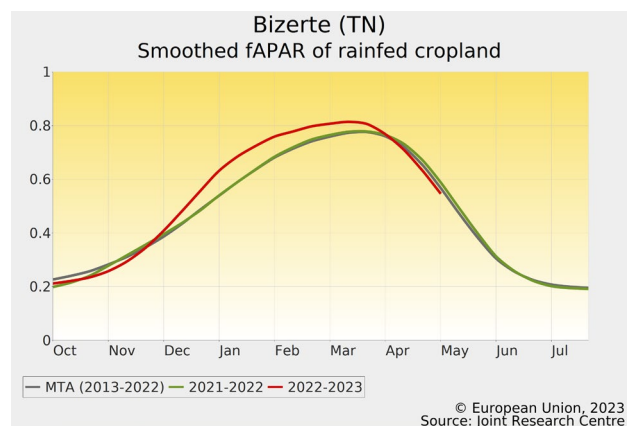
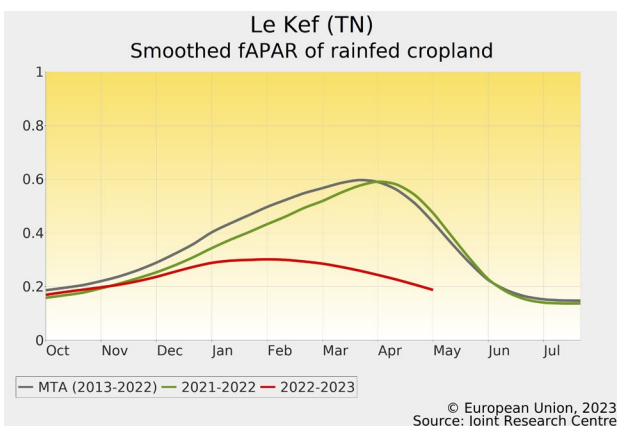
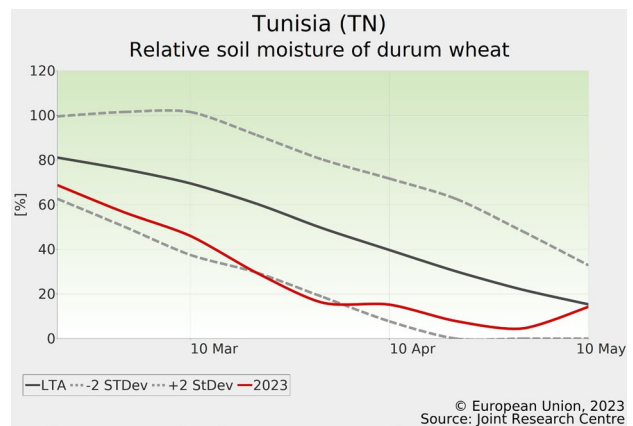
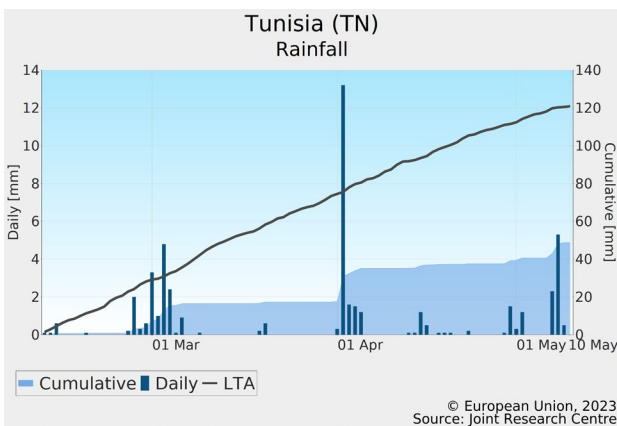
## Dire expectations for cereal production

Wheat and barley in Tunisia are negatively impacted by persistent drought conditions and a compromised season is confirmed. Our yield forecasts for the country are far below the 5-year average.

This winter crop campaign in Tunisia has been markedly affected by drought. Rainfall during the analysis period occurred in sporadic and low-intensity events, mostly in early March and the beginning of April. Cumulative precipitation during the review period was the lowest of the 1979-2022 historical series in almost all central and northern regions of the country, where most of the national cereal production takes place. The resulting rain deficit ranged from 65% to 80% below the LTA (e.g. Siliana 25 mm against an LTA of 106 mm, and El Kef 30 mm against an LTA of 110 mm). No significant rain events

have occurred in the last 40 days (since 2-April), thus providing the conditions for irreversible crop damage during flowering and grain filling: crops adapted their physiology to the drought by accelerating development at the expense of primary production. Analysis of earth observation data confirms a shortening in crop cycles, a faster-than-usual senescence phase and below to well-below biomass accumulation throughout the season.

A high probability of crop failure is faced in the regions of *El Kef*, *Siliana* and *Zaghuan*, whereas a below to well-below biomass accumulation is observed in all the other regions, the only exception being *Bizerte*, where crops benefitted from irrigation and are faring well. Our yield forecast for cereals in Tunisia is revised downward compared with February and set far below the last 5-year average.



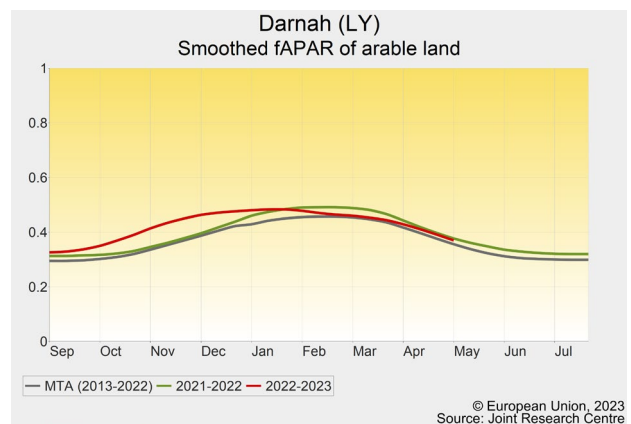
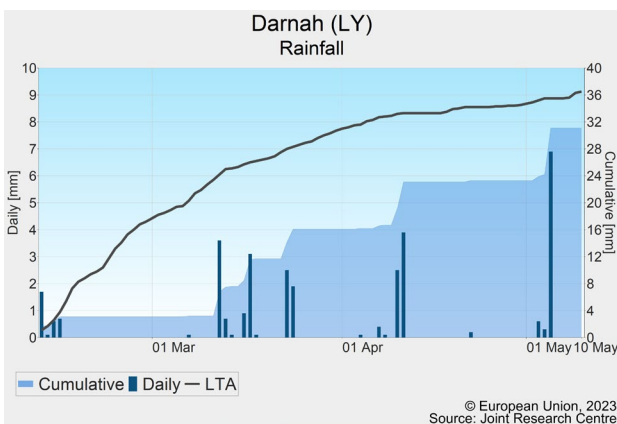
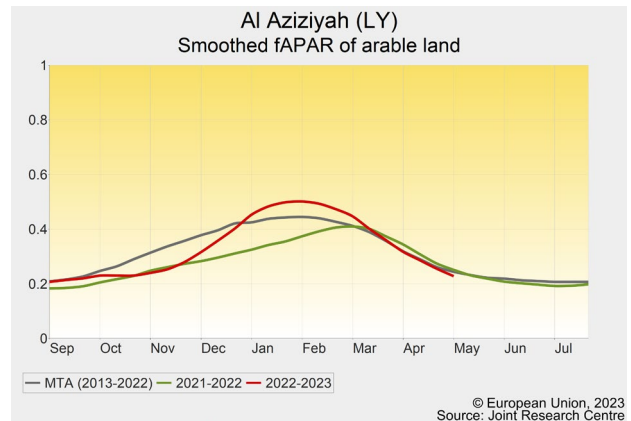
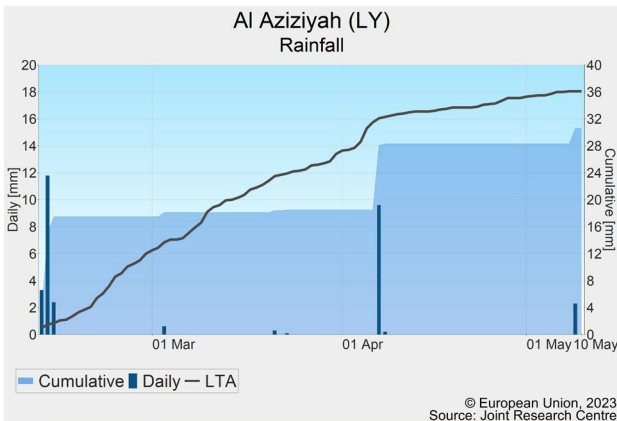
# Libya (LY)

## Average to above-average cereal production expected

The review period was characterised by moderate fluctuations of daily temperatures around the LTA, and below-average rainfall. Wheat and barley have matured and are ready for harvesting. The overall yield outlook for the country is moderately above the 5-year average.

Mild and dry weather conditions took place in the agricultural regions of Libya during the period of review. Average daily temperatures mostly remained 1 to 2°C above the LTA along the coastline of *Tripolitania* (Northwest), and 1 to 2°C below the LTA in the coastal regions of *Cyrenaica* (Northeast). Thermal sums (Tbase 0°C) were close to the LTA (-5% to +5%). Rainfall events in *Tripolitania* were unevenly distributed and mostly occurred in mid-February, at the beginning of April and the beginning of May. In *Cyrenaica* they were of limited intensity and evenly distributed over the February-May

period. Cumulative precipitation was overall below the LTA, except in *Nuqat al Khams* and *Darnah*, where the rain cumulate was 10% above the LTA. Despite the relatively dry weather overall, and a low presence of irrigation systems along the coastline of *Tripolitania*, crops this season benefited from mild temperatures, an absence of extreme temperature events, and from rain events in February, around the flowering period. The interpretation of earth observation information suggests above-average biomass accumulation in the agricultural areas of *Al Aziziyah*, *Jabal al Akhdar* and *Darnah* and around-average levels in the other regions of the country. Cereals matured and are ready for harvesting. Our yield forecasts for wheat and barley are based on the historical yield trend and are somewhat above the 5-year average.



# Egypt (EG)

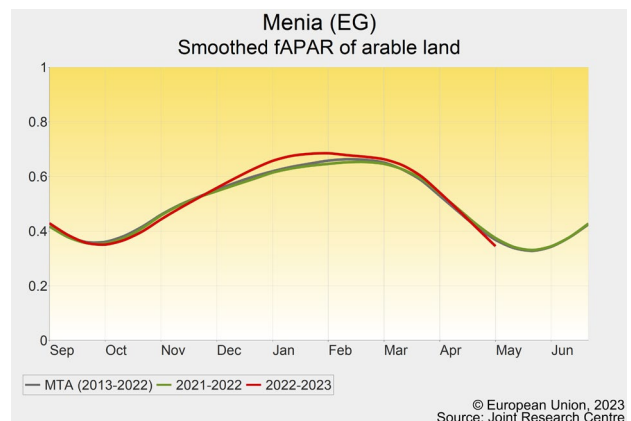
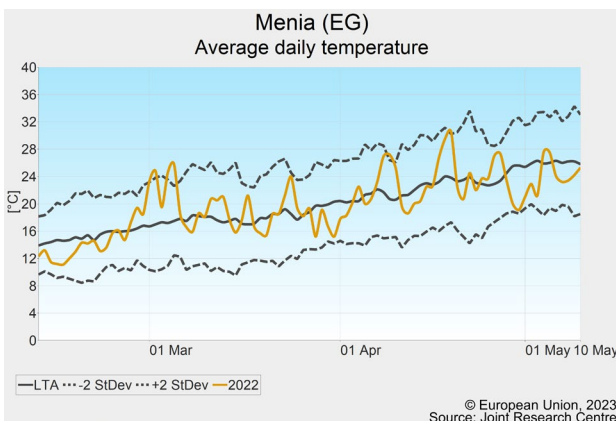
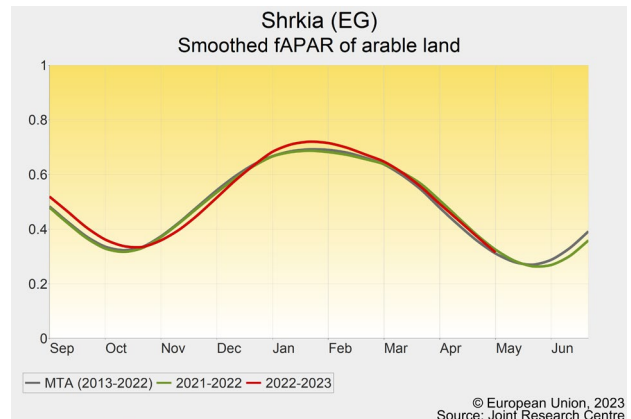
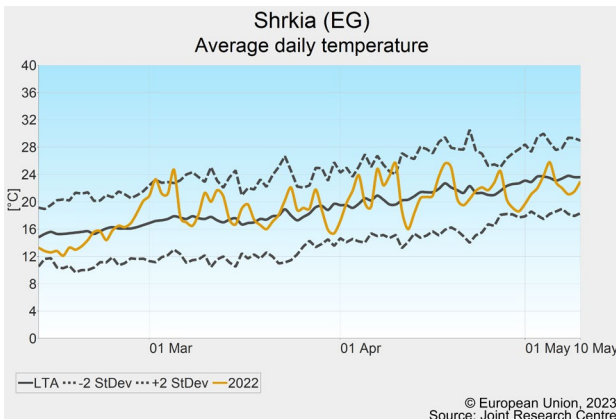
## Moderately above-average outlook for winter cereals

In Egypt, thermal conditions were slightly above the climatological average, allowing good ripening. The harvest is about to begin under favourable climatic conditions. Our forecasts for the country are in line with the 5-year average.

In the Nile Delta, above-average temperatures (1-2 °C > LTA) have marked the whole period of review (11 February – 10 May). Temperatures were particularly warm during the first week of March, when average daily temperature reached 6-8 °C above the LTA (e.g. *Shrkia*). However, no stress conditions were observed for crops in the ripening phase. Similar temperature profiles were observed for the Nile valley regions (e.g. *Menia*). Rainfall cumulates were

10% to 20% below average in the Nile Delta regions and 30% to 50% below average in the Nile valley regions (overall deficit of 5-15 mm). However, most of the cereal production in Egypt is not influenced by rainfall variations, since it relies on the irrigated fields of the Nile valley and Nile Delta regions.

Satellite imagery suggests that cereals are in average to above-average condition, which indicates that there has been sufficient water supply from irrigation to support adequate crop growth during flowering and ripening. Barley and wheat harvests will start soon, in the last dekad of May. Our yield forecasts for this country are close to the 5-year average.





# Crop yield forecast

## North-Africa yield forecasts for wheat - May 2023 Bulletin

Country	Area (x 1000 ha)					Yield (t/ha)					Production (x 1000 t)				
	Avg 5yrs	2022	2023	%23/5yrs	%23/22	Avg 5yrs	2022	MARS 2023 forecasts	%23/5yrs	%23/22	Avg 5yrs	2022	2023	%23/5yrs	%23/22
DZ	1 805	1 389	<b>1 389</b>	-23	+0	1.70	N/A	<b>1.28</b>	-24	N/A	3 245	N/A	<b>1 783</b>	-45	N/A
EG	1 321	1 339	<b>1 339</b>	+1	+0	6.53	N/A	<b>6.73</b>	+3	N/A	8 605	N/A	<b>9 005</b>	+5	N/A
LY	190	169	<b>169</b>	-11	+0	0.77	N/A	<b>0.76</b>	-1	N/A	150	N/A	<b>128</b>	-14	N/A
MA	2 693	2 433	<b>2 433</b>	-10	+0	1.79	1.11	<b>1.48</b>	-17	+34	4 830	2 701	<b>3 606</b>	-25	+34
TN	585	517	<b>517</b>	-12	+0	2.00	2.42	<b>1.62</b>	-19	-33	1 170	1 252	<b>837</b>	-28	-33

## North-Africa yield forecasts for barley - May 2023 Bulletin

Country	Area (x 1000 ha)					Yield (t/ha)					Production (x 1000 t)				
	Avg 5yrs	2022	2023	%23/5yrs	%23/22	Avg 5yrs	2022	MARS 2023 forecasts	%23/5yrs	%23/22	Avg 5yrs	2022	2023	%23/5yrs	%23/22
DZ	1 159	1 025	<b>1 025</b>	-12	+0	1.22	N/A	<b>1.06</b>	-14	N/A	1 460	N/A	<b>1 084</b>	-26	N/A
EG	25	22	<b>22</b>	-10	+0	3.79	N/A	<b>3.91</b>	+3	N/A	97	N/A	<b>87</b>	-10	N/A
LY	137	136	<b>136</b>	-0	+0	0.51	N/A	<b>0.53</b>	+4	N/A	70	N/A	<b>73</b>	+4	N/A
MA	1 347	1 137	<b>1 137</b>	-16	+0	1.21	0.62	<b>0.99</b>	-18	+60	1 627	700	<b>1 121</b>	-31	+60
TN	488	303	<b>303</b>	-38	+0	1.05	1.72	<b>0.74</b>	-30	-57	514	521	<b>225</b>	-56	-57

## North-Africa yield forecasts for soft wheat - May 2023 Bulletin

Country	Area (x 1000 ha)					Yield (t/ha)					Production (x 1000 t)				
	Avg 5yrs	2022	2023	%23/5yrs	%23/22	Avg 5yrs	2022	MARS 2023 forecasts	%23/5yrs	%23/22	Avg 5yrs	2022	2023	%23/5yrs	%23/22
DZ	355	241	<b>241</b>	-32	+0	1.51	N/A	<b>1.10</b>	-27	N/A	578	N/A	<b>265</b>	-54	N/A
EG	1 139	1 148	<b>1 148</b>	+1	+0	6.50	N/A	<b>6.68</b>	+3	N/A	7 392	N/A	<b>7 671</b>	+4	N/A
LY	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
MA	1 776	1 602	<b>1 602</b>	-10	+0	1.83	1.18	<b>1.52</b>	-17	+29	3 258	1 890	<b>2 437</b>	-25	+29
TN	70	61	<b>61</b>	-14	+0	1.74	1.92	<b>1.30</b>	-26	-32	123	117	<b>79</b>	-36	-32

## North-Africa yield forecasts for durum wheat - May 2023 Bulletin

Country	Area (x 1000 ha)					Yield (t/ha)					Production (x 1000 t)				
	Avg 5yrs	2022	2023	%23/5yrs	%23/22	Avg 5yrs	2022	MARS 2023 forecasts	%23/5yrs	%23/22	Avg 5yrs	2022	2023	%23/5yrs	%23/22
DZ	1 450	1 148	<b>1 148</b>	-21	+0	1.75	N/A	<b>1.32</b>	-24	N/A	2 666	N/A	<b>1 518</b>	-43	N/A
EG	182	190	<b>190</b>	+4	+0	6.73	N/A	<b>7.02</b>	+4	N/A	1 212	N/A	<b>1 334</b>	+10	N/A
LY	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
MA	917	831	<b>831</b>	-9	+0	1.71	0.98	<b>1.41</b>	-18	+44	1 572	810	<b>1 169</b>	-26	+44
TN	515	457	<b>457</b>	-11	+0	2.03	2.49	<b>1.66</b>	-18	-33	1 047	1 135	<b>758</b>	-28	-33

NB: Yields are forecast for crops with more than 10000 ha per country.

Sources: 2018-2023 data come from FAO, INRA Maroc, ONICL Maroc, Ministère de l'agriculture des ressources hydrauliques et de la pêche Tunisie, MED-Amin baseline DB, DSASI-MADR Algeria and the Egyptian Arab Republic - Ministry of Agriculture and Land Reclamation.

2023 yields come from MARS Crop Yield Forecasting System (output up to 10.05.2023).

The column header '%23/5yrs' stands for the 2023 change with respect to the 5-year average (%). Similarly, '%23/22' stands for the 2023 change with respect to 2022 (%).

N/A = Data not available.

The **JRC MARS Bulletin – Crop monitoring European Neighbourhood** is a JRC–European Commission publication from MARS4CAST (JRC Unit D5 – Directorate for Sustainable Resources)

JRC MARS Bulletins are available at <https://ec.europa.eu/jrc/en/mars/bulletins>

#### Analysis and reports

G. Manfron, L. Nisini, L. Panarello

#### Reporting support

SeproTec, I. Biavetti, G. Mulhern

#### Edition

G. Manfron, M. van den Berg and B.Baruth

#### Data production

MARS4CAST (JRC Unit D5), Datameteo, VITO

#### Contact

JRC D5/MARS4CAST

JRCMARSBULLETIN@ec.europa.eu

#### Legal notice

Neither the European Commission nor any person acting on behalf of the Commission is responsible for the use, which might be made of this publication.

#### Disclaimer

The geographic borders are purely a graphical representation and are only intended to be indicative. The boundaries do not necessarily reflect the official European Commission position.

#### Technical note

The long-term average (LTA) used within this Bulletin as a reference is based on an archive of data covering 1991-2022. The medium-term average (MTA) used within this Bulletin as a reference is based on an archive of data covering 2013-2022.

#### Acknowledgement

We would like to thank MED-Amin partners for the provision of statistical data. MARS stands for Monitoring Agricultural Resources.

© European Union, 2023



#### Mission statement

The Joint Research Centre provides independent, evidence-based knowledge and science, supporting EU policies to positively impact society.

