The 2017-2018 winter cereal campaign in Morocco has been marked by delayed crop growth. This was as the result of the late arrival of autumn rains, which forced Moroccan farmers to sow later than usual. Since then, cereals have profited from abundant rains, resulting in an above-average outlook. However, in northern croplands, the unusual heavy rains in March, which were coupled with hot weather, could increase the pressure of pests and diseases during flowering. In Algeria, very poor distribution of rain has led to a mixed outlook. Coastal provinces benefited from fairly positive growing conditions. Interior provinces, however, have been affected by a continuous lack of rain; and low biomass accumulation suggests a reduction in winter cereal yield potential. At the country level, the yield forecasts for Algeria are below average. In Tunisia, the outlook for the largest wheat- and barley-producing areas is also mixed. Northern provinces (which are the main wheat-producing areas) have benefited from positive growing conditions, whereas continually dry winter conditions have constrained the vegetative development in the central and southern regions, which are more commonly used for barley production. In Libya and Egypt, positive thermal anomalies have prevailed during most of the season so far, with unusual hot temperatures during flowering. However, irrigation, which characterises agriculture in both countries, has been sufficient to prevent water stress, leading to a yield prospect in line with the average.

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1. Agro-meteorological overview
2. Country analysis
3. Remote sensing map
4. Crop yield forecast
5. Atlas

Covers the period from December 2017 to 15 March 2018
1. Agro-meteorological overview

Morocco, Algeria and Tunisia

Overall, temperatures from December to February were close to the seasonal average, albeit with large fluctuations. The first half of March was distinctly warmer than usual, with positive thermal anomalies reaching 1-6°C. Rainfall totals, considering the whole review period (1 December–15 March), significantly exceeded the seasonal average in the northern half of Morocco and the area close to the Mediterranean in north-western Algeria. Rainfall was well below average in southern and south-eastern Morocco, north-eastern Algeria and northern Tunisia.

Temperature

December was moderately (0.5–1.5°C) colder than usual in the region, but the last days of the month were distinctly warmer than usual. In January, temperatures strongly fluctuated between rather mild and quite cold periods, resulting in a monthly mean that was near or slightly below the seasonal average in most of Morocco, while a positive thermal anomaly of 1-3°C (increasing eastwards) was experienced in the areas between eastern Morocco and Tunisia.

In the first dekad of February, an exceptional cold spell was experienced throughout the Maghreb region. During this period, daily mean temperatures remained 2-5°C below the long-term average (LTA). These temperatures were among the lowest on record for this period, considering our climatological records since 1975. On the coldest days, the minimum temperature fell below +5°C in most agricultural areas, but frost events with temperatures as low as −5°C occurred in several places farther from the coastline. Daily maximum temperatures during the first half of March approached +20°C and reached even higher values on the warmest days.

Precipitation

The autumn of 2017 was drier than usual until late November in most of the Maghreb region, with the exception of the north-eastern Mediterranean coastline of Algeria and the northernmost and southernmost parts of Tunisia, which were wetter than usual.

In Morocco, the prevailing dry conditions caused delays to the start of the cropping season, but the frequency of precipitation increased in the last days of November. From late November until the end of January, rainfall presented a surplus (mostly 20-100 mm) in the north-western half of Morocco where crop cultivation dominates. Rain in February was around average. The first half of March was extremely rainy in Nord Ouest, and in the northern part of Centre, Centre Sud and Centre Nord regions, where 80-500 mm precipitation was recorded, sometimes in the form of heavy storms.

In Algeria, precipitation patterns have presented substantial spatial and temporal variability during this cropping season so far. In December, the western and eastern inland regions experienced a precipitation deficit in the range of 20-40 mm, while the central and eastern coastal parts of the country received above-average rainfall, exceeding the LTA by 20-80 mm. In January, the central and eastern agricultural areas experienced a precipitation deficit (typically there had been only 5-50 mm of rain, meaning a 30-90 mm deficit compared with the LTA), whereas some western regions experienced slightly more rain than usual. From the beginning of February until mid-March, rain remained 20-90 mm below the LTA in the north-easternmost regions as well as in a zone between eastern Tiaret and the western half
of Bouira. Meanwhile, territories along the coastline from Oran until Jijel were wetter than usual, with rainfall totals reaching 50-180 mm. In Tunisia, near-average or slightly above-average precipitation was experienced in a relatively narrow belt along the northern coastline, with adequate temporal distribution throughout the review period. In contrast, just slightly southwards, a precipitation deficit of 50-120 mm was experienced, in comparison with the seasonal average of 150-250 mm. Along the southern border of the country, unusually abundant and frequent rainfall events in December resulted in a substantial precipitation surplus for the review period; however, this region is less important for crop cultivation.

Libya and Egypt

Both countries experienced warmer-than-usual conditions during the review period (1 December to 15 March). The positive thermal anomaly was particularly well expressed in the Nile Valley, the Nile Delta and eastern Egypt. Rainfall exceeded the seasonal average in western Libya and some coastal areas in western Cyrenaica, whereas other littoral regions in Libya and Egypt experienced below-average rainfall.

Temperature

Between 1 December and 31 January, most of coastal Libya and western Egypt experienced near average or slightly above-average thermal conditions, with daily mean temperatures fluctuating between 0.5°C and 1.5°C above the LTA. In the Nile Delta and eastern Egypt, there was a stronger positive thermal anomaly (1.5-2.5°C) during this period. From early February to mid-March, the positive thermal anomaly further increased, to 2.0-4.5°C compared with the LTA. The main agricultural areas (such as the Nile Valley and the Nile Delta) during this period experienced a positive thermal anomaly of 3.5-4.5°C.

Precipitation

Rainfall was concentrated along the Mediterranean coastline of Libya and Egypt, where most rain-fed agriculture can be found.

In Libya, the western part of coastal Tripolitania experienced abundant precipitation (40-130 mm) in December. The rainfall tendency decreased from January onwards, but total precipitation levels are substantially (30-100 mm) above the LTA for the review period as a whole (1 December to 15 March). In eastern coastal Tripolitania, rainfall accumulation typically remained close to the LTA (40-70 mm). In western coastal Cyrenaica, which is one of the most important cereal-producing regions of Libya, precipitation exceeded the LTA by 10-80 mm, which is 20-60% more than usual. The eastern part of this region was drier than usual, presenting a 25-60 mm rainfall deficit.

In Egypt, along the western coastline, precipitation was moderate (20-50 mm), while the eastern coastline experienced 40-80 mm of rain. Compared with the LTA, the whole coastal area of the country and the fringes of the Nile Delta (where cereal cultivation is typically rainfed) received below-average rainfall. However, most of the cereal production in Egypt is not influenced by local variations in rainfall, since it comes from the irrigated fields of the Nile Valley and Nile Delta regions.
2. Country analysis

Morocco

Positive outlook for winter cereals despite delayed start to the season

The late arrival of the autumn rains marked the beginning of the 2017-2018 agricultural campaign in the whole country. However, once the rain arrived during the first decadal of December, it came abundantly (with episodes of 40 mm/day), causing soil moisture levels to recharge and thus helping Moroccan farmers to accomplish most winter cereal sowing at that time. As a consequence, crop development has shifted in time, similarly to what happened in the 2009-2010 season (see fAPAR graph), without causing major concerns so far. Moreover, cereals benefited from abundant and well-distributed precipitation from December to February, during emergence and vegetative development, resulting in above-average biomass accumulation, as reflected in the fAPAR signal.

Although rain was well distributed across most cropping regions, winter cereals of Centr’ Sud, where durum wheat is dominant, suffered from scarcer winter rains until February, which constrained the vegetative development of cereals in this region.

The abundant rain in March, which occurred in most of Morocco’s arable land, has ensured a good water supply during the reproductive phase of flowering, which is currently taking place. However, heavy rain storms ($P_{max}$ > 130 mm/day) in the border region between Nord Ouest and Centre Nord could have caused local damage to cereals. Moreover, the high humidity levels in those areas, coupled with the hot weather of March, could increase pest and disease pressure at this sensitive stage of flowering.

On balance, at the national level, the overall outlook is positive for all crops, and the current yield forecasts are above the average of the past five years and distinctly above last year’s poor levels.
Algeria

Delicate situation in interior cropland areas

As in Morocco, the 2017-2018 campaign in many of Algeria’s agricultural regions has been marked by delayed crop growth due to the late arrival of rains, which extended the sowing window until January. However, in the case of Algeria, rain was less abundant and poorly distributed in the main producing regions. In western and central provinces (wilaya) (e.g. Relizane, Mascara, Ain Defla), well-distributed rains provided good levels of water supply, which resulted in good growing conditions. In more interior western provinces, such as Tiaret and Saida, precipitation was scarce until February, leading to low soil moisture levels that were only partially recharged with the rains that occurred in March. Low soil water supply limited the vegetative development of crops, which currently present below-average biomass accumulation (as inferred from satellite images). In these regions, more rain is needed to ensure an adequate water supply during the critical stage of grain formation in the coming weeks.

In eastern Algeria, most winter cereals have been stressed as a result of scarce and poor rains (most events < 6 mm) during winter and deteriorating soil moisture conditions, which has weakened crops to varying degrees during vegetative growth. The hot weather in March so far (+4°C above the LTA and Tmax > 25°C), is aggravating these constrained growing conditions. In the interior provinces of Oum El Bouaghi and Batna, the low biomass accumulation (see fAPAR graph) suggests a significant reduction in winter cereal yield potential. Near the coast, in Sétif, Guelma and Mila, vegetative conditions are only slightly below average and abundant rain could sustain adequate crop development during flowering (April/May). At the country level, the moderately positive outlook in coastal regions is outweighed by the below-average expectations in many interior provinces. Therefore, the yield forecasts for all crops are below the five-year average.
Tunisia

Fairly good outlook in northern regions, poorer in the south

During the period under review (1 December to 15 March), rainfall in Tunisia was unevenly distributed across agricultural regions, giving rise to different prospects for different regions.

In the main wheat-producing regions, in the northern and coastal districts of Bizerte, Béja and Jendouba, well-distributed rains provided optimal conditions for the emergence and vegetative development of crops. Drier conditions prevailed in central and southern regions (e.g. Kef, Siliana and Kairouan), where winter barley is more common. In those regions, despite the rainy days of January and mid-February, the climatic water balance has been continually negative since December.

Winter temperatures have been fluctuating around the average, increasing sharply at the end of February. March, so far, has been the hottest since the early 1970s across the country, which is causing crops to rapidly increase water consumption, while soil moisture levels are also decreasing because of the lack of rain in most cropping areas.

Winter cereals are currently in the heading stage, advanced by around one week earlier compared with an average season. Soil water conditions in northern regions are still sufficient to meet plant demands, but rain will be needed in the coming weeks when the critical phase of grain formation begins. The situation is more critical in central and southern districts, where soil water conditions have started to limit biomass growth, and the FAPAR signal, especially in Kairouan, suggests an impact on yield potentials. Crops will reach flowering in the coming weeks (April) and rains to recharge soil water stocks are urgently needed.

Overall, at the country level, our forecasts for both soft and durum wheat are slightly above the five-year average, whereas the forecast for barley is slightly below the five-year average.
Libya

Advanced crop season with average outlook for winter cereals

Mild temperatures since the beginning of the season (September/October) have favoured advanced development of winter cereals in the two main agricultural areas of Libya, Tripolitania in the west (Tripoli) and Cyrenaica in the east (Al Fatah, Darnah). The above-average canopy development (fAPAR graph) indicates that wheat and barley in those regions have received sufficient water supply (mainly coming from irrigation) to support adequate development during flowering and grain formation. In both regions, the weather in March has been rather hot ($T_{\text{max}} > 28^\circ \text{C}$), which could shorten the grain-filling period, which is currently under way. On account of the low inter-annual variability of yield and the relatively positive growing conditions, our forecasts are in line with the historical average for both crops.

Egypt

Hot weather during flowering

Temperatures have been consistently 3-6°C above the average from December onwards in the cereal-producing regions of the Nile Valley and Nile Delta, which has permitted a good crop growth during the vegetative development phase. Unusually hot weather ($T_{\text{max}} > 30^\circ \text{C}$) occurred during flowering (mid-February and March). However, the positive fAPAR signal indicates that irrigation practices that characterise Egyptian agriculture have been sufficient to prevent water stress during flowering and the subsequent grain-filling phase, which is currently under way. Our forecasts for both barley and wheat are in line with the five-year average, also considering the stable yield trends.
3. Remote sensing map

The mild winter, with above-average precipitation across Morocco’s cropland areas, favoured good vegetative growth. The below-average fAPAR signal is explained by the delayed development of cereals as a result of the late sowing. There is above-average vegetative growth in northern Tunisia and the coastal provinces. However, there are significant negative biomass accumulation anomalies in central Tunisia and inland Algeria, where dry conditions have prevailed during most of the season.
4. Crop yields forecast

### North-Africa yield forecasts for wheat - March 2018 Bulletin

<table>
<thead>
<tr>
<th>Country</th>
<th>Avg 5yrs</th>
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<th>MARS 2018 forecasts</th>
<th>%18/5yrs</th>
<th>%18/17</th>
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Note: Yields are forecast for crops with more than 10000 ha per country; figures are rounded to 10 kg
2018 yields from MARS CROP YIELD FORECASTING SYSTEM (CGMS output up to 10/03/2018)

### North-Africa yield forecasts for barley - March 2018 Bulletin

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<th>Country</th>
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<th>MARS 2018 forecasts</th>
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Note: Yields are forecast for crops with more than 10000 ha per country; figures are rounded to 10 kg
2018 yields from MARS CROP YIELD FORECASTING SYSTEM (CGMS output up to 10/03/2018)

### North-Africa yield forecasts for soft wheat - March 2018 Bulletin

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<th>Country</th>
<th>Avg 5yrs</th>
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Note: Yields are forecast for crops with more than 10000 ha per country; figures are rounded to 10 kg
2018 yields from MARS CROP YIELD FORECASTING SYSTEM (CGMS output up to 10/03/2018)

### North-Africa yield forecasts for durum wheat - March 2018 Bulletin

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<th>Country</th>
<th>Avg 5yrs</th>
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<th>MARS 2018 forecasts</th>
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</table>

Note: Yields are forecast for crops with more than 10000 ha per country; figures are rounded to 10 kg
2018 yields from MARS CROP YIELD FORECASTING SYSTEM (CGMS output up to 10/03/2018)
5. Atlas

Morocco, Algeria, Tunisia

Temperatures and precipitation regime
Libya, Egypt
Temperatures and precipitation regime
The current JRC MARS Bulletin – Crop monitoring European Neighbourhood is a JRC – EC publication from MARS4CAST (JRC D5 unit – Directorate Sustainable Resources)

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

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MARS stands for Monitoring Agricultural Resources

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