



Kingdom of Morocco



ROYAUME DU MAROC



Ministère de l'Agriculture
et de la Pêche Maritime

Direction of Strategy and
Statistics



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Crop forecasting bulletin

Cropping season 2011-2012

Highlights

Cumulated rainfall from 1st September 2011 to 15 April 2012 at national level was very low 221 mm corresponding to 68% of long term average (327 mm) on the same period. Temperatures were exceptionally low from January to February. However, low these temperatures partially mitigated drought and, reduced diseases occurrence. The state of the vegetation as detected by NDVI was bad in the South of the agricultural areas and normal elsewhere. Cereal (soft wheat, durum wheat and barley) production is estimated at **4.72 million tons**, at April 10th 2012. However, this forecast could be reevaluated to higher production, as the season was rainy late in April.

This bulletin is jointly published by the Direction of Strategy and Statistics of the [Ministry of Agriculture](#) (DSS), the [National Institute for Agronomic Research](#) (INRA) and the [National Meteorology Direction](#) (DMN). It is produced in the framework of "Crop Monitoring as an E-tool Agriculture in Developing Countries" project ([E-AGRI](#)), funded by the European Union in its 7th Framework Programme for research, technological development and demonstration. This bulletin is intended to support the mission of DSS in the field of crop forecasting. European institutions partners of [E-AGRI](#) are: [JRC](#), [Alterra](#) and [VITO](#). Data used for analysis are: Normalized Difference Vegetation Index (NDVI) and climate data available on spatial interpolation grid of 25x25 km, covering agricultural areas.

Estimated cereal production at April 10th, 2012.

	Average yield (Tons/ha)	Area (millions ha)	Production (millions tons)
Soft wheat	1.15	2.18	2.51
Durum wheat	1.03	0.96	1.00
Barley	0.64	1.89	1.22
Total	0.94	5.04	4.72



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CLIMATIC ANALYSIS

Rainfall

The cumulated rainfall from September 1st to of April 15th was 221mm at national level, corresponding to 68% of the long term average (327mm) over the period 1988-2011 (**Figure 1**). In term of rainfall, the cropping season was similar to the two dry seasons of 1999-2000 and 2004-2005.



Figure 1: Ranking of the cropping seasons since year 1988, according to cumulated rainfall from September 1st to April 10th.

Temperatures

Temperatures were exceptionally low during 2011-2012 cropping season, starting from second half of January, both in absolute values and in duration (**Figure 2**). Extreme low values were observed during the month of February 2012. However, these low temperatures have partially mitigated drought, by reducing both crop growth and evapotranspiration (by approximately 80mm). Also, low temperatures reduced the diseases occurrence.

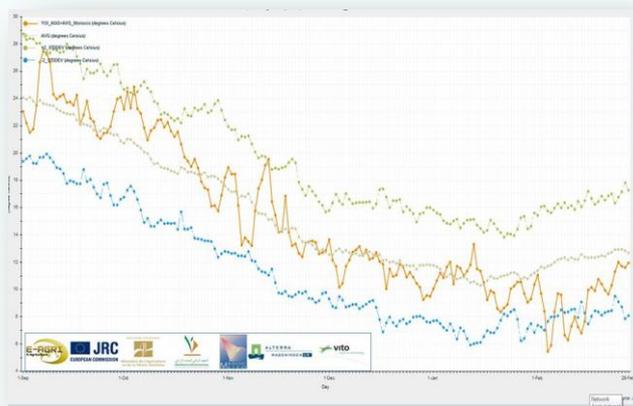


Figure 2: Average daily temperature from September 1st 2011 to February 20th 2012, at national level.

VEGETATION ANALYSIS

The state of the vegetation, detected through NDVI was bad in the South of the agricultural areas and, normal in Northern regions of Morocco (**Figure 3**). Vegetation was strongly reduced in South of Chaouia, part of Doukkala, Essaouira, Safi, El Kelâa des Sraghna and Marrakech. However, NDVI was normal in North-Western area of Chaouia, in Saïs, Zaër, Gharb and Loukkos areas and good in Moulouya area.

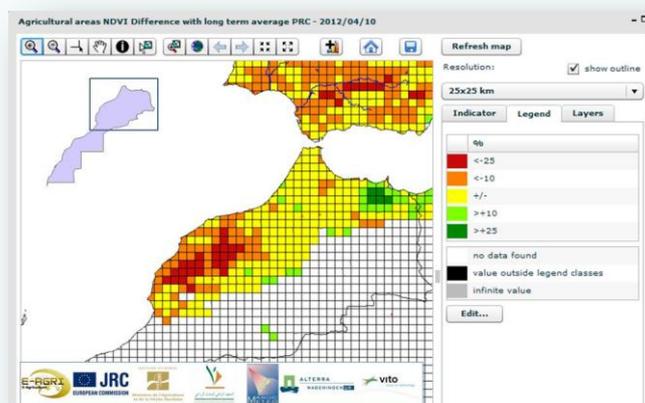


Figure 3: NDVI of agricultural areas at April 10th 2012, compared (%) to long term average at the same period.

The state of the vegetation (NDVI) during 2011-2012 cropping season is similar to that of 2000-2001, over the period from



February 1st to April 10th (Figure 4). For instance, cereal production was 4.47 million tons in 2000-2001 and the total area was 4.8 million hectares (vs. 5.04 million hectares in 2011-2012).

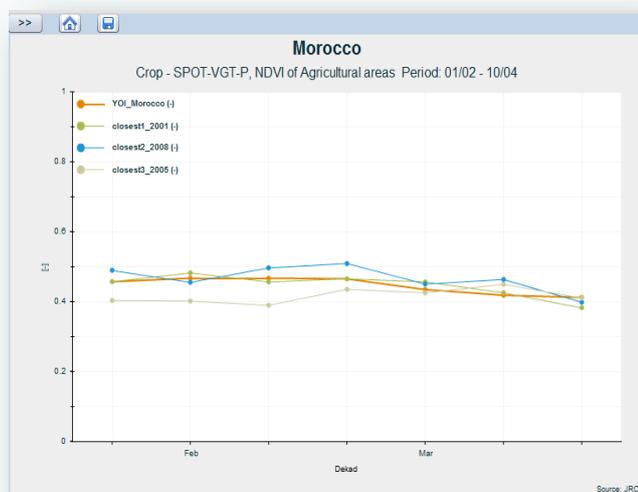


Figure 4: NDVI during 2011-2012 cropping season, compared with previous seasons since 1989, for the period February 1st to April 10th. The most similar cropping season with the current season, is 2000-2001.

CEREAL FORECAST AT APRIL 10TH 2012

Cereal (soft wheat, durum wheat and barley) production is estimated at **4.72 million tons**, at April 10th 2012. However, this forecast could be reevaluated to higher production, due to late rains in April (15 mm). The production is equivalent to 77% of a normal year, calculated over 10 years from 2000 to 2011 (6.15 million tons).

METHODOLOGY

Cereal production has been forecasted based on two analysis tools:

- The "[MARSOP3](#)" Web tool, for climate and vegetation analysis ;
- The "CGMS Statistical Toolbox" software, for crop forecasting.

The "[MARSOP3](#)" Web tool, managed by [Alterra](#), is dedicated to real time analysis of the climate and vegetation conditions, during the cropping season. This tool is linked to the agro-database of the European Union ([JRC](#)) and provides several useful indices: temperature, rainfall, solar radiation, potential evapotranspiration, number of cold or hot days, degree x days, NDVI, etc. for the agricultural areas of Morocco, at 25x25 km spatial grid level.

The "CGMS Statistical Toolbox" (CST) software is dedicated to crop forecasting. The CST relies on two kind of analysis: a multiple regression analysis (parametric) and a scenario analysis (non-parametric). These two kind of analysis use time series of crop statistics (provided by [DSS](#)) and of rainfall (provided by [Alterra](#)) and vegetation indices NDVI and DMP (provided by [VITO](#)). Crop forecasts could be made at different spatial scales (provinces, agro-zones, national), at dekadal time step starting from February till the end of April.

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