



## Crop Monitoring as an E-agricultural tool in Developping Countries



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# REPORT DESCRIBING REGIONAL STATISTICS FOR MOROCCO

**Reference:** *E-AGRI D21.4: Report describing regional statistics for Morocco.*

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**Version:** 1.0

**Date:** 26/02/2014

## DOCUMENT CONTROL

### Signatures

Author(s) :

Reviewer(s) :

Approver(s) :

Issuing authority :

### Change record

Release	Date	Pages	Description	Editor(s)/Reviewer(s)
1.0	26/02/2014	32	Report describing regional statistics for Morocco	

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## ACRONYMS & CLOSSARY

<b>AFS</b>	Area Frame Sampling
<b>DSS</b>	Direction de la Stratégie et des Statistiques
<b>E-AGRI</b>	Crop Monitoring as an E-agricultural tool in Developing Countries project

## 1. EXECUTIVE SUMMARY

The main goal of the work is to describe existing datasets with regard to regional statistics for winter-wheat over the last 10 to 15 years. Area and yield data of the three main cereal crops, soft wheat, durum wheat and barley, were provided by “la Direction de la Stratégie et des Statistiques” (DSS). They are available for 40 provinces of the country for the period of 1978-2012. Production at a province level is obtained by multiplying the yield value by the area both estimated by DSS. Area estimation for cereal crops in Morocco is made every year by DSS between February 10<sup>th</sup> and March 30<sup>th</sup>, using a sampling method of 3,000 unit areas representing 19 million hectares. Starting since 2008, DSS has renewed the sampling procedure to integrate modern techniques of satellite remote sensing and GIS which improved precision of estimators. A GIS application has been specifically developed for this purpose with capability of automated steps of the sampling procedure. Within the sampled areas, sub-sampled plots are harvested and their yields directly measured. Production of a sampled area is the product of measured yield on sub-sampled plots and area represented by the sample. Data on production and area is then aggregated by province and provided in worksheet format. Data quality of agricultural statistics is broadly in line with European standards.

## 2. INTRODUCTION

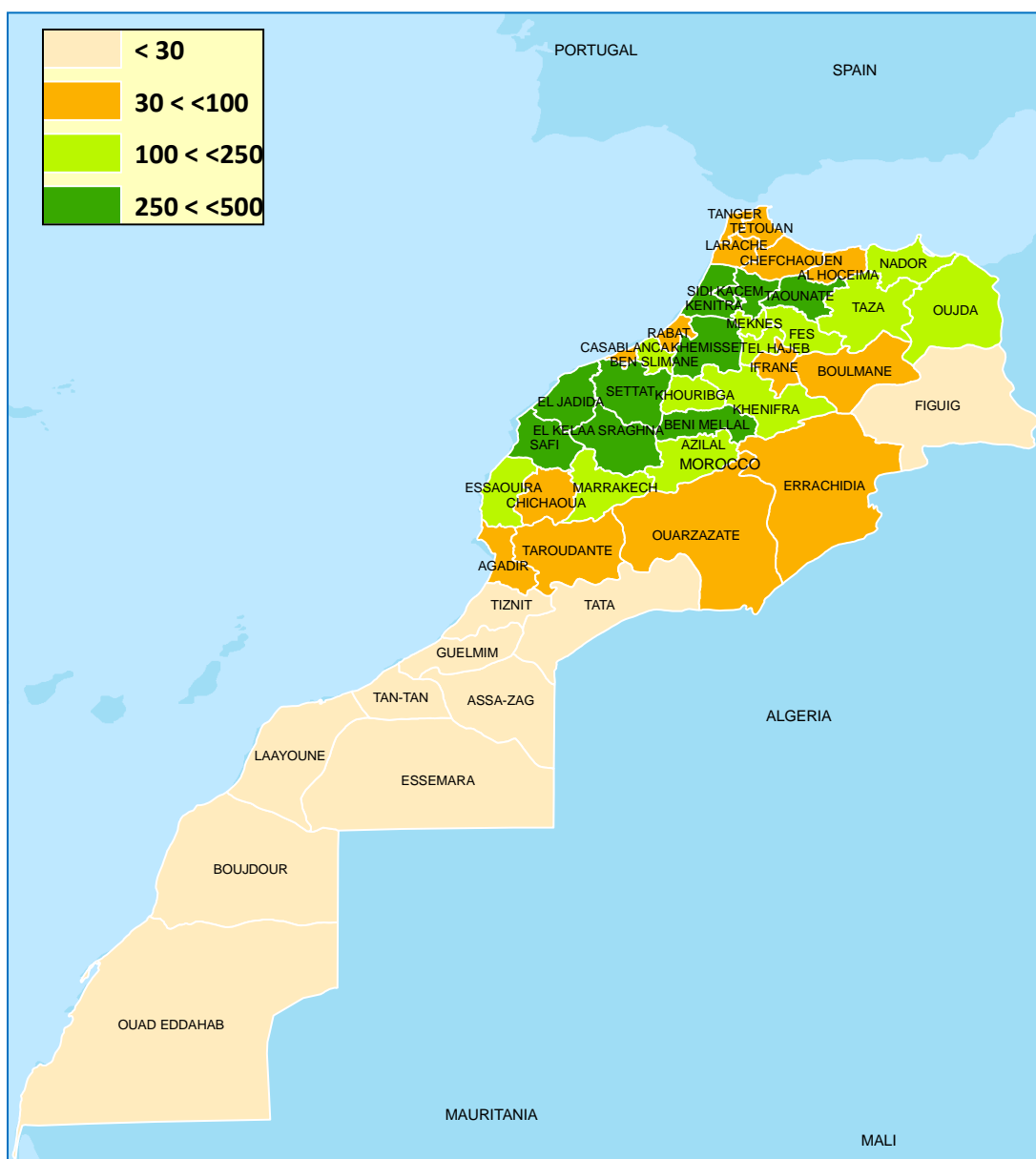
The total area of cereals has steadily increased since 1980, at an average rate of 39,600 hectares/season. This increase was mainly the result of increased soft wheat area, boosted by the large scale state promotion of this crop (in French, Opération de promotion du blé tendre), launched in 1985-1986. This operation was designed to double the cultivated area of soft wheat, from 0.5 million hectares to 1.0 million hectares, using as incentives: the distribution of new improved varieties and fixed prices for harvested grain for producers, and fixed marketing margins for industrials. The area of soft wheat which had stagnated at around half a million hectares for over thirty years, until the early 1980s, has been doubled in 1986, and multiplied by four, ten years later. The area stabilized then at around two million hectares, occupying more than a fifth (1.9 million hectares, from 1998 to 2011) of the agricultural area of the country (8.7 million hectares). Over the period 1998-2011, the area of soft wheat has increased at an average rate of 34,900 hectares/season, accounting for 88% of total cereal area increase. The area of durum wheat and barley declined at a rate of 11,600 and 13,800 hectares/season, respectively.

In Morocco, the responsibility of agricultural survey is under the responsibility of the Direction of Strategy and Statistics (DSS, Ministry of Agriculture), since 1975. DSS is responsible for designing, conducting surveys, coaching regional teams, analysis and publication of results and at regional level, statistical services are responsible for filling questionnaires relatives to the samples of their areas, checking and inputting the data collected. Data entry is provided by the regional services of agricultural statistics. In Morocco, information available covers the fields of production of major crops, structure by age, sex and breed of livestock, foreign trade and price production of major grains, legumes, olives and wholesale prices of major fruit and vegetable. Crop forecasts are also available for the three major cereals (soft wheat, durum wheat and barley), olives and citrus.

The objective of this deliverable is to describe the cereal statistics tables provided by DSS in the framework of E-AGRI project.

### 3. REGIONAL STATISTICS WHEAT STATISTICS

Area and yield data of the three main cereal crops, soft wheat, durum wheat and barley, were provided for 40 provinces of the country for the period of 1978-2012 (Figure 1). Production at a province level is obtained by multiplying the yield value with the area estimated by DSS.





**Figure 1** : Map of average production (in Mega tons) of autumn cereals (soft wheat, durum wheat and barley confounded) by province. (Source: Balaghi et al., 2012).

Area estimation for cereal crops in Morocco is made every year by DSS between February 10<sup>th</sup> and March 30<sup>th</sup>, using a sampling method of 3,000 unit areas representing 19 million hectares (see Deliverable D54.2). Starting since 2008, DSS has renewed the sampling procedure to integrate modern techniques of satellite remote sensing and GIS which improved precision of estimators. A GIS application has been specifically developed for this purpose with capability of automated steps of the sampling procedure (see Deliverable D54.2).

Within the sampled areas, sub-sampled plots are harvested and their yields directly measured. Production of a sampled area is the product of measured yield on sub-sampled plots and area represented by the sample. Data on production and area is then aggregated by province.

Monitoring of vegetation, area and yield estimations are carried out by DSS along the cereal crop cycle in three phases:

- **Phase 1:** A survey on the evolution of harvest, is done in February, to evaluate crop growth stages and vegetative stand of crops ;
- **Phase 2:** A survey on land cover, done between February and June, to estimate cereal areas ;
- **Phase 3:** A survey on expected production, done in April (1 to 2 months before harvest) to estimate production of the three main cereals: soft wheat, durum wheat and barley.

Official agricultural statistics are delivered in Excel format, at province administrative level; which makes the province, the smallest territorial area for forecasting (**Figure 2**). Data quality of agricultural statistics is broadly in line with European standards.

The screenshot displays an Excel spreadsheet titled 'Official statistics cereals Morocco 1979-2012.xlsx'. The data is organized in a grid with provinces listed in rows (e.g., AGADIR, AL HOCEIMA, AZULAL, BEN SLIMANE, BENI MELLAL, BOULMANE, CASABLANCA, CHEFCHAOUEN, CHICHAOUA, EL HAÏEB, EL JADIDA, EL KELAA SRAHJEN, ERRAACHIDIA, ESSAOUIRA, FES, FIGIG, GUELIMM, IRFANE, KENITRA, KHIMMSET, KHOURRA, KHOURRACHA, LARACHE, MARRAKTCH, MEKNES, NADOR, OUAZAZATE, OUJDA, RABAT, SAFI, SETTAT, SIDIKACEM, TANGER, TANTAN) and years from 1988 to 2011 in columns. The data includes production in thousands of quintals (x 1000 q) and area and yield for soft wheat, durum wheat, and barley. The spreadsheet interface shows various Excel tools like 'Fichier', 'Accueil', 'Insertion', 'Formules', 'Données', 'Révision', 'Affichage', and 'JMP'. The status bar at the bottom indicates 'Prêt' and 'Barley / Durum wheat / All 3 cereals / NUTS1 / A1 | 4'.

Figure 2: Cereal statistics for soft wheat, durum wheat and barley, at province level provided by DSS and available on Excel file. Area and yield are provided for all provinces.