The MARS Crop Yield Forecasting System – introduction by JRC

Bettina Baruth and Olivier Leo

Joint Research Centre, Institute for the Protection and Security of the Citizen, Monitoring Agricultural Resources Unit (MARS), TP 483, 21027 Ispra (VA) Italy

MARS project

The MARS project of the Joint Research Centre of the European Commission which started in 1988 was initially designed to apply emerging space technologies for providing independent and timely information on crop areas and yields for the European Union territory. Based on the recognized need of DG Agriculture to have information on the condition of land and arable crops, notably for the management of the common organisations of the markets the MARS project has been running a crop yield forecasting system since 1993 for the quantitative assessment of the major European crops in all Member States. Since 2000, the expertise in crop yield estimation has been applied outside the EU. Services have been developed to support EU aid and assistance policies and to provide building blocks for a European capability for global agricultural monitoring and food security assessment.

Beside the MARS project there are several international bodies active on agricultural monitoring and forecasting as well as national programmes. A recent overview can be found on the pages of the GEOSS initiative on agricultural monitoring (http://www.earthobservations.org/cop_ag_gams.shtml) This community of practice represents twenty-five national and international organizations concerned with agricultural monitoring.

MARS Crop Yield Forecasting System (MCYFS)

The MARS Unit provides scientific and technical support to EU Agriculture and Food Security policies. One core activity is centred on the provision of timely crop yield forecasts for the major crops in Europe and neighbouring countries as well as in strategic areas of the world. This is the result of a regulation, stating maintenance, operational run and analysis of the MARS Crop Yield Forecasting System (MCYFS). The latest regulation has been adopted January 2008 for the period 2008 – 2013 (Council Regulation (EC) No 78/2008) to cover the operational activities for the next 6 years. Within the regulation the effectiveness of the crop yield forecasting has been acknowledged and that the CAP needs can not be met alone by the traditional agricultural statistics and forecasting systems. The JRC guarantees scientific relevance, independence and timeliness of the support. The rationale behind the crop forecasts at EU level is based on the lack of timely information to take rapid decisions on Common Agricultural Policy instruments during the year. The system is able to monitor crop vegetation growth (cereal, oil seed crops, protein crops, sugar beet, potatoes, pastures, rice) and include the short-term effects of meteorological events on crop productions and to provide yearly forecasts on European crop predictions. The system is made by remote sensing and meteorological observations, agro-meteorological modelling (Crop Growth Monitoring System, CGMS) and statistical analysis tools. The action is also involved in developing techniques to estimate crop areas using remote sensing and area frame sampling.

A second core activity monitors crop development, forecasts crop production and provides information on vulnerability in specific food insecure areas. The action also provides technical support for Food Security Information projects financed by the European Commission in Africa.

Results of the above mentioned activities are published in form of monthly or bi-monthly climatic and crop monitoring bulletins for Europe with quantitative yield forecasts per country. Monthly national and regional crop monitoring bulletins for Food insecure regions including qualitative and for some countries quantitative estimates are regularly issued as well. The regions and countries covered in 2009 for a different set of monitored crops include: European Union, Ukraine, Belarus, Russia, MERCOSUR countries, Maghreb countries, Sudan, Somalia, Eritrea, Ethiopia, Uganda, Kenya, North Korea, India and China.

Outsourcing MCYFS operational service

The operational service to run MCYFS is, for a large extent, outsourced through the MARSOP project (Monitoring Agricultural ResourceS - OPerational) and started in the course of 2000. The Centre for Geo-Information of Alterra (Alterra-CGI) is the leader of the MARSOP project in co-operation with Meteo Consult, Flemish Institute for Technology (VITO), University of Reading and GISAT (a remote sensing and geoinformation service company in the Czech Republic). Besides project management, Alterra-CGI is responsible for the running and maintenance of the agro-meteorological information system CGMS, as well as building the infrastructure to disseminate the information, which is collected and generated within MCYFS. The latter part focuses on building advanced interfaces for visualising and analysing data which result from the various components within MCYFS (weather, crop, satellite, yield forecast).