E-AGRI Event:
Workshop on Crop yield forecasting based on remote sensing
12-14 October 2011, Rabat, Morocco

Introduction:

The workshop is the first event of the E-AGRI project. It aims to disseminate the methodology of crop growth monitoring and yield forecasting using remote sensing techniques. The two organizers of the workshop: INRA (Morocco) and VITO (Belgium) have developed and applied the main components of the methods. Nevertheless the presentation and discussion of the workshop were extended to the issue of area estimation.

Participants:

The workshop is jointly organized by INRA and VITO, with the contribution of the National Meteorological Direction (DMN) and the Direction of Statistics and Strategy of the Ministry of Agriculture. The institutes from E-AGRI consortium including JRC and Alterra joined the workshop. Many researchers from regional centres of INRA (Meknes, Tanger, Oujda, Settat, Kenitra, Tadla, and Rabat) participated as well. Other Moroccan institutions also joined the meeting such as the Morocco Central Bank (Bank Al-Maghrib), and the Ecole Natioanle d'Agriculture de Meknès. An expert from the University of Gadarif, Sudan was also present. The name list of the participants can be found at the end of the document.

Workshop Presentations:

All presentations can be found on the MOSS/FTP sites of the project or on:
http://www.inra.org.ma/def.asp?codelangue=23&id_info=2004&rub=1099&rub1=1124.

The Wednesday afternoon was essentially dedicated to the official welcome from INRA (Morocco) with the welcome address by the General Secretary of INRA, **El Idrissi Ammari Abdelmajid**. The local organizer **Riad Balaghi (INRA)** presented the programme of the workshop.

Qinghan Dong (VITO, coordinator of the project) explained the frame and the six constituent parts of the projects (work-packages).

Riad Balaghi and **Mohamed El-Aydam (JRC)** introduced the collaboration between INRA Morocco and the JRC of the European Commission in the field of yield and production estimation including data transfer, CGMS simulation for Morocco and the publication of three Bulletins since 2009, as well as the training of Moroccan experts. The Collaboration Agreement implemented for 5 years is planned to be extended. The E-AGRI project provides to both sides an excellent opportunity and financial support to further concretize this collaboration, especially to set up a CGMS adapted for Morocco with key contribution of Alterra, VITO, DMN and DSS.

Thursday and Friday were dedicated to the technical parts of this workshop. **Herman Eerens** (**VITO**) gave a lecture of basic principles on low resolution remote sensing and its application on agriculture (essentially through the MARS project), including the current availability of LoRes sensors, their pre- and post-processing, the main vegetation indices derived from these sensors and their application for crop monitoring. A case study using a SIMILARITY analysis was shown for the region of Morocco. Questions are raised:

- on the relation between the similarity of yield and the technical trends (varieties of cultivars);
- on the selection of the most relevant dekads for the analysis (the month of March might be too early for forecasting since heat-wave, heavy rain or insect disease can occur in later April or even May);
- on the possibility of application using data from other sensors such as NOAA (long time series) or MSG (availability on "water-limited" products);
- on the distinction between the yield forecasts (early in the year) and the yield estimation (once per year).

Riad Balaghi explained how he used these vegetation indices to estimate the crop yield in the two study areas (Morocco and the Huaibei Plain in China). An inter-comparison between the indices was made to select best correlated indices for each region. In both cases, DMP seems to be the best remote sensing indicator for yield estimation. On the other hand, the CGMS simulation produced even closer estimates to the published official yield figures (2009-2011 harvests). Questions are raised on:

- inclusion of the variables such as rainfall may produce better linear regression (however the correlation exists between the rainfall and vegetation indices);
- use of non-linear regression is possible but confusing for reporting to decision makers. Nevertheless this non-linear option can be integrated into the statistical toolbox of CGMS.

Tarik El Hairech (DMN, the National Meteorological Direction) introduced an approach called "AURELHY" for interpolating the meteorological station data into grids, which are needed in the CGMS application. The approach is particularly suitable for Morocco as it considers the effect of topography for T_{min} and T_{max} interpolation. DMN proposed to include the method into the CGMS set-up in Morocco.

Ahmed DOUAIK (INRA) gave a presentation on his research on using NDVI time series and stepwise multi-linear regression to establish crop fraction maps in the region of West Nizamabad (Central India).

Mohamed Jlibene (INRA) introduced the crop phenology and the impact of climate (especially the rainfall) on the different development stages of wheat in Morocco and the consequence on the yield. He emphasized on the vulnerability approach for climate risk assessment.

Steven Hoek (Alterra) explained the statistical toolbox developed at the level 3 of CGMS. The flexibility of the toolbox should allow an integration of indicators other than those derived from CGMS.

Kamal Bensaid (Bank Al Maghrib, the central bank of Morocco) (http://www.bkam.ma), presented his methodology used by his institution for forecasting agriculture production in Morocco. His team includes about 70 statisticians and economists and the methodology is essentially based on the historical rainfall data.

On the domain of crop area assessment, **Mustafa Tahiri** from **the Direction of Statistic and Strategy of the Ministry of agriculture** (DSS) introduced his approach using area frame sampling and remote sensing to carry out the crop acreage statistics. His department developed a tool to perform the automated zoning and generation of segments.

Javier Gallego (JRC) presented the approaches used by the member states of the EU for producing acreage statistics. No standardized methodology is agreed among the member states. However the European Union through its EUROSTAT office assesses the land use and land cover through the so-called LUCAS survey (Land Use and Cover Area frame Statistical survey) every three years. He explained also the major "mistake" occurred in the MARS ACTION4-Activity B "Rapid estimates of crop area change": crop area estimations relied too much on satellite images without intensive ground survey.

Hussein Suleiman (the University of Gadarif, Sudan) presented his activities on crop monitoring within his university.

Finally, **Charles Situma (DRSRS)** explained his department's operation on crop monitoring. They perform the area survey using aerial photography. With experienced photo interpreters and well distributed sampling, the area estimation can be achieved with a good accuracy. On the other hand, they use quite traditional methods to measure the vegetation reflectance with a radiometer and try to correlate the measures with historical yields. For this reason, they are particular keen to use the method focused in this workshop: using remote sensing indicators to forecast the crop yield.

Discussion and proposed actions

The most striking impression from all participants of the workshop is the great synergy has been produced in the case of Morocco with the involvement of other institutes outside of the project consortium. The discussion afterwards was grouped into three study areas.

The study area of Morocco:

- The collaboration between three Moroccan institutes (INRA, DMN and DSS) has been formalized after the kick-off of the E-AGRI project. The Moroccan partners expected a CGMS system, which could be named as **M-CGMS or CGMS-Maroc,** can be installed in all involved Moroccan institutions and managed by DMN which has IT facilities. The set-up of CGMS is expected to take place anytime soon. The calibration can be

started after the physical installation of the system. (***This point needs to be discussed in the workshop of Anhui***).

- The field experiments are carried out in 3 regions in Morocco for calibration purpose needed for CGMS as well as in BioMA applications.
- The collaboration between Alterra and DMN needs to be further strengthened. The meteo dataset generated by DMN using Aurelhy method can be compared with that currently used by Alterra. The temporal downscaling of the meteo grid to a daily level needs to be further investigated.
- The 3rd level (the statistical toolbox) of the future M-CGMS should allow an ingestion of both agro-meteorological output and the remote sensing indicators. This "upgraded" toolbox (stand-alone version) allowing integration of the RS indices will be delivered to INRA within month for test purpose.
- The expert from the Central bank of Morocco requested to have low resolution RS data and be integrated into their study. This point needs to be discussed with INRA as some real time data are not free of charge. The forecasts made by the Central Bank can be compared with those by INRA and JRC. The forecasts for the region West African can be exchanged with other institutions (JRC for example).
- Concerning the monitoring system BioMA which was not discussed during this workshop, the most interesting module for Morocco is the one for monitoring of diseases. The communication between the University of Milan and INRA needs to be intensified. It could be useful that UMI brings a visit to INRA Morocco.
- The collaboration agreement between JRC and Morocco will be extended and enlarged to three partners, INRA, DMN and DSS. The content can cover the research areas beyond the CGMS application, such as crop area estimation (see below).
- Regarding the crop area estimation, much experience on ground survey was already acquired by DSS (see their presentation). Improvement can be still made with help of JRC (especially from Javier Gallego). Mustafa Tahiti would like to bring a visit to VITO early next year to learn the classification methodologies applied at VITO. For the E-AGRI project, a new crop mask based on SPOT HiRes data could be provided by DSS. Ground survey data collected by DSS can already be made available for the project.

The Study Area of Anhui,

More data provision could allow extending our application (crop yield forecasting using remote sensing) beyond the Huaibai Plain. The following data are requested or would be required:

- the crop mask at 100 m resolution;
- the yield data at county level;
- may be the region of study can be extended in this work-package 4 (RS-Yield).

The study area of Kenya:

- Capacity building is the main task for DRSRS within the E-AGRI project. The methodology of yield forecasting using remote sensing can be the first application to be transferred and trained. First analysis will be carried out by VITO, as Kenya partner can provide the yield statistics and and some basic GIS data. Further contact at DRSRS is Vincent Mate Imala (vineima@yahoo.com).

Conclusion:

Much enthusiasm shown by the Morocco colleagues from different disciplines correlated with the emphasis set by the European Commission in this project regarding the collaboration with the Mediterranean region.

Press Release:

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ACTUALITÉS ECONOMIE SPORT OPINIONS CULTURE & LOISIRS MA VIE

MAROC MAGHREB AFRIQUE MOYEN-ORIENT MONDE SCIENCES & ENVIRONNEMENT MÉDIAS

Accueil → Economie → Agricultures-et-peches

Marchés. Les cours du pétrole ouvrent en nette progression à New York

GB. L'avenir de l'euro "n'est pas en danger"

Maroc. M. Lahlimi prend part à Paris à la Conférence de l'OCDE sur le thème "deux ans après"

Dernière mise à jour : 11/10/2011 à 09:02

Atelier sur les prévisions des rendements des cultures par techniques de télédétection spatiale, du 12 au 14 octobre à Rabat

Un atelier de formation sur les prévisions des rendements des cultures par les techniques de télédétection spatiale sera organisé du 12 au 14 octobre à Rabat par l'Institut national de la recherche agronomique (INRA).

Premier événement du Projet E-AGRI financé par la Commission européenne dans le cadre de son 7ème Programme "Framework Programme (FP7)", cet atelier constitue une occasion pour familiariser et standardiser l'utilisation des techniques de télédétection pour les prévisions des rendements des cultures, indique un communiqué de l'INRA.

L'atelier, initié en collaboration avec l'Institut VITO-Belgique et la Direction de la stratégie et des statistiques et la Direction de la météorologie nationale, sera animé par une pléiade de spécialistes et d'experts du Maroc, d'Europe et de Chine.

Les zones tests du Maroc et ceux de la Province de Ahuri (Chine) seront utilisées comme cas d'études lors de cette rencontre.

Le Projet E-AGRI vise la diffusion et la promotion des technologies de prévision des récoltes développées par les institutions européennes au Maroc, en Europe et en Asie.

MAP

Voir aussi:

- Maroc-Espagne-UE : Les professionnels coordonnent leurs actions pour la pêche
- Le Pdt de l'IMRI qualifie d'"irrecevables" les arguments d'une Commission du PE pour justifier son rejet de l'accord agricole Maroc-UE
- Martin Schultz: "Le Maroc a réalisé de grandes avancées démocratiques"
- Eneko Landaburu: Le secteur énergétique "devrait jouer un rôle-clé dans le partenariat UE-Maroc"
- Lancement à Rabat du projet de jumelage institutionnel Maroc-UE

A LA UNE

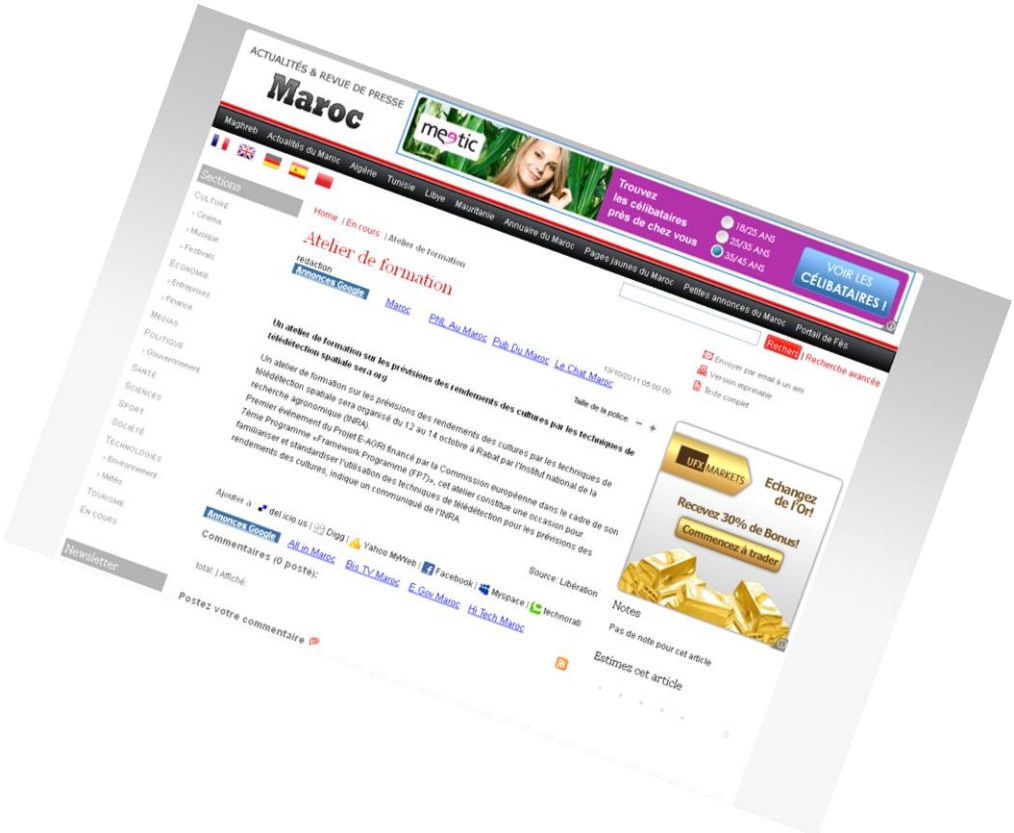
- Allocution royale à l'ouverture de la session d'automne du parlement. Les nouvelles institutions à l'épreuve — Octobre.16, 10:18 | 775
- Mobilité, sécurité et migration. Trois facettes du dialogue en cours entre l'UE et le Maroc — Octobre.16, 9:20 | 457
- Observation des législatives du 25 novembre. Les candidatures pour l'accréditation sont ouvertes — Octobre.16, 15:39 | 703
- Elections législatives. Lancement à Rabat de la caravane nationale d'inscription sur les listes électorales — Octobre.16, 12:52 | 189
- Bâtiment. 63.000 emplois crées dans le secteur du BTP en 2010 — Octobre.16, 9:4 | 121

CHRONIQUES

- Edito: Elections législatives. Le PJD en pole position — Octobre.16, 17:45 | 313
- Edito: Programmes des partis. On veut des propositions concrètes — Octobre.12, 12:59 | 238

CARICATURES


Libération
Atelier de formation


Maroc
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Maghress
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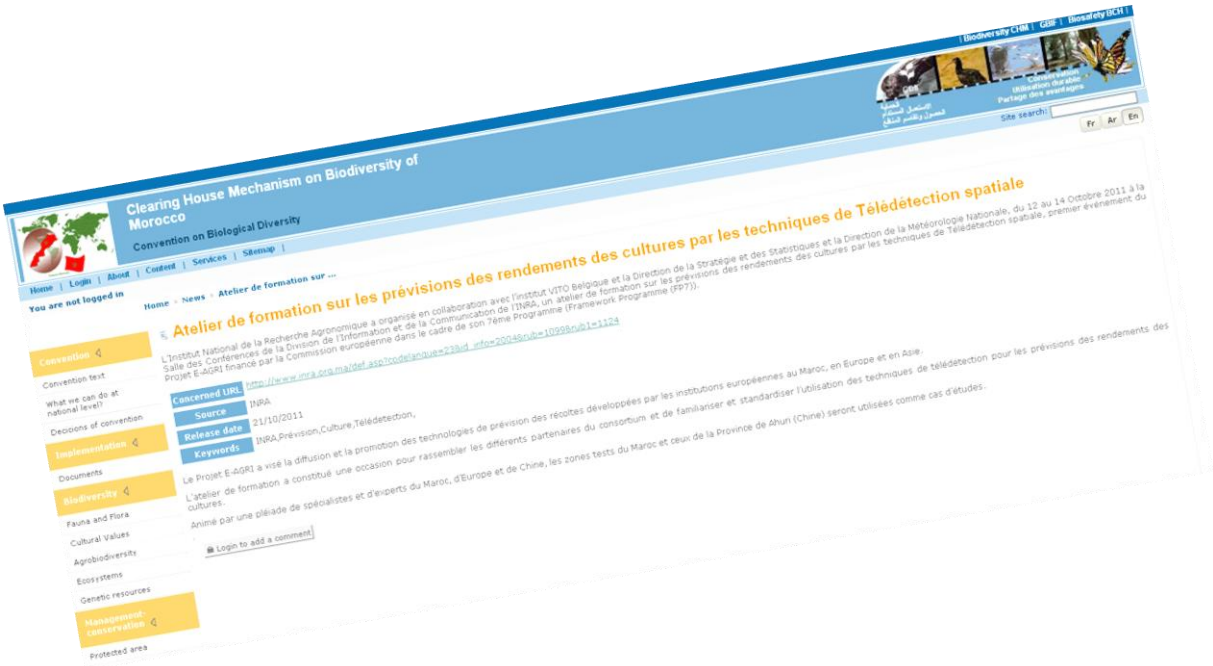
Libération


Clearing House Mechanism on Biodiversity of Morocco
Convention on Biological Diversity
Atelier de formation sur les prévisions des rendements des cultures par les techniques de Télédétection spatiale

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Workshop group photo: