Report on research institutions and value adding companies

Flemish Institute for Technological Research (VITO)

The AGRICAB project: Developing increased Earth Observation capacity for better agriculture and forestry management in Africa

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The main focus of the recently started AGRICAB project 'A Framework for enhancing earth observation capacity for agriculture and forest management in Africa as a contribution to GEOSS', funded by EC-FP7, is to integrate European and African research capacity and advances in the use of earth observation technology for agriculture and forestry.

Apart from the sustained provision of data, the project aims at a continued and better exploitation of and access to satellite data. Twinning partnerships between African and European institutes are being set up in order to integrate earth observation and predictive modeling in agriculture and forest management in different themes: (i) yield forecasting for food crops, (ii) early warning and agricultural mapping of food crops, (iii) agricultural statistics, (iv) livestock and rangeland monitoring, and (v) forest and forest fire monitoring.

The rapid expansion of earth observation based information services to society requires continuous knowledge gain and scientific know-how expansion by various user communities. AGRICAB engages in a deliberate effort to enhance local capacity and knowledge transfer for developing a sustainable data and information management capacity. AGRICAB intends to allow African partners: (i) to get exposed to state-of-the art techniques and models for agricultural and forest monitoring, (ii) to discover these techniques and models through workshops and dedicated training, (iii) to gain experience in the application of these techniques and models on the local conditions in various use cases, and finally, (iv) to adapt appropriate models for integration in the local operational workflows. Through the use cases, located in North Africa, Senegal, Kenya, Mozambique and South Africa, methodologies will be adapted to local conditions and demonstrated in different agro-meteorological conditions.

In the coming years, a series of national and regional training workshops will be organized in Tunisia, Niger, Senegal, Kenya, Mozambique and South-Africa. For more information: www.agricab.info and agricab@vito.be.

The HABISTAT and MS.MONINA project: Remote sensing services for NATURA 2000 habitat monitoring and conservation status assessment

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The ever increasing impact of modern human society on biodiversity and the resources it provides, has made biodiversity conservation a topic of growing societal concern in the last decades. Concurrently with the professionalization of nature conservation, the field has gradually taken up stronger

commitments towards society of achieving predefined targets. This evolution is prevalent at different spatial levels: global (e.g. Convention on Biological Diversity), European (e.g. Habitats and Birds Directives), national and sub-national (e.g. the Flemish MINA-plan, regional Natura 2000 conservation goals), and site level (e.g. management plans, Natura 2000 site-specific conservation objectives). In order to reach biodiversity conservation targets, data are needed. This includes both baseline data as well as a monitoring of changes taking place. In the European Union (EU) for instance, the Habitats Directive, obliges all member states to survey and evaluate the conservation status of protected habitat types and species, and to report this to the European Commission on a six-yearly basis. For habitats, this requires a. o. monitoring and reporting the status and trends of distribution, range, areal extent, habitat quality (structure and functions), and future prospects.

In the recently finished, BELSPO-funded HABISTAT project (2007-2011; http://habistat.vgt.vito.be/), a conceptual framework was developed for an operation-oriented methodology to map, monitor and evaluate vegetation and habitat types and their degree of development. The developed methodology consists of a consecutive three-step approach, where each component builds on the outcomes of the previous one(s). In each of the three steps, the input from both ecological and remote sensing knowledge proved crucial for its success. For the first time in Flanders, Natura 2000 habitats in two pilot sites have been successfully mapped and their conservation status assessed using remote sensing. The project has shown that with an integrated ecological and remote sensing knowledge approach, it is possible to meet the highly detailed requirements for NATURA 2000 monitoring. As such, the project has laid the necessary fundaments and identified the remaining key research issues, to evolve from exemplary study and showcases to a Natura 2000 monitoring system that is operationally supported by remote sensing services. A final report on the project and a multitude of publications are available on request with the corresponding author.

The recently started EC FP7-SPACE project MS.MONINA (2010-2013; http://www.ms-monina.eu/) intends to set the basis for and demonstrate such a service, complying with pan-European efforts for data harmonization and exchange (GMES, INSPIRE, SEIS), and relying on a strong user involvement

The HeathReCover project: Remote sensing support to assist ecological restoration management after heathland fires

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Heathland and peat bogs are highly valued as habitats for biodiversity conservation and as landscapes of common European cultural heritage. In the past decades, a lot of efforts and resources have been invested to protect the remaining areas, and to properly manage them in order to conserve their intrinsic value. Nevertheless, in Belgium, continuing external pressures on heathlands and peat-bogs, such as nitrogen deposition and desiccation, remain high, endangering the long-term positive outcome of these investments. The recent catastrophic wildfires of 2011 in the nature reserves of the *Kalmthoutse Heide* (Flanders) and the *Hautes Fagnes* (Wallonia) have raised a lot of public concern regarding the vulnerability of these unique heathland ecosystems to uncontrolled fires. Remote sensing (RS) has been shown to be useful to clarify the complex interaction between fires and ecosystems. A variety of methodologies can be applied to delineate burn scars, assess the short002Dterm fire severity and monitor the long-term vegetation recovery. Available methodologies range from hyperspectral post-fire data analysis to multi-temporal analysis of vegetation indices derived from multispectral data. These approaches showed the complementarities of hyperspectral and multi-temporal (VNIR-SWIR) data sets, with hyperspectral imagery representing the specific surface cover conditions over large areas and multi-temporal imagery revealing the intra- and inter-