



THE CHALLENGE

Global population has increased from about 2.5 billion in 1950 to more than 7 billion in 2012 and is projected to reach more than 9 billion by 2050. According to FAO, to achieve *food for all*, **global food production will need to grow** by 70% and up to 100% in developing countries. **Sustainable intensification of agriculture** is thereby imperative, requiring a thorough understanding of the impact of shifting cultivation practices on the environment. In this perspective, earth observation based information systems, which are currently mostly focused on **short term** agricultural productivity forecasts, will need to be enhanced with the capacity to assess **the dynamics** of cultivation practises and their **impact on productivity and the environment**. This is a key requirement to explore possible pathways towards sustainable agriculture in the **long term**.

PROJECT OBJECTIVES

The **GEOGLAM** Initiative (Global Agricultural Monitoring), a key component of **GEO** (Group on Earth Observation), aims to improve transparency in global agricultural monitoring. SIGMA's objective is to **actively contribute to GEOGLAM** and in specific to its **research agenda** through the development of methods and products that will enable to better formulate answers to the following sustainability questions:

How and where do changes in crop land distribution affect other ecosystems?

How and where do changes in cultivation practices affect environmental and sustainability options?

AT A GLANCE

Title: Stimulating Innovation for Global Monitoring of Agriculture and its Impact on the Environment in support of GEOGLAM

Instrument: FP7, Collaborative Project

Duration: 42 months

Start Date: November 2013

Consortium: 22 Partners from 17 countries

Project Coordinator: VITO

Project Web Site: www.sigma.info

Key Words: Agriculture, Environment, Remote Sensing, Global, Innovation, GEOGLAM, GEO

Contact: esiteSigma@vito.be



Photo Credit: Isabelle Piccard



How can we ensure integration of developed methods in global monitoring systems?

METHODOLOGY

SIGMA builds on an **international partnership** of expert organizations, to enable the global agricultural and environmental monitoring community to compare results based on disparate sources of data over a variety of cropping systems. As such, the project intends to develop remote sensing based methods to identify, map and assess:

- **agriculture and crop land changes**, globally, regionally and locally
- changes in **agricultural production** levels and shifts in cultivation practises
- **environmental impacts** of Agriculture

Activities are undertaken at global, regional and local level, the main challenge being to thoroughly understand the dynamics, interactions and validity of the developed methods at various scales.

EXPECTED RESULTS

SIGMA will establish an operational network of globally distributed research and monitoring organizations in Europe, Asia, Africa, and South America. Its research activities will **strengthen international agricultural risk management capacity**. Developed methods will significantly increase scientific knowledge and understanding of agricultural dynamics in relation to the **environment** and produce tangible products:

- crop land maps and statistics, identifying potential for expansion
- maps of agricultural systems, shifts in cultivation practises and crop yield gaps, identifying potential for intensification
- assessments of impact of agriculture on the environment, both due to intensification as expansion
- training sessions, modules and materials on remote sensing based agricultural monitoring

PROJECT PARTNERS

VITO (Flemish Institute for Technological Research), <i>Belgium</i>	DEIMOS Imaging SLu (DEIMOS), <i>Spain</i>
Université Catholique de Louvain (UCL) Belgium	SARMAP Sa, <i>Switzerland</i>
Stichting Dienst Landbouwkundig Onderzoek (Alterra), <i>Netherlands</i>	EFTAS Fernerkundung Technologietransfer GMBH, <i>Germany</i>
Agricultural Research Institute for Development (CIRAD), <i>France</i>	GeoVille Informationssysteme und Datenverarbeitung Gmbh, <i>Austria</i>
University of Twente (ITC) Netherlands	GeoSAS Consulting Service PLC, <i>Ethiopia</i>
International Institute for Applied Systems Analysis (IIASA), <i>Austria</i>	Regional Centre for Mapping Resources for Development (RCMRD), <i>Kenya</i>
Food and Agricultural Organization of the UN (FAO), <i>Italy</i>	Instituto Nacional de Tecnologia Agropecuaria (INTA), <i>Argentina</i>
Space Research Institute of the National Academy of Sciences of Ukraine (SRI), <i>Ukraine</i>	GISAT S.R.O., <i>Czech Republic</i>
Space Research Institute of Russian Academy of Sciences (IKI RAN), <i>Russia</i>	SarVision B.V, <i>Netherlands</i>
Joint Research Centre – European Commission (JRC), <i>Belgium</i>	Centre Regional AGRHYMET, <i>Niger</i>
National Meteorological Centre (NMSC), <i>China</i>	Institute of Remote Sensing and Digital Earth, Chinese Academy of Science (RADI), <i>China</i>

