

## Water and Soil Conditions Observed from Space

- **Infoterra GmbH leads consortium to support monitoring of environmental status across Europe**
- **ESA GMES Service Element `SAGE` set off successfully**
- **Project Results support Implementation of new European Environmental Policies through Water Framework Directive (WFD) and Soil Thematic Strategy (STS)**

A European consortium with 28 members, lead by the German Infoterra GmbH, has now started work on one out of ten ESA GSE Service Elements, worth € 1.5 Mio each. First project milestones have been completed and results have been positively received by the European Space Agency (ESA) as the contracting authority and various national environmental authorities.

Recent European environmental policies and corresponding directives oblige national, regional and local authorities across Europe to provide reports containing information of a new quality. The local in-situ measurements and statistical methods that have been applied as a reporting basis so far will need complementary information. This can be acquired through spatial monitoring in an appropriate resolution, delivering information applicable for management decisions such as the allocation and monitoring of endangered areas in order to maintain a certain status, or initiate mitigation activities.

The SAGE -*Service for the Provision of Advanced Geo-Information on Environmental Pressure and State*- project aims at supporting the authorities in fulfilling the reporting standards of the Water Framework Directive (WFD) and the Soil Thematic Strategy (STS) by introducing a new source of information into existing monitoring systems: Earth observation data. The integration of information derived from such data with existing in-situ measurements and established models is a cost-efficient and reliable way to deliver the required up-to-date geospatial environmental information. With its product portfolio comprising the two product lines *AquaSAGE* and *SoilSAGE*, the project offers a unique opportunity to bridge the gap between the policy demand and the technology offered today.

This opportunity has been recognized by various national and regional users across Europe, that have agreed to join the SAGE consortium and participate in the project as core users:

- European Topic Centre for Terrestrial Environment (ETC-TE)
- Umweltbundesamt - Federal Environment Agency (UBA), Austria
- Umweltbundesamt - Federal Environment Agency (UBA), Germany
- Swedish Environmental Protection Agency (SEPA), Sweden
- Confederación Hidrográfica del Ebro (CHE), Spain
- Institut Francais de l'environnement (IFEN), France
- Landesanstalt für Wald- und Forstwirtschaft (LWF), Germany
- Amt der Vorarlberger Landesregierung, Austria
- County Administration of Dalarna, Sweden

These users are closely integrated into the project, giving them the opportunity to steer the development of the SAGE services according to their defined needs and standards.

In a first step, SAGE seeks to establish its services in five countries, representing different European regions: Austria (Alpine conditions), France (Central European/Mediterranean test sites), Germany (Central European region), Spain (Mediterranean conditions) and Sweden (Boreal test sites). The SAGE services will cover all European environmental conditions, however, they will be customized according to the environmental and socio-economic conditions in the respective region.

As a basis for all services developed within the project, basic geo-information products containing land use / land cover information (e.g. agri-ecosystem maps, maps of forest conditions, or maps displaying soil organic matter or the degree of sealing) will be created. These will then be combined with other GIS data (e.g. existing in-situ measurements, digital elevation models, topographic maps, or infrastructure maps) both fed into existing models already established within the user community, resulting in the final SAGE product lines:

*AquaSAGE* is the framework for the development of water-related information products. For testsites in France and Spain, service providers EADS-Astrium SAS (F) and Tragsatec (E) are developing maps compatible to existing user systems, displaying irrigated surface and irrigation volume of the respective test area, thus providing input for the estimation of water availability in the course of the vegetation period. Setting the irrigation volume against the available water resource (stored resource and rainfall in the corresponding period), a prediction of water abstraction pressure is rendered possible.

The Swedish partner Metria Miljöanalys acquires information on the nitrogen leakage from boreal forests - influenced by forest management - into the surface water, allowing conclusions on the risk of water pollution. The river Dalälven drainage basin in central Sweden is used as study area.

A similar approach is performed in Germany, where statistics and maps quantifying nitrogen and phosphorus emission into the surface water of the test catchment area in Thuringia are detected. In these regions such emissions are usually caused by the intensity of agricultural activities, which will be surveyed by the responsible service provider Infoterra GmbH. The results will serve as an input to water pollution models used to identify areas at risk.

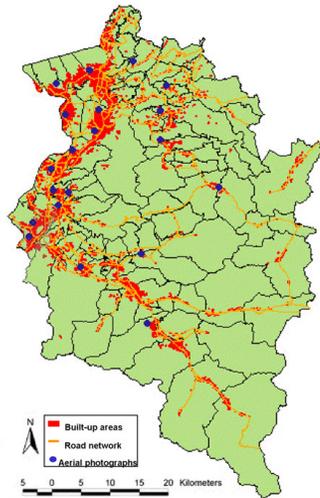
*Soil*SAGE, the soil-related SAGE services, are developed in Austria, where GeoVille GmbH will be evaluating three pilot provinces with respect to administrative land consumption, the ecological impact of soil sealing as well as the geophysical impact connected to the sealing degree. This information can be used as a basis for regional and spatial planning decisions.

As products and services using spaceborne data are not yet a well-established information source for public authorities, one of the consortium's main goals is to enlarge the existing user community of such services among the public authorities in Europe. The strategic goal of SAGE is to establish a European service based on adequate partnerships throughout the EC member states. After a successful implementation of the services in the five selected countries, a roll-out to other EU member states is planned. In order to address specific national, regional or local conditions, the consortium aims to establish new partnerships with relevant institutions and companies in the respective countries.

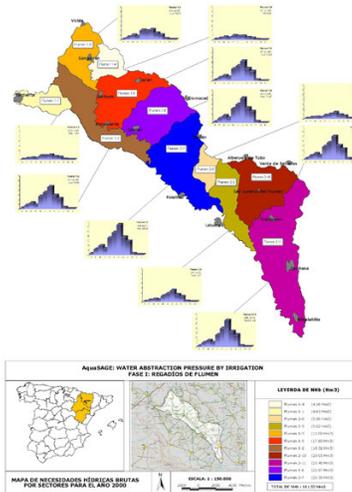
The SAGE project is one of ten ESA GMES Service Element (GSE) projects. GMES is an initiative set up jointly by the European Commission (EC) and the European Space Agency (ESA) to establish a European capacity of *Global Monitoring for Environment and Security* by 2008. A main focus of this initiative is to provide information relevant to newly implemented European directives, regarding priority themes such as *Environmental Stress* and *Land Cover*, which are addressed in this particular project.

The SAGE consortium comprises 28 users, service providers and researchers from 8 European countries. The project is lead by Infoterra GmbH, a 100% subsidiary of EADS-Astrium, the leading European satellite company. Infoterra has a workforce of approximately 25 employees in Friedrichshafen, Germany and about 150 employees in Barwell and Farnborough in Great Britain. Infoterra collects and processes data obtained from Earth observation satellites and flight missions. These tailor-made information products are used e.g. in agriculture and forestry, urban and regional planning, cartography and resource management.

The following image examples may be used to illustrate the above product descriptions of the SAGE portfolio:



Landcover Mapping (*SoilSAGE* Austria)



Irrigation Volume (*AquaSAGE* Spain)

If you would like to receive the above images in print quality, or wish to receive samples for other test areas, please contact [Mareike.Doepke@infoterra-global.com](mailto:Mareike.Doepke@infoterra-global.com).

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