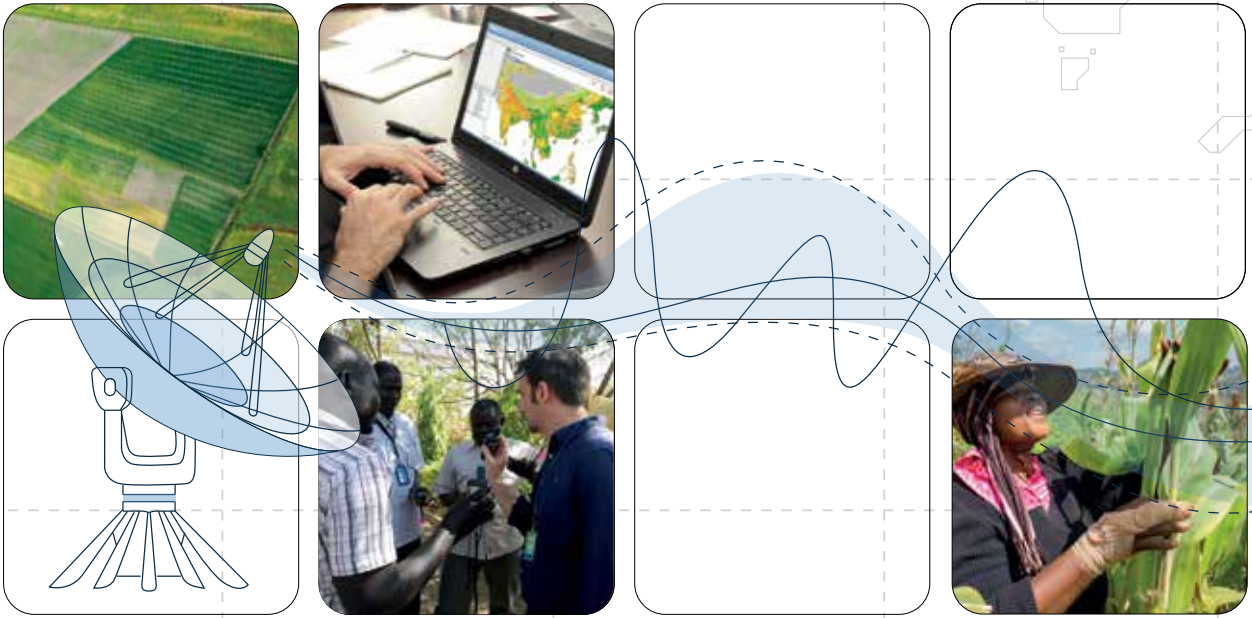
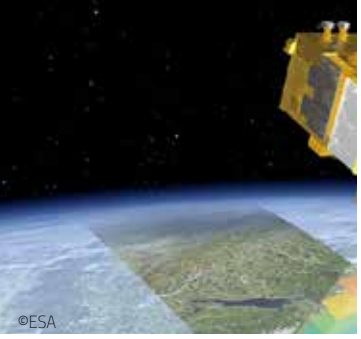
Food and Agriculture Organization
of the United Nations



FAO Geospatial

Support for sustainable resource management



WHO WE ARE

The FAO Geospatial Unit

Agricultural production provides direct livelihoods for 2.5 billion people and feeds the entire planet. It must, by 2050, produce 49 percent more food than in 2012 as populations grow and diets change.

Yet climate change, biodiversity loss, land degradation, water scarcity, pollution and many other challenges are hampering these efforts to sustainably feed the planet.

The 2030 Sustainable Development Agenda and the Sustainable Development Goals (SDG) are designed to address these issues. It is however clear that no meaningful and effective action can be taken without sound and timely data to inform and guide decision makers.

This is why geospatial data simply defined as information with a geographical component, is relevant to agriculture.

FAO has more than 30 years of experience in the development and use of geospatial data, methods and tools and helps countries implement appropriate solutions to create sustainable food systems.

This work is organized and delivered through projects and programs carried out both at FAO headquarters and through regional, subregional and national offices in developing countries, to ensure that best practices and standards are adopted and implemented.

Mission

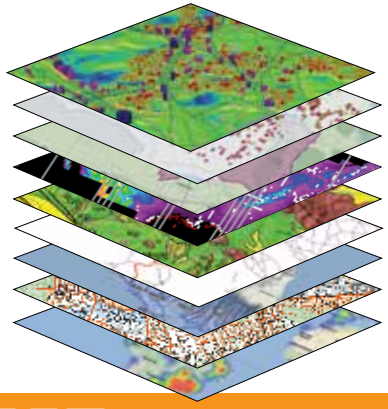
The mission of the Geospatial Unit is to characterize and monitor natural resource use, and to propose adequate information for policy relevant solutions.

Through remote sensing, we define:

- **Standards and indicators** for the regular monitoring, qualitative and quantitative, of natural resources.
- **Methodologies and tools** that support governments and institutions in the study and assessment of innovative and effective plans for production, management and safeguarding, and in building the resilience of natural resources.

These data and tools are applied to a wide range of applications including:

- agricultural production
- water governance
- forest management
- climate change monitoring
- ecosystem and biodiversity protection
- emergency and disaster management



WHAT WE DO

Land Cover Assessment

What is it?

Assessing the bio-physical cover of the earth's surface is an essential prerequisite for many geospatial applications. We produce national and regional **Land Cover Datasets**, benefiting from the most recent advances in Earth Observation Missions, cloud-computing platforms, Object-based Image analysis and Analysis-Ready Data, as well as with the integrated support of local knowledge.

Datasets are described with the **Land Cover Meta Language (LCML)**, a joint **FAO\ISO standard** developed with the final aim of providing a common reference structure for the comparison, exchange and/or integration of data for any generic land cover classification system.

What is it useful for?

It is baseline primary information crucial for:

- the sustainable management and monitoring of natural resources
- environmental protection
- food security
- ecosystem services mapping
- land use planning
- humanitarian programs

Agricultural Monitoring

What is it?

Geospatial information and technology support the development of **National Agricultural Monitoring Systems (AMS)** by providing the knowledge for cost- and time-effective statistical sampling strategies to determine accurate assessment of crop acreage and yields.
The use of multi-temporal high-resolution optical and radar imagery enables the identification of cropland areas, agricultural intensity and plant growth.

What is it useful for?

Stratification of areas of interest and areal frame design with multiple stages, associated with statistical estimators, allows fast assessment and monitoring of agricultural information, useful for:

- improved accuracy of cost/time-effective agricultural statistics
- more efficient Agricultural Market Systems
- encouraging coordination of policy action on food security

LCCS software

The Land Cover Meta Language (LCML) is a powerful tool to characterize geographic features using a modern approach with respect to the conventional classification methods.

The main advantages are that **it is an ISO Standard (ISO 19144-2:2012)** based on objects where a land cover class is defined by the object(s) it contains and their spatial (horizontal and vertical) and temporal relationships. It includes additional attributes of land use and land cover characteristics (climate, landform, topography).

In addition, the LCCS3 (Land Cover Classification System version 3) software contains a graphical interface to create, edit and export LCML-based legends.

Agro-Ecological Zones assessment

What is it?

For assessing agricultural resources and potential, we use the **Agro-Ecological Zones (AEZ)** methodology developed with the International Institute for Applied Systems Analysis (IIASA). This matches crop specific requirements for climate, soil and terrain resources, under assumed levels of input and management conditions, providing maximum attainable productivity and crop yields. By comparing future climatic conditions with baseline information on suitability and yield, the impact of climate on the performance of crops under different levels of management can be assessed.

What is it useful for?

Climate change is caused by an increased intensity and frequency of drought, changes in the level and distribution of precipitation, sea-level rise, storm surges, soil salinization, land degradation and soil erosion. The assessments of the impact of climate scenarios on the agriculture sectors and food production are crucial for:

- national plans to mitigate and adapt to these negative effects
- risk management
- land use planning

Multi-variate vulnerability assessment

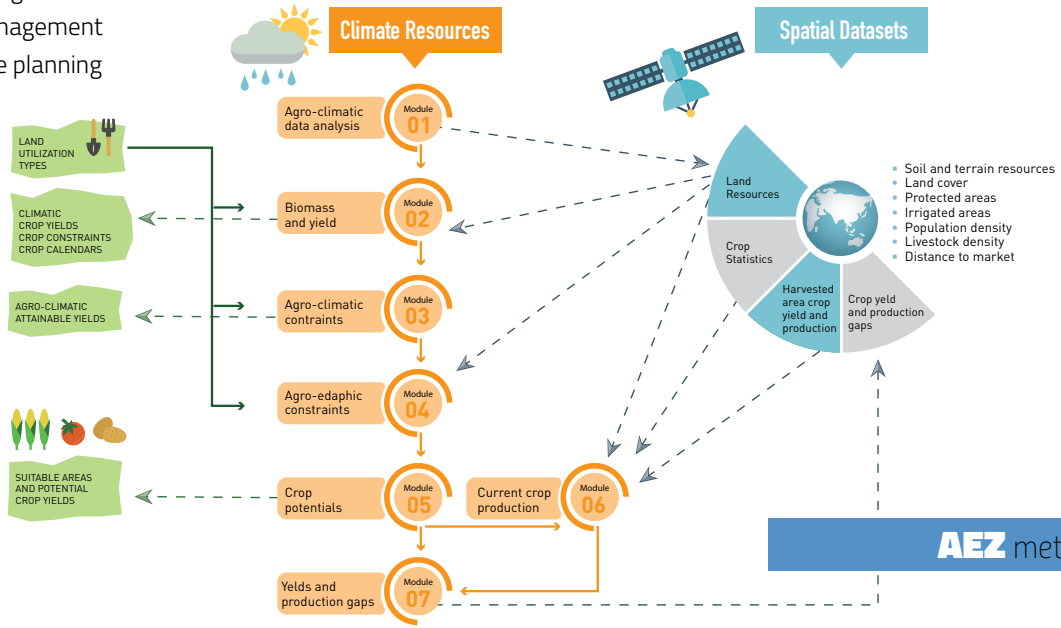
What is it?

We develop **Land Resources Information Management Systems (LRIMS)** to undertake multi-variate assessments by integrating bio-physical information on crop performance with socio-economic data and by developing impact and vulnerability scenarios. These scenarios allow the identification and characterization of the most vulnerable people and where adaptation policies can be focused.

What is it useful for?

Land resource information is essential to:

- understand climate impacts on cropping systems
- guide policy-makers in developing climate responsive policies and plans, assessing vulnerabilities and calculating the risk
- provide location-specific adaptation options for farmers
- decision-making related to land investment and management

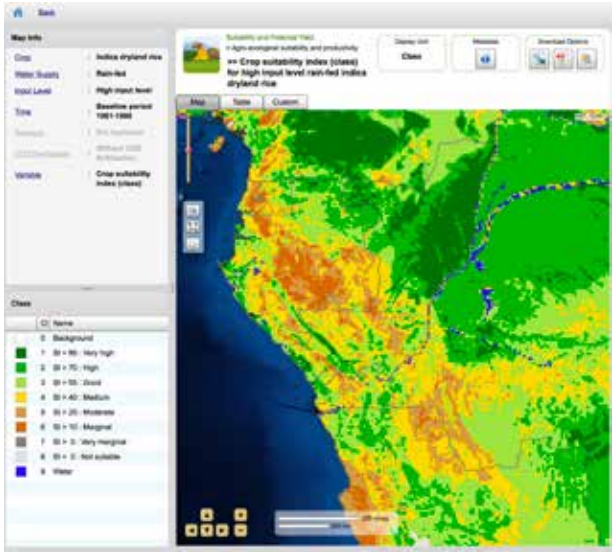


Data Portals

FAO develops web-based integrated portals for data analysis and dissemination, to support decision makers and promote multidisciplinary approaches to sustainable development. Among them are:

FAO GEONETWORK
Based on GeoNetwork opensource, this portal is one of the world's largest repositories of national, regional and global thematic datasets. Each dataset has its own metadata, compliant with ISO standards, and many of these datasets are accessible dynamically via Web Map Services (WMS)

GAEZ
The Global Agro-Ecological Zones data portal version 4 (GAEZ v4) is the fourth global assessment of land suitability, potential attainable yields and potential crop production for specified management assumptions and input levels, both for rain-fed and irrigated conditions. It provides users with thousands of global datasets and tabular outputs that are aggregated by administrative units for current major land use/cover patterns and land protection status, for baseline periods and future projected scenarios.



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PARTNERSHIPS

FAO is a member of many pivotal international, intergovernmental and multi-sector partnerships including the Committee on Earth Observation Satellites (CEOS) and the Group on Earth Observations (GEO) and related initiatives, such as Group on Earth Observations Global Agricultural Monitoring Initiative (GEOGLAM) and the Global Forest Observations Initiative (GFOI). These partnerships coordinate and harmonize data, methodologies and monitoring systems to improve and promote standards, interoperability of systems, data validation and calibration of instruments.

FAO is also actively involved in initiatives to improve the collection, use, coordination and application of geospatial data within the United Nations, for the benefit of its many mandates. These include the UN Geographic Information Working Group (UNGIWG) and the UN Committee of Experts on Global Geospatial Information Management (UN-GGIM).

It has also recently partnered with the UN Environment Programme to protect the health of ecosystems and develop more sustainable food systems. One priority is improving and ensuring access to data, statistics and indicators for tracking natural land use. Other priorities include providing evidence-based information and methodologies to back the science-policy interface and making progress towards achieving the Sustainable Development Goals.

A three-year partnership has been agreed between FAO and Google to foster innovation and expertise, and broaden access to easy-to-use digital tools.

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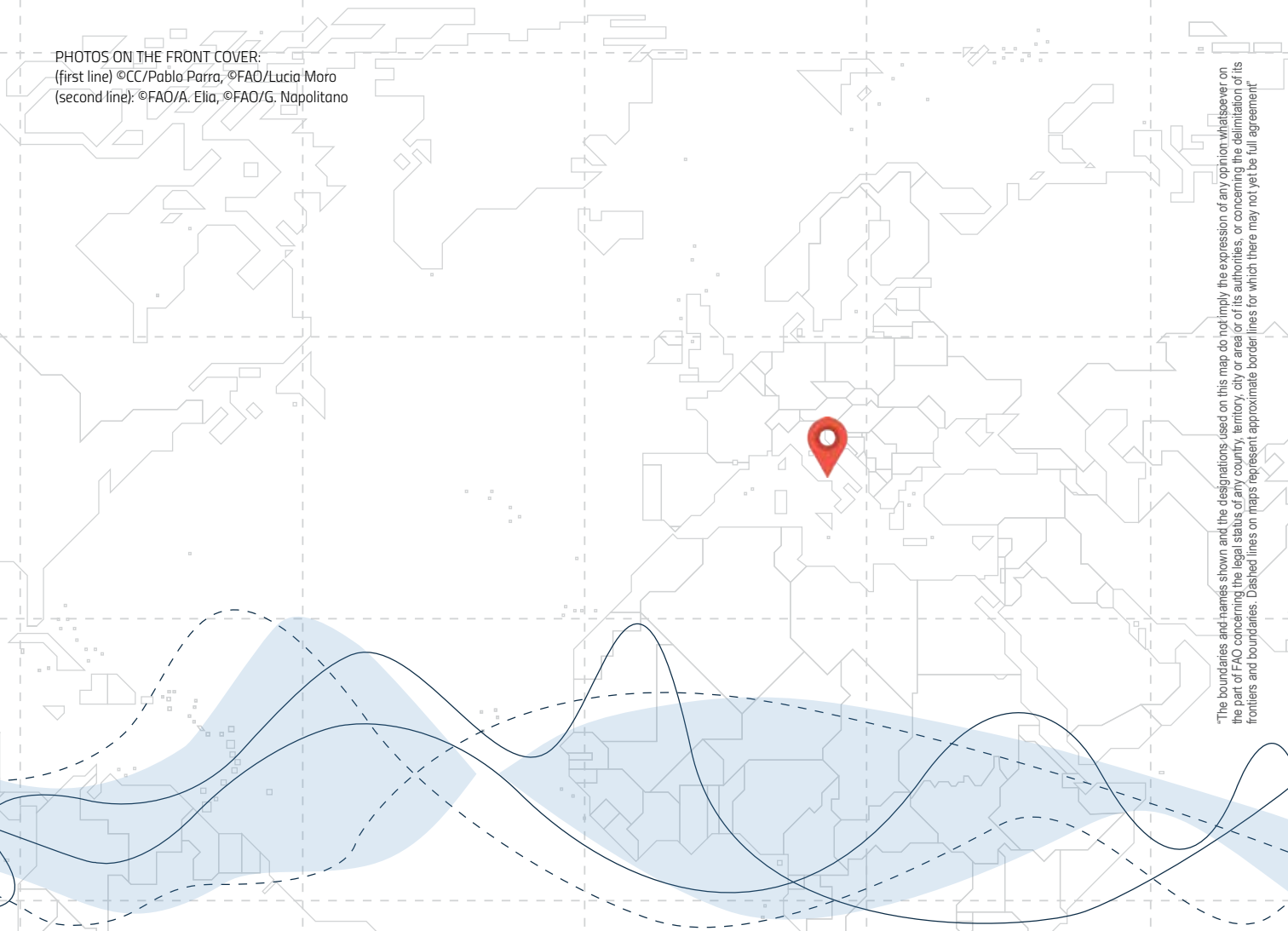

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FAO Geospatial

Support for sustainable resource management

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CA3237EN/1/02.19