



*Earth Observation Summit
Washington DC
31 July 2003*

FAO Position Paper

The Food and Agriculture Organization of the United Nations (FAO) is pleased that the United States has taken this initiative to promote an integrated earth observation system.

Understanding global economic and environmental challenges involves at least two main components that we consider to lie at the heart of this Summit:

- assisting lower income countries to enhance and sustain their development progress; and
- strengthening the collaborative linkages between scientists and policymakers in order to understand better the dynamics of global environmental change.

Addressing the needs of these diverse user communities confront us with human and institutional challenges rather than technological, per se.

Why is FAO attending this Summit? FAO is the specialized technical agency of the United Nations with a mandate to assist countries in the conservation and sustainable use of their agriculture, forestry and fishery resources. Our core mandates lie in the delivery of development assistance, data analysis and information dissemination, and serving as a neutral forum for topics ranging from food safety to conservation of genetic resources to global assessments of natural resources. As such, FAO is a major user of satellite and *in situ* data for applications that include land and water development, food production, early warning systems, hazard assessment and response, and regional and global assessments (see Annex 1).

FAO is aware of the large amount of relevant earth observation data that does not find its way into development activities or global change studies. We are also aware there is often a lack of appropriate data at the ground level when it is needed. Addressing these problems are among the reasons this Summit is timely and necessary. However, progress in improving the use of earth observation data will be slow unless many more users have cost-effective access to the imagery products they need and the capacity to use them.

Improving on the present model. The approaches to earth observation used during the past three decades are in need of re-examination. There are many benefits to be realized from a successful integrated earth observing system but speaking for FAO, I would like to emphasise just one very important one that will precede all the others – greater capacity to use earth observation products among more countries for purposes of policy making and sustainable development. FAO hopes this Summit and its follow-up does not focus (excessively) on technological issues such as development of improved sensors but rather on building capacity and collaboration mechanisms to ensure that the enormous amount of good quality data already available and even more on the horizon is fully utilized. To do this, we must:

- Strengthen the capacity of users to process and apply the (already large) supply of earth observation data. This requires a better understanding of user needs, focusing first on products - scale, frequency, accuracy, affordability – and including the relevant socio-economic dimensions from the start.
- Change the earth observation business model to include: a) an end-to-end structure that matches data generation with delivery of products needed by key user groups in the policy and development communities; and, b) actively facilitates the assimilation of terrestrial datasets needed for large-scale analysis.
- Provide systematic support to *in situ* observing systems and networks as a way to promote collaboration and data exchange. Closer ties between the *in situ* and satellite observation communities means more accurate assessment and the opportunity for better policymaking. This will improve the quality of terrestrial data and is a foundation upon which our future should be built.

Terrestrial observations need special attention. It is well known among some members of the science and development communities that terrestrial data suffers greatly from fragmentation in ownership, gaps in coverage, and weak mechanisms for data exchange and collaboration. Many activities and studies are forced to use lower quality data than is desirable. One example is found in the Terrestrial Carbon Observation (TCO) initiative (part of the IGOS carbon theme) which seeks to make a global estimate of terrestrial carbon sinks and fluxes at a known accuracy. Achieving this will require significant improvements in datasets related to land cover change, forest cover, fire, biomass and leaf area index, coastal and wetland dynamics and freshwater flow. The results can have significant implications for the Kyoto Protocol and future climate change negotiations as well as benefits for many other users of these products. However, unless more investment is made today to generate and assimilate improved terrestrial data efforts such as TCO will not succeed.

Moving forward. The initial architecture for an integrated earth observation system is in place and the space agencies, collaborating within the framework of the Committee on Earth Observation Satellites (CEOS) and the Integrated Global Observing Strategy partnership (IGOS-P), are among the key elements. However, much work is still needed to realize the benefits of integration and reduce imbalances between developed and developing countries. Foremost is the need to formulate policy-relevant questions that are based in science and have a defined community of users. There already exist a wide array of policy-relevant science questions to draw upon. These have arisen from expert panels related to implementation of multi-lateral environmental agreements such as on biodiversity, climate change and desertification as well as the Millennium development goals, the WSSD Johannesburg plan of implementation, and the new partnership for Africa's development (NEPAD). While the exercise will not be a simple one, we are not starting anew.

Working through its technical programmes and global change initiatives such as GTOS, FAO would also encourage the follow-up to this Summit to examine ways and means to:

- link the precision, accuracy and consistency with which land-based sites can measure certain variables to larger scale assessments that are possible on satellite platforms. The Terrestrial carbon observation (TCO) initiative is one example; others could be initiated in the field of agriculture.
- improve user access to dynamic geo-spatial data and information, both within and outside the specialized technical agencies with multi-lateral organizations.

- improve observing systems in developing countries through capacity building aimed at the collection, use and management of earth observation data.
- intensify development of information management tools and software to integrate maps, databases and documents in order to provide rapid analysis for development activities as well as emergencies and early warning systems.
- re-examine and prioritize critical gaps in the current observation system framework.
- develop a global gridded data system that draws on *in situ* and earth observation data for applications at multiple scales and multiple uses.
- define requirements and standards for national and international information infrastructure through forums such as the ISO and the OpenGIS.

International collaboration is essential. FAO welcomes the initiative taken to organize this Summit and the representation by countries and international organizations. We believe there is an important role to be played by the United Nations system in integrated earth observation and the IGOS partnership is an affirmation of the need for such collaboration. While nations can go far on a bi-lateral basis, agreement on standards, definitions and norms, building capacity to collect and exchange data in a free and transparent setting requires a forum in which consensus can be reached among all countries. The recently established Joint Technical Committee on Oceanography and Marine Meteorology (Unesco-Ioc/Wmo) is an example of the benefits of using a multi-lateral mechanism to coordinate observation standards, data quality and to fill key gaps; a similar mechanism may be needed for terrestrial observations.

To strengthen collaboration between the multi-lateral organization and the space agencies, the following actions could be considered:

- systematically use archived data to generate “change” products for global assessments in sectors such as food and agriculture, forestry, oceans, and environment.
- plan for and invest in *in situ* observing networks when defining earth observation missions through interaction with user communities.
- define and generate products that are needed to support implementation of multi-lateral environmental agreements.
- facilitate data access and processing policies for organizations where financial and technological capacity to process such data is less strong and improve catalogue access to imagery over the internet.

FAO stands ready to participate actively in developing the plan for an integrated earth observation system during the coming year. We especially look forward to confronting the challenges in improving the coverage, quality and availability of terrestrial data and information.

ANNEX 1

Examples of FAO activities currently using earth observation products

Global / regional

- Advanced real-time environmental monitoring information system (Artemis)
- Global information and early warning system (GIEWS - sub-Saharan Africa)
- Global forest resources assessment (FRA)
- AfriCover land cover mapping
- AsiaCover land cover mapping
- Desert locust information service

- Natural disaster assessment and monitoring (droughts, floods, insects, etc.)
- Emergency prevention system against transboundary animal and plant pests and diseases (EMPRES)

National:

- Land cover maps (at higher resolutions)
- Forest inventories
- Crop yield forecasts
- Watershed management
- Pasture management (use habitat mapping)
- Hotspots (Bosnia, Congo, Iraq, North Korea, etc.)

Examples of earth observation products currently used by FAO

- NOAA vegetation index for estimating drought conditions (Sub-Saharan Africa)
- Spot 4 Vegetation (VGT/NDVI) for crop monitoring and yield forecasting
- Spot 4 to forecast and map locust outbreaks
- Eumetsat for drought early warning
- Modis (250m) for GIEWS, locust outbreak etc.
- Landsat scenes for global forest assessment

Examples of FAO activities that could further benefit from an integrated earth observation system

- A dedicated, operational land observation system that provides long-term continuous data, especially in Africa.
- Regular supply of higher resolution imagery on a regular basis (5 year intervals) for agricultural environmental hotspots in Africa and Asia.
- High resolution global land cover map, in particular in tropical areas.
- A hydrological network database with global coverage.
- Systematic GIS digitizing of archive data on land and water resources.
- Seasonal mapping of small water bodies in Africa.
- Global assessment of irrigated lands.
- Global map of freshwater wetland dynamics.
- Operational monitoring of forest fires and logging areas.
- Microwave sensors for soil moisture, biomass, small water bodies.