

AGRHYMET: SERVING THE SAHEL REGION WITH GEO-INFORMATION AND TRAINING

Geospatial Co-operation in Vulnerable Sahel

To monitor the environmental changes and find solutions in the vulnerable Sahel region, the AGRHYMET institute (AGRIculture, HYdrology and METeorology) was established thirty years ago. AGRHYMET aims at collecting, processing and managing biophysical and socio-economic data. Furthermore, the organisation services the Sahelian countries with information and training to cope with challenges in food security, natural resource management and desertification control.

The Sahel region is a zone stretching across the African continent from the Cape Verde Islands and Mauritania to Sudan. The region is synonymous with desertification, drought and harsh living conditions. Man-induced changes to vegetation from overgrazing and intensive use of wood for cooking and heating are being supplemented by global climatic change that will put even more pressure on this extremely vulnerable habitat.

CILSS

The Permanent Interstate Committee for Drought Control in the Sahel (Francophone abbreviation CILSS, see websites) was created on 12th September 1973 as an intergovernmental organisation of nine Sahelian countries. The current mandate consists of 'seeking to assure food security and to combat the effects of drought and desertification for a new Sahelian ecological balance'. In organisational terms CILSS is comprised of three branches: the Executive Secretariat based in Ouagadougou, capital of the Republic of Burkina Faso, the Sahel Institute, a specialised institute, based at P.O. Box 1530 in Bamako, capital of the Republic of Mali, and an AGRHYMET Regional Centre (ARC). The last is a specialised institute based in Niamey, capital of the Republic of Niger and provides the special focus of this article.

AGRHYMET Regional Centre

The AGRHYMET Regional Centre is a specialised institute of CILSS and an interstate public body with legal status and financial autonomy and carrying international status. It was created in 1974 in the wake of the drought that had hit the Sudano-Sahelian zone of West Africa since 1969 and resulted in human and ecological disasters in 1972 and 1973. Originally, the Regional Centre was geared towards training in agro-meteorology and operational hydrology and their applications. The restructuring of CILSS in 1993 resulted in the creation of two major programmes: Information and Training and a Management Centre.

Information Requirements

The mission for AGRHYMET is the collecting, processing, analysing and managing of biophysical and socio-economic data, while at the same time producing and disseminating information on food security, natural resource management, desertification control and the environment. The resulting objectives are to sensitise and regularly and pertinently inform populations, decision-makers and other stakeholders such as national authorities, development partners and so on, to encourage more rational decision making on issues relating to food security, natural resource management and the environment in the Sahel. In conformity with this mission the ARC organisation constitutes of three operational units: the Food Security Unit, the Methods and Applications Unit and the Natural Resource Management Unit.

Food Security Unit

The duties of this unit include the collection and management of biophysical and agro-socio-economic data and the exploitation of ground-truth and satellite data for crop prediction, early warning (drought, and the often occurring huge, both in terms of geographical spread and individual size) plagues of pests such as locusts. Warning and advice is also provided to farmers and producers, involving the following activities:

- analysis and processing of biophysical information using, among others, satellite, airborne and agro-socio-economic data
- monitoring cropping season and vulnerable populations
- analysis and information dissemination regarding food security through early-warning bulletins intended for decision-makers and advice to farmers and producers.

Accordingly, the Food Security Unit consists of three components devoted to crop monitoring, risk zones and vulnerability and, last but not least, analysis and statistics.

Methods and Application Unit

This unit engages in improvement of existing methodologies, development and transfer of new tools to users, and agro-meteorological and environmental modelling. In practise this means the improvement and development of methods for field monitoring, developing software and applications in food security for desertification control and natural resource management and developing methods and tools for environmental monitoring.

Natural Resource Management

This third unit collects, processes, analyses and manages data on agricultural and pastoral phenomena, crop and water resources. This involves collecting and managing data for ecosystem monitoring, developing and transferring methods and techniques for natural resource monitoring, studying and analysing changes in land use and cover, climate change etc. It also means providing assistance to users in terms of study, training and advice on issues relating to natural resource management and the environment. Development and transfer of products, tools and methodologies to CILSS member countries is another task. The Natural Resource Management Unit is made up of two components, one for climatology and resources and the other for geographical information systems and remote sensing.

Geospatial Products

AGRHYMET has a wide variety of data available on climate, hydrology, agriculture, food, phyto-sanitary and pastoral matters. NOAA satellite data is offered via all channels, while NOAA satellite-based lake and pond, and pasture area monitoring can also be obtained. METEOSAT satellite data for rainfall estimation and satellite image animation is available. In the mapping domain, information is available and for sale on administrative units, road networks, forests, soils, rainfall and crop monitoring, hydrography, watering points for humans and cattle, Normalised Difference Vegetation Indices (NDVI, greenness), sea surface and ground temperatures and rainfall stations locations and readings. Also available are aerial video-survey and aerial photos of specific areas or locations taken at customer request. In addition, biological data products, for reference only, include collections of nematodes, insects, rodents and other crop pests, rearing of locusts, rodents and other pests, and cultures of bacteria, fungi, weeds, etc.

Provision of Services

Some of the services offered by AGRHYMET include agro-hydro-meteorological studies, satellite-image processing, phyto-sanitary analyses, field consultancy, laboratory research and analyses, advice on development issues, advice on design, development and utilisation of GIS and studies and advice on ecological and environmental issues.

Project Participation

ARC is taking part in the programme for monitoring land use and land cover across West Africa funded by USAID and initiated by the USA Geological Survey USGS EROS Data Centre, the AGRHYMET Regional Centre, the Sahel Institute and the Word Resource Institute WRI.

Why Monitor?

Conditions dominating West African earth resources are changing radically at both local and regional level. The ecosystems upon which West African societies depend for their survival are showing many signs of stress. It is therefore essential to comprehend changes in land cover in order to understand the functioning of these ecosystems, the eco-services they provide and the wellbeing of certain populations. An explicit geographical study of changes in land use and land cover will enable a better understanding to emerge of causes and consequences on the environment and societies. Such knowledge will enable improvement in decision-making concerning water and soil resource management and ensure that these ever-changing ecosystems and landscapes are managed in a sustainable way.

Programme Implementation

The land use and land cover programme comprises two phases. A first phase (1997-2001) focused on the methodology for data collection, socio-economic studies and Corona and Argon-satellite photography of the following countries: The Gambia, Mali (Kalokani), Burkina Faso (Hippopotamus pond) and Niger (Mayahi). A second phase, currently underway, is mainly addressing long-term monitoring of land use and land cover in the Sahel and West Africa.

Training

This AGRHYMET initiative is expected to strengthen capacities of Sahelian nationals and institutions in the conception and execution of programmes and activities in food security, desertification control, natural resource management and the environment through vocational training adapted to the Sahelian context. The Training Major Programme comprises two units: the Basic Training Unit and the Continuous Training Unit.

Basic training includes two courses of training intended for Engineer Students and Higher Technician Students in courses of study covering Agro-meteorology, Crop Protection, Hydrology, and Maintenance of Meteorological Instruments and Microcomputing. Between 1975 and 2003 the Training Major Programme has trained 820 Higher Technicians and Engineers in Agro-meteorology, Hydrology, Instrumentation and Crop Protection.

The types of activities here comprise individual, personalised training courses and group training courses. The AGRHYMET Regional Centre offers training modules for potential users in public and private sector, NGOs and supervision of trainees for students on master's and PhD study programmes.