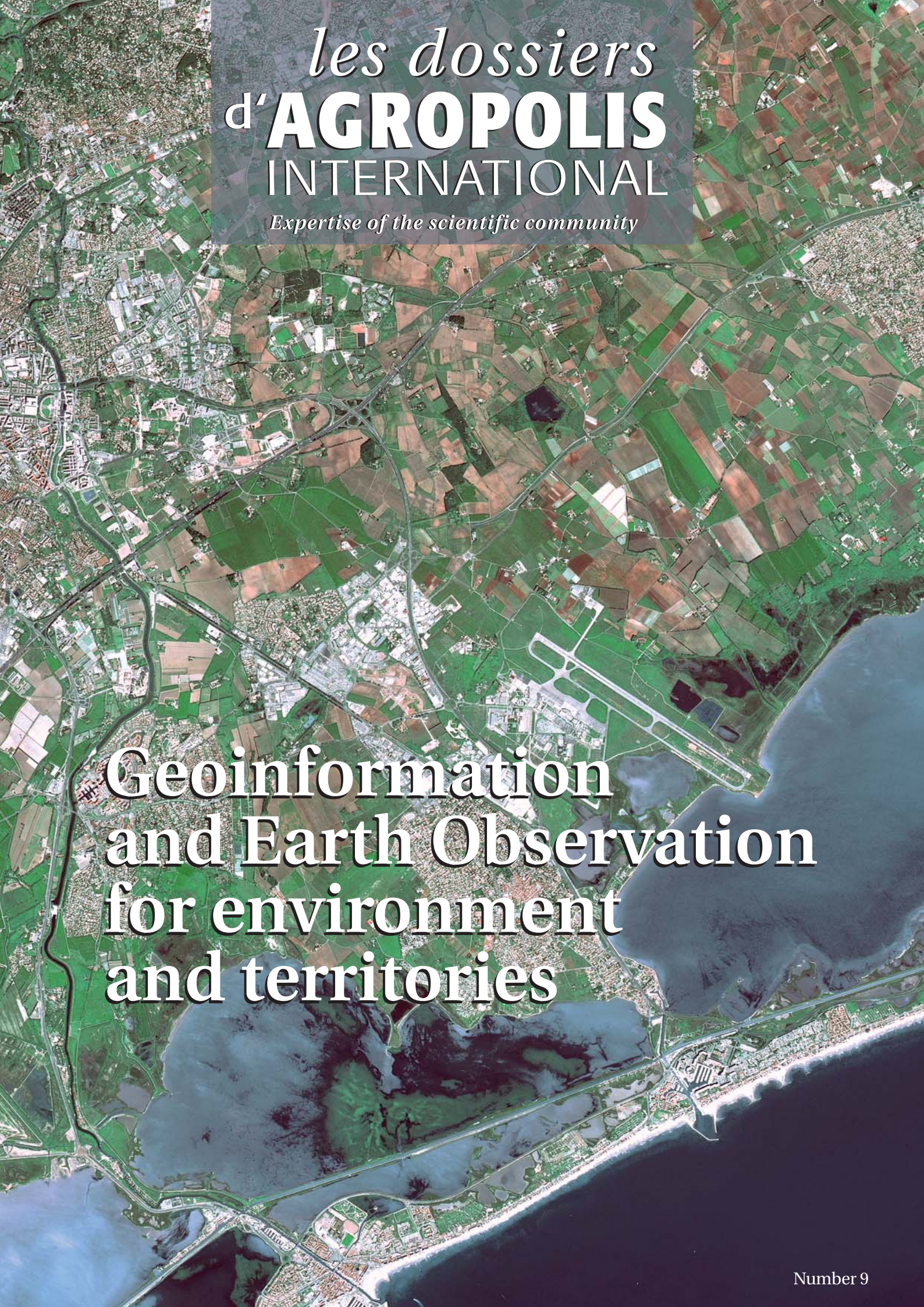


les dossiers
d'AGROPOLIS
INTERNATIONAL
Expertise of the scientific community

Geoinformation and Earth Observation for environment and territories

Number 9

constraints of different social groups will be clearly expressed and taken into account by all concerned parties.

A fifth line of activity is devoted to training (representing around 20% of the UMR's activities): initial engineering training, MSc and PhD courses, continuing professional education, etc.

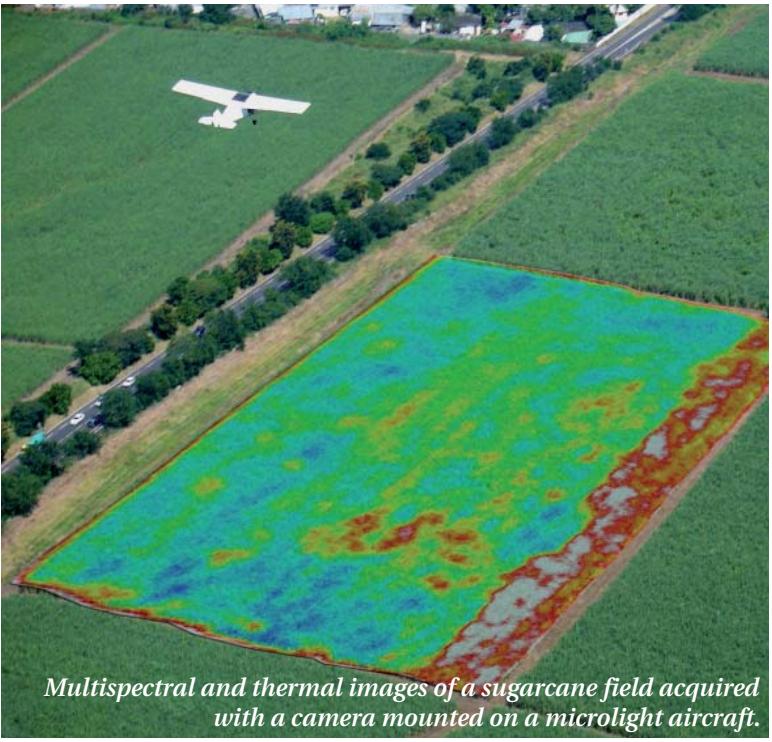
Approaches are developed in remote sensing, computer science, spatial analysis, geography, environmental science and territorial development. The UMR coordinates research projects and public policy support projects that concern agriculture, the environment, natural areas, forests, aquatic environments, animal health, territorial development and hazards.

Earth Observation, integrated management *of environments and* societies, information *for territorial development* in tropical environments

The overall goal of the *Expertise et SPAtialisation des Connaissances en Environnement* unit (ESPACE, IRD) is to develop and implement methods for the spatialization of knowledge through remote sensing and integrated approaches, from data acquisition to decision-making processes, with the aim of promoting sustainable territorial development in tropical environments.

The scientific and technological activities of the unit are organized in the framework of three methodological research programmes:
- satellite Earth Observation for monitoring tropical environments: remote sensing based spatial indicators, near real time environmental observation and monitoring methods
- integrated approaches to environment and society: landscape analysis and observatories for environmental management, spatialization of environment-health risks; territorial governance indicators
- integrated knowledge systems to enhance decision-making support: interoperable information systems for sharing mixed (spatial and *in situ*) data, modelling of dynamics. •••

Development of light airborne image acquisition systems (visible and thermal IR bands): the AgriDrone project



Multispectral and thermal images of a sugarcane field acquired with a camera mounted on a microlight aircraft.

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The aim of the AgriDrone project is to supply farmers in Réunion with sugarcane production management support tools to enable them to increase crop yields and reduce expenditures through efficient fertilization, irrigation, weeding and pest control.

These new tools are based on aerial photographs taken with commercial digital cameras. These cameras are equipped with band-pass filters through which only the desired wavelengths pass (e.g. near infrared). A thermal camera is also used to measure surface temperatures. These cameras are mounted on small unmanned aerial vehicles or ultralight-type aircraft that are ready for service upon request. Maps are drawn up on the basis of geoinformation obtained from the images. Spectral information from the images is correlated with the field data (plant nitrogen and water contents, leaf area, biomass, etc.) in order to clarify the link between the measured radiometric signal and the surface parameters, and to develop relevant agricultural indicators for the agricultural subsector. The tools developed within the framework of AgriDrone will ultimately enable users to gain insight into the actual situation on target farms (planted area, average field slope, heterogeneity, etc.), and to monitor crop development and growth anomalies (germination, weed infestation, water and nitrogen stress, etc.).

A comprehensive operational service is now available based on the methods and tools developed through this project: a catalogue of mapping products, a tool for disseminating and handling digital maps and teaching material for secondary schools and technical services.

This project is carried out by CIRAD in partnership with Cemagref, *Avion jaune* and CERF. It is supported by the French Ministry of Agriculture and Fisheries and the Réunion Region.

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