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VALORISATION & INNOVATION en PARTENARIAT
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Editorial

The Mediterranean Basin, at the crossroads between three continents, is an impressive cultural, religious and social mosaic. Throughout history, its unique position has favoured the exchange and intermingling of people and goods. However, the increasing concentration of human activity in areas bordering on the Mediterranean is now posing a major threat to this common good, exacerbated by the impact of climate change and reduced water availability. The growing economic divide between the northern shores and the southern and eastern shores of the Mediterranean is also cause for concern. The food issue, which has been in the spotlight in recent months, will hit countries on the southern shore particularly hard, as they are net importers of agricultural products.

Given the rural, food and environmental issues in the region, the France-led plan for a Mediterranean Union could revive scientific cooperation, particularly in the field of agriculture. CIRAD has chosen the Mediterranean as one of its priority operating zones, and as far as possible, it will be working jointly with INRA in the zone. It is working to build on its partnerships and expertise in the fields of water saving, animal disease surveillance, rural poverty, sustainable forest management and adapting varieties to new ecological constraints, among others. This type of active, united application of the whole range of agricultural skills in the region is vital if we are to tackle the crucial challenges facing the Mediterranean. Let's work together on this!

Etienne HAINZELIN

CIRAD Director of Research and Strategy

Irrigator network in the Mediterranean

CIRAD is currently developing training courses in economical water management for farmers' organization leaders and development staff in Morocco, in collaboration with the Meknès agricultural college, the *Institut agronomique et vétérinaire Hassan II*, CEMAGREF, the *Fondation pour l'agriculture et la ruralité dans le monde* and the Lot Chamber of Agriculture. These courses are to be extended to the rest of the Maghreb. In addition, teaching films on the water shortage in the Maghreb and the possible solutions are being produced under the *Fonds de solidarité prioritaire* "SIRMA" project supported by the Ministry of Foreign Affairs.

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Agricultural research cooperation with Egypt

In April 2008, a programme for Franco-Egyptian cooperation on agricultural research was established and an ongoing call for projects launched by the *Bureau de liaison agricole franco-égyptien,* to encourage French research organizations to set up partnerships with their Egyptian counterparts. The programme will run alongside the 2007 partnership agreement between CIRAD and the Egyptian Ministry of Agriculture and Land Reclamation. Several projects on varietal breeding and tolerance of water and salt stress (citrus fruits, sugarcane and mango) are under study.

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Creation of biotechnology enterprises

The Languedoc-Roussillon Incubation business incubator has just approved two enterprises set up in relation to research work under way at CIRAD: ISUA® specializes in producing algal biomass in an original type of bioreactor, and in producing active and functional biomolecules for the natural health product industry through metabolite extraction-concentration; GREENFEEL produces tropical plant compositions grown in vitro in elegantly designed glass bubbles, for the interior design market.

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100% poultry products

CIRAD and a firm in Réunion, Crête d'Or Entreprise, have recently signed a partnership agreement to exploit a CIRAD patent for the use of poultry fat, modified by dry fractionation and texturing, in meat products. The agreement covers the adaptation of the processes concerned to an industrial scale, and an assessment of the sensorial quality of such meat products. Partners are due to be sought in France and Arab countries in the Gulf and the Maghreb, for the export of these types of products and this shared know-how.

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Sensorial analysis of chocolate

in June 2008, CIRAD and the *Université du chocolat* (Paris) organized an eighth training course in sensorial analysis of cocoas and chocolates, for small- and industrial-scale cocoa and chocolate makers. The participants were introduced to the sensorial analysis of cocoa beans, mass and chocolate: basic tastes, aromas and flavours, relevant descriptors, etc. Fermentation, roasting and the various origins were also looked at. These seminars are held regularly in Montpellier, with the next one scheduled for June 2009.

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Science

Underground water resource management

In both the northern and southern Mediterranean, increased use of underground water resources has enabled a spectacular boom in agriculture, but has also led to the overexploitation of those resources. Water tables near the coast are particularly susceptible to the intrusion of salt water, which is largely irreversible. In the longer term, there is a risk of reduced replenishment of water tables throughout the region.

development of new underground water resource management practices

In view of this, CIRAD will be supporting the development of new underground water resource management practices to prevent the deterioration of the Roussillon aquifer in France, the Chaouia aquifer in Morocco and the Querença-Silves aquifer in Portugal. The aim is to strengthen the capacity of farmers and catchment area agencies to anticipate on future changes and assess new underground water usage strategies. ■

» Are you concerned by the replenishment of underground water reserves?

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Orange harvesting in the Bas-Cheliff region, Algeria.
Stamp: "SIRMA" project in the Maghreb.

Supporting pastoral farmers in the Maghreb and Mashreq

Pastoral systems in the countries of the Maghreb and Mashreq are changing dramatically as a result of population growth and sedentarization, and the ensuing conversion of common rangelands into individual fields and orchards.

CIRAD, ICARDA (International Center for Agricultural Research in the Dry Areas, in Syria), and national research organizations in the region are working to investigate these changes on a local population level, in the hope of building pastoral and agropastoral farmers' capacity to adapt to the increasingly difficult climatic conditions. They are analysing how farms currently operate and are organized. Bioeconomic models, socioeconomic analyses on a household and social group level and diagnoses of institutions and organizations on a community level are being developed. ■

socioeconomic analyses on a household and social group level

» Are you interested in these changes in animal production?

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Citrus stocks adapted to Mediterranean conditions

The Mediterranean is the world's second largest citrus fruit production basin, after Brazil. However, citrus fruit growing in the region is facing increasing problems with diseases, drought, salinity, and chalky soils. Producing countries are currently converting their orchards using stocks that are resistant to the Tristeza virus and can withstand water and salt stress and the chalky soils that are common in the region. With European funding, CIRAD and its partners in Spain, Morocco, Tunisia and Turkey are working to satisfy the region's need for new varieties and to propagate the new stocks. Their methods are based on biotechnologies, and training courses have been organized in Morocco, Tunisia and Turkey. A multi-site agronomic assessment network has been set up for promising stocks. Tetraploid stocks are proving more tolerant of salt and water stress. ■

a multi-site agronomic assessment network has been set up for promising stocks

» Are you looking for new citrus varieties?

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Market

Supporting natural reserves in Lebanon

Lebanon's natural areas have been badly damaged by urbanization. Even its emblematic cedar forests have almost entirely disappeared.

CIRAD contributed in 2005 to a project document concerning the establishment of a network of natural reserves, funded by the *Fonds français pour l'environnement mondial* (FFEM). The Tannourine, Chouf and Horsh-Ehden reserves in particular are protecting some remaining cedar forests, the vestiges of the country's fine forests of the past. The future Jabal Moussa reserve is a zone of Mediterranean forest in which wolves are still found. It has been recognized as a preserved natural area that needs to be protected against urbanization. CIRAD and the *Atelier technique des espaces naturels* (ATEN-Montpellier) are establishing a training course for the managers of Lebanon's natural reserves, to be held in 2008 or 2009. ■

protecting some remaining cedar forests, the vestiges of the country's fine forests of the past

» Are you interested in preserving natural areas?

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Training forest engineers in Algeria

At the request of the *Direction générale des forêts* in Algeria, the *Institut agronomique méditerranéen de Montpellier* has for several years been working with CIRAD to run training courses in how to restore eroded mountain zones, for Algerian forest district managers. These courses are held each year in France and

management of national parks, geographical information systems, forest tree seedling production

Technology

Integrated management of the cedar forests of the Middle Atlas

The cedar forests of the Middle Atlas contain considerable biodiversity and act as a water tower for the region. However, they are under threat from drought and over-grazing.

At the request of the Moroccan government, CIRAD is supporting a project headed by the country's *Haut Commissariat aux Eaux et Forêts et Contre la Désertification,* on the management and protection of forests in Ifrane province, in the Middle Atlas. The project has been working with the authorities, towns and villages, local populations and associations to create the socioeconomic conditions and install the equipment required to renovate the province's agro-silvo-pastoral systems (irrigation, fruit crop plantings, rehabilitating rangelands, etc). It has led to the creation of the Ifrane National Park, which now has its own development plan. The establishment of a biosphere reserve in the cedar forests of the Middle Atlas is under study, with a view to obtaining recognition from UNESCO of this ecosystem of global interest. ■

working with the authorities, towns and villages, local populations and associations

» Are you concerned about forest protection?

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last two weeks, including theory lessons and field trips to the Cévennes and the Alps. Each session has around a dozen participants.

Other training requirements are currently emerging, as regards management of national parks and periurban forests, geographical information systems and satellite image processing, forest tree seedling production, etc. CIRAD is developing new training courses on these topics that could be organized on request, in either France or Algeria. ■

» Are these training courses of interest to you?

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Expansion of banana growing in Turkey

Banana growing has really taken off in Turkey in recent years, with a total output of some 165 000 tonnes, solely for the domestic market. To limit the damage caused by the country's relatively harsh winters, production is concentrated in a coastal belt along the shores of the Mediterranean in the Antalya region.

Since 2005, CIRAD and the University of Akdeniz in Turkey have been looking for new varieties that are more tolerant of the cold, the main factor limiting the crop's expansion in the region. With the collaboration of VITROPIC, which produces banana in vitro plantlets, an initial assessment in a greenhouse of four Cavendish-type elite varieties has given very promising results. Varieties Williams, MA13 and cv902 are well suited to these Mediterranean conditions, and surpass local varieties. The assessment is continuing, with a second cycle in 2008. ■

an initial assessment in a greenhouse of four Cavendish-type elite varieties has given very promising results

» Are you interested in these banana varieties?

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Maintaining argan trees in southern Morocco

Argan, a forest species indigenous to Morocco, is traditionally used by women to make argan oil, and by men for grazing and wood. The argan groves are currently subject to over-grazing and various other constraints, and their area and density are decreasing sharply, both on the plains and in the piedmonts. To protect and rehabilitate them, the Moroccan government has launched a project to improve the employment situation for rural women and manage the argan groves of southwestern Morocco sustainably. CIRAD, the University of Rabat and the *Institut agronomique et vétérinaire Hassan II* in Agadir are working on using argan oil extracted from the kernels, useful molecules extracted from the fruit pulp, and vegetative propagation of argan, intercrops, and using symbiotic root fungi to improve seedling quality.

using argan oil extracted from the kernels, useful molecules extracted from the fruit pulp, etc.

Another project has just been launched on cloning argan with other partners. There are plans to analyse argan genetic diversity and set up an argan tree collection. ■

» Are you interested in argan?

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Animal disease surveillance in the Maghreb

The considerable ability of some diseases to spread across borders suggests that regional animal disease control and surveillance strategies are required. Over an area covering Morocco, Algeria and Tunisia, France is supporting several projects to set up such regional systems for surveillance of bluetongue, foot-and-mouth, West Nile fever, rabies and sheep pox.

Within this framework, CIRAD is acting as the link between these different countries, with a view to improving exchanges of information and experience between veterinary services and to organizing operations on a regional scale (monitoring circulating bluetongue serotypes). An epidemiology training tool, RANEMA®, has also been adapted to the situation in the region, to build the technical skills of the partners concerned. A workshop is to be held in October 2008, to debate possible infectious disease control and surveillance strategies. ■

improving exchanges of information and experience between veterinary services

» For further information: http://epireg-maghreb.cirad.fr

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VIP

Domaines Abbes Kabbage

Domaines Abbes Kabbage is a major citrus fruit and seedling producer in the Agadir region, in southern Morocco. CIRAD and Domaines Abbes Kabbage have been working together since 2004, to breed pipless citrus fruit varieties.

Interview with Mr Ikbal Srairi, Director of Domaines Abbes Kabbage's citrus department

© Ikbal Srairi

❍ What does Domaines Abbes Kabbage do?

We are a Moroccan firm that grows and exports fruit and vegetables. We have 1500 ha of citrus plantings, 300 ha of vegetables under glass, and large nurseries producing both citrus and olive seedlings. We mainly produce pipless clementines for the very demanding fresh fruit markets in North America and Europe.

❍ How did you come to work with CIRAD?

We have long been interested in diversifying the mandarin group of species so as to satisfy demand from our customers, and CIRAD has substantial experience of creating and breeding citrus trees. I met Yann Froelicher and Patrick Ollitrault, geneticists from CIRAD, at a citrus growers' conference in Orlando in 2000 and again in Agadir in 2004, which was when we decided to set up a long-term partnership to breed pipless hybrids based on the genetic resources in our collection in Morocco.

Domaines Abbes Kabbage at a glance

Nationality: Moroccan
Status: private
Founded: 1957
Staff: 1000
Annual output: 30 000 tonnes of citrus fruits and 1.5 million seedlings
Field: arboriculture

❍ In your view, what are the merits of breeding triploid varieties?

Triploid varieties, which are necessarily sterile, are a major step forward for citrus growing. In addition to guaranteeing pipless fruits, they limit cross-pollination with conventional self-incompatible clementine varieties grown nearby. Most of the major citrus-growing countries have launched triploid breeding programmes for these reasons.

❍ What do you think about the advent of new, protected citrus varieties?

The policy of protecting plant varieties, which is relatively new for citrus species, is gaining momentum, as it has for apple and peach varieties, among others. These new protected varieties will bring major changes in terms of marketing periods, appearance, taste, shelf life, etc. Producers and traders will have to adapt to new forms of competition. While traditional varieties will have trouble competing, this will be an opportunity for the new varieties produced by modern breeding programmes.

❍ What are the most significant results of your collaboration with CIRAD?

We have begun breeding planting material specifically tailored to Mediterranean conditions. More than 2000 tetraploid hybrids are currently being assessed in Agadir. Moreover, we have worked together to fine-tune grafting and seedling acclimatization techniques. Lastly, our collaboration has enabled a Moroccan graduate student to work at the INRA/CIRAD station in Corsica on aspects relating to this project.

❍ Do you have any plans for new projects with CIRAD?

We are starting to look into stock tolerance of water stress. This is a particularly important field for us, due to the ever-shrinking water resources in our region.

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VIP

Montpellier

CIRAD's Montpellier research centre is an international scientific centre whose activities are intended to support development-oriented research projects being conducted in the field in the Mediterranean, Africa, Latin America and Asia. It has a mandate for research, appraisals, teaching and training, and scientific and technical information.

CIRAD in Montpellier

includes the Languedoc-Roussillon regional management team and totals 1100 staff members split between the Lavalette and Baillarguet sites. Its researchers carry out 30 000 days of missions per year in a hundred or so countries.

CIRAD receives more than 800 researchers and technicians on professional or academic courses each year, half of whom come from developing countries.

In Montpellier, CIRAD has specialized infrastructures and equipment, world-renowned reference laboratories, technical platforms, tropical greenhouses, and a library specializing in tropical and Mediterranean agriculture. In all, there are 60 000 m² of offices and laboratories.

Reference laboratories

- Water, soil and plant analysis
- Food and materials analysis (wood, rubber and fibres)
- Tropical plant and animal disease identification
- Quarantine service for high-risk seedling and clone transfers
- Botanical and entomological collections

Technical platforms

- Cellular imaging
- Plant genomics
- Animal genomics and pathology
- Remote sensing and geographical information

An exceptional scientific environment

The Montpellier centre is located at Agropolis International, the world's greatest concentration of skills and expertise in agriculture, food, environment and rural societies in tropical and Mediterranean regions. It is involved in the scientific, economic and cultural life of the Languedoc-Roussillon region, in liaison with the local authorities and local industry, and in several research and development projects in Mediterranean countries.

CIRAD is one of the scientific partners of the University of Montpellier Sud de France campus, led by the universities UM1, UM2 and UM3 and the Montpellier SupAgro agricultural college, which has just been accepted by the Ministry of Higher Education and Research as part of the *"Opération Campus"* project.

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