



cirad

AGRICULTURAL RESEARCH
FOR DEVELOPMENT

**2017
HIGHLIGHTS**

ACTIVITIES REPORT

SPOTLIGHT

**LIVING
TERRITORIES**



AGRICULTURAL RESEARCH
FOR DEVELOPMENT

2017 HIGHLIGHTS

ACTIVITIES REPORT



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PRESENTATION OF CIRAD

CIRAD is the French agricultural research and international cooperation organization working for the sustainable development of tropical and Mediterranean regions

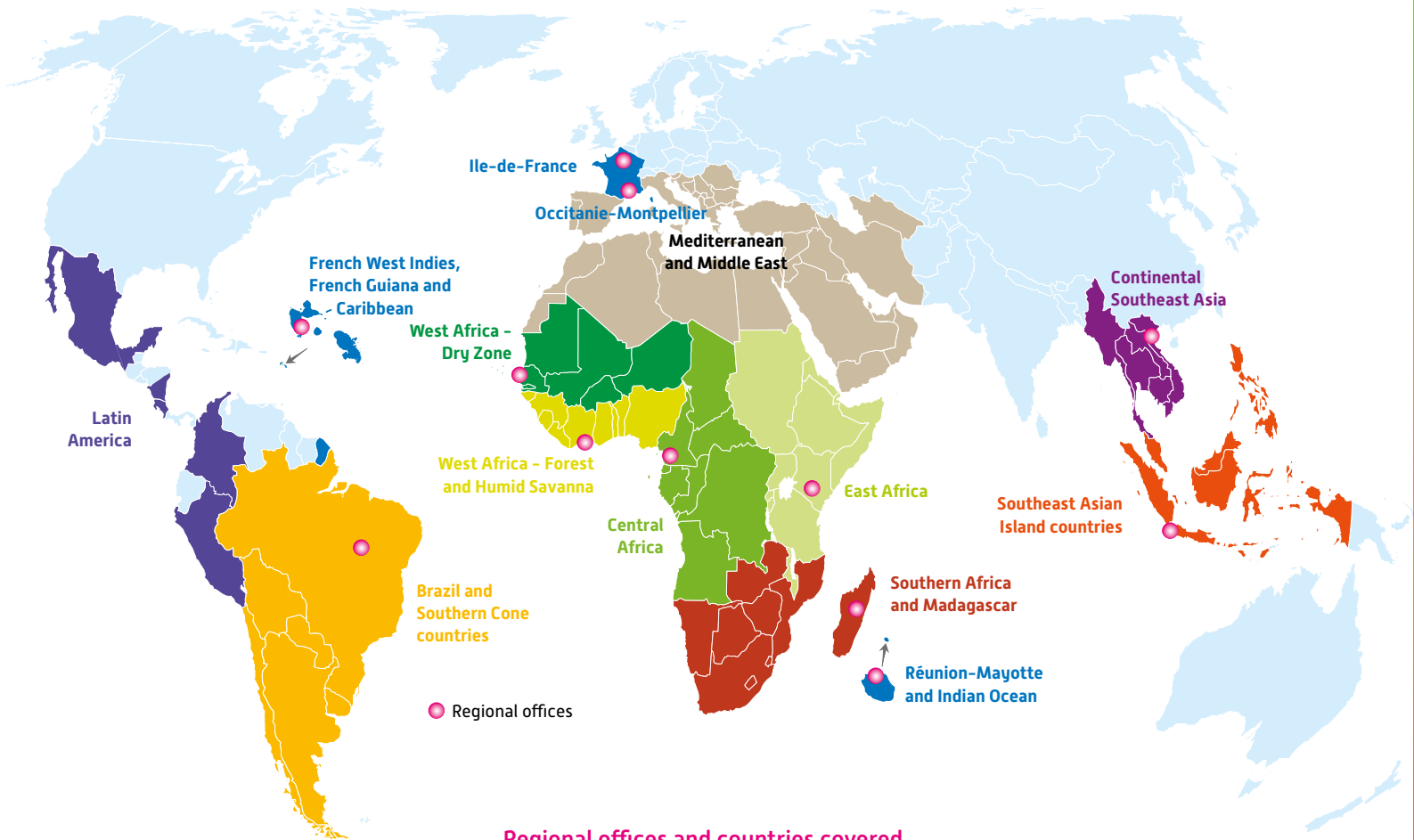
CIRAD's recognized expertise in agricultural issues in the South makes it a European reference in global scientific networks.

Its scientific operations respond to the needs of local populations and the main issues facing agriculture worldwide.

CIRAD is a targeted research organization that sees partnership as one of the cornerstones of its scientific strategy.

In Paris, our head office.
In Montpellier, a research, reception and training centre, at the heart of an international scientific hub.

In the French overseas regions, laboratories, collections, technical platforms and experimental facilities that are unrivalled worldwide.





Th. Erwin / CIRAD

CIRAD has revised its strategic vision to boost its development impact

Interview with Michel Eddi, President Managing Director, on the new strategic vision for 2018-2028

CIRAD had already embarked on operational application of the 2012-2022 strategic vision, but General Management decided to revise the contents of that vision. Why?

The current global context can be summed up in two words: urgency and necessity. Five years after finalizing its initial vision, CIRAD therefore decided to relaunch its strategic debate on development issues. While the challenges remain the same, they are now urgent and in some cases more substantial, due to the speed of certain processes. I am talking about climate change, the demographic transition that is so long coming in Africa, and the resulting issues, such as security and migration, the most pressing for France and Europe, and increased degradation of biodiversity and habitats. In view of these alarming

phenomena, we cannot rule out even the most catastrophic scenarios for the future of the planet.

The idea of a binary world – a developed North, protected by its wealth, and a developing South, highly dependent on external aid – is now totally outdated. The question of sustainable development is a global one, and the challenges faced bear witness to the interdependence of our societies: the future for all depends on the efforts made by each and every citizen, in line with their means and responsibilities, in a world in which a substantial part of the human race is living in great poverty. This is why it is now vitally important that we tackle those challenges together, in a coordinated fashion, notably thanks to the work being done by scientists in North and South. In political terms, this global dynamic has facilitated a major step towards this collective awareness, with the signing in 2015

by the entire global community of the major agreements on climate and the sustainable development goals.

Within the new vision, what are the main consequences for CIRAD's activities as a result of this analysis?

The main priority for CIRAD is to maximize its development impact by continuing to change. This is the ultimate, central aim of its mandate, and science and partnership are the main means of achieving it. This means rethinking how we plan and implement our operations by introducing the question of impact ex ante, in other words when designing our research projects. This is crucial if we are to fulfil our commitments and strengthen our partnerships within such a short time frame.

“ *The idea of a binary world
–a developed North,
protected by its wealth,
and a developing South,
highly dependent on external aid–
is now totally outdated.* ”

It is equally important to set objectives and targets at country level and to work with stakeholders to build the sustainable development pathways that will serve to achieve them. To this end, the vision proposes integrating the knowledge and innovations generated with our partners into a political action approach to be built with stakeholders on a country or regional level and working with decision-makers to build programming and assessment frameworks for their implementation. We must ensure greater development impact by taking account of the main demographic, environmental, climate and food transitions. CIRAD has set itself the challenge of promoting the frameworks and tools required to engineer transitions that will benefit countries in the global South, by means of science and partnerships. The third main element is the need, over and above science, technology and innovation, for unprecedented

efforts to build the skills and capacity that will enable men and women to act and do. More than ever, we must invest in training if we are to implement the agro-ecological transitions required the world over, and in developing rural employment.

The vision was adopted in December 2017. What are the results, six months on?

The strategic vision fits into a debate and programming process in four stages. It marks the starting point. The next step is to set the vision out in a “scientific and partnership strategy objectives” (SPSOs) document, in other words to design concrete, planned operations for the coming five years. We have been working on this since January of this year. The SPSOs will be submitted

to the Board of Trustees for approval in December 2018.

Based on the vision and the resulting SPSOs, two other exercises will then be conducted. The first consists in defining the operational priorities that will structure the future contractual objectives to be negotiated with the State. The second will set out, by means of “multiannual letters of objectives” (MLOs), the contribution required of each research unit towards overall implementation of CIRAD’s strategy objectives.

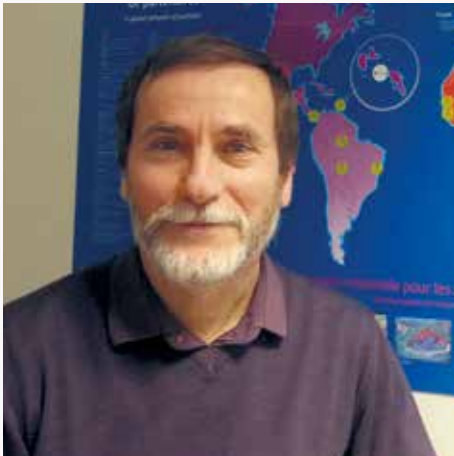
These various stages will enable CIRAD to put its ideas into action and boost the impact of research on development.



PREPARING FOR TOMORROW

to build long-term,
comprehensive
roadmaps
for societal
transformations
in response to
the challenges
posed by
development
in the global South

In an internal memo, CIRAD General Management has set out the principles and rules governing geographical mobility for the organization as a whole, within a common action framework.



CIRAD

Philippe Petithuguenin,
Deputy Director General in charge of Research and Strategy

CAREERS IN LINE WITH CIRAD'S PRIORITIES

Geographical mobility, at the heart of CIRAD's scientific strategy

When they join CIRAD, our researchers make a contractual commitment to geographical mobility. Mobility is key to the success of the organization's scientific operations. It is the expression of a collective response to scientific questions and to expectations expressed by our partners. Each planned assignment is subject to the approval of General Management.

Rules, principles and a schedule

The memo sets out the time scale, the three aspects – scientific, partnership-related and financial – to be clarified, and the roles of each party. Our research teams, units and departments suggest assignments, and the Management Committee makes the final decision. The Regional Directors concerned are also involved in checking that the assign-

ment fits in with our geographical partnership strategy. Any plans for mobility must be drawn up jointly with our partners.

Practicalities tailored to experience

The profile and personal circumstances of each researcher are taken into account. Mobility is a priority for "junior researchers", and should serve to build their scientific reputation. For "senior" researchers, financial aspects are important, albeit tempered by other criteria, such as the type of work being done by the researcher and the situation of the country or partner concerned. The experience and skills acquired through geographical mobility are taken into account when deciding on promotions.

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A FUTURE ETHICS AND SCIENTIFIC INTEGRITY OFFICE

Three questions for **Philippe Feldmann**, specialist in scientific integrity issues at CIRAD

Ethics are a major priority for CIRAD. After signing the national research ethics charter in 2015, CIRAD is now rolling out its own specific code of ethics.



© M. Gunther

Why draft a code of ethics?

Philippe Feldmann: Ethics are a major priority for CIRAD. After signing the national research ethics charter in 2015, CIRAD is now rolling out its own code of ethics. In view of its responsibility to society as a whole, research has to be exemplary in terms of its practices and principles.

What is in the code?

P.F.: It sets out the ethical principles and rules applicable to its staff members, whether administrative or scientific. In particular, it takes account of the specificities of scientific partnerships for development, and collaboration with the private sector.

In line with its strategic vision and its values, CIRAD works to build balanced, equitable

partnerships and foster sustainable development, notably by building research, training, appraisal and innovation capacity amongst its partners in the global South.

So what now?

P.F.: CIRAD is getting ready to launch an Ethics and Scientific Integrity Office, to be backed up by an Ethics Monitoring Committee. The office will be the point of entry for CIRAD employees or people from outside CIRAD who may have questions relating to the code and more broadly to ethics and scientific integrity as a whole.

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Montpellier research centre

A FUTURISTIC GLASSHOUSE TAKES SHAPE



© D. Delebecque, CIRAD

The keys to the high-performance glasshouse on the Lavalette site have been handed over*, after a year of building works. The glasshouse has six 40-m² glass "chapels", a 12-m² culture chamber, an office, sanitation facilities, and work and storage areas.

Climate conditions are very closely controlled: temperature and humidity, and adjustable CO₂ concentration (up to 1000 ppm), lighting and photoperiod. This enables detailed analyses of the effects of climate change on plant development and growth.

Two trials have already begun on rice: one to study the impact on photosynthesis of doubling ambient CO₂ levels, the other the

effect of nitrogen fertilization on plant nitrogen use efficiency and susceptibility to disease.

These initial trials will also serve to assess the overall performance of the glasshouse, before it is opened to CIRAD as a whole and to outside partners in 2019. The second phase** (equipment purchasing) is scheduled for 2018.

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* Phase 1 was funded by the Regional Council, under the State-Region Planning Contract.

** Phase 2 is funded by the State.

THE CIRAD WEBSITE IS NOW MOBILE-FRIENDLY

The CIRAD website is now available in a version optimized for smartphone screens. This mobile version is easier to navigate and more comfortable to read, to facilitate access to information. This is an advantage for anyone wanting to know more about CIRAD, particularly in Africa (560 million 2G users in 2015), where for want of other infrastructures, information is primarily accessed via smartphones.

[www@cirad.fr](http://www.cirad.fr)

<https://www.cirad.fr/en/news/all-news-items/articles/2017/ca-vient-de-sortir/the-cirad-website-is-now-mobile-friendly>



Publication. What impact do thematic publications have?

The Scientific and Technical Information Service (DIST) has conducted an impact study of the five books on CIRAD's annual topics* published by Quae and Springer up to 2017. An analysis of various criteria (sales, hits and downloads, referencing, indexing, citation, social media activity, bibliographical reference sharing websites, media) served to

pinpoint ways of boosting the dissemination and visibility of these publications.

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*2013: biodiversity; 2014: family farming; 2015: climate change; 2016: sustainable development and tropical supply chains; 2017: living territories.

Incentive scheme

CIRAD SUPPORTS CREATIVE, INNOVATIVE RESEARCHERS

To foster the development of ideas that are either novel or ahead of their time, CIRAD has launched an incentive scheme for scientific creativity and innovation (AI CRESI).

The aim is to build an ideas incubator, by facilitating the emergence of original scientific initiatives, for instance with a view to moving into a new scientific niche. Funding is available for operations to test the relevance of and nurture ideas, and if possible to turn them into research projects. The selection criteria centre on the originality of the proposal and the possibility of converting intuitions and intentions into concrete scientific operations.

CRESI is currently supporting an exploration of the diversity and distribution of the archaea associated with agro-ecosystems using innovative metagenomics and culturomics techniques; a collaborative platform for analysing and validating information on genetic resources worldwide; a study of the synergies between firms and territorial development that could be used to reach the sustainable development goals (SDGs); and the development of an innovative method for identifying and monitoring cocoa pollinator populations on a plot scale.

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Technology transfer and development

Mash: the success story of a sugarcane field mapping tool

A contract was recently signed between CIRAD and Mitr Phol, a Thai firm that is number 5 in the global sugar market, relating to the Mash tool. Development of the tool was supported by the new products and services incubator (INPP), and it serves to monitor sugarcane harvesting in virtually real time, using radar and optical satellite images.

e-WATCH: a web tool for managing monitoring data

e-WATCH serves to manage geo-referenced field data. This software suite, developed by CIRAD and supported by the new products and services incubator (INPP), has been used to build several platforms: vulnerable zones in West Africa (IUCN), Agrisource with INRA (EIT-Climate KIC), and the cotton supply chain in Mali (AFD).

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Montpellier University of Excellence (MUSE)

SEVEN WINNING PROJECTS LED BY CIRAD

Under the Support for Research call for projects launched last September by Montpellier University of Excellence (MUSE), four types of projects (research, recruitment of post-doctoral researchers, shared structural facilities, and heavy equipment for technological platforms), organized around five subject areas (Agronomy-Environment-Biodiversity, Biology-Health, Chemistry, Mathematics-Computer Science-Physics-Structure, and Social Sciences) will share a grant of € 5.8M.

Of a total of 264 proposals submitted, 58 (20%) were selected. CIRAD leads seven in all, and is a partner in five others. In particular, it leads five of the eleven projects selected under the heading Agronomy-Environment-Biodiversity. With 40% of all projects

submitted, this category is by far the largest, which proves the vitality of the sector in Montpellier.

Montpellier University of Excellence (MUSE) was founded to make Montpellier the European capital of health and the agro-environment. The project, submitted by the University of Montpellier in response to the I-Site project launched by the French government, took shape in 2017. MUSE associates all the research establishments, the university and four grandes écoles in Montpellier.

Its scientific vision centres on three societal issues: "Feed - Care - Protect".

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<https://www.cirad.fr/en/news/all-news-items/articles/2018/institutionnel/cirad-projects-muse>

Projects led by CIRAD

CarniVespa: Recherche de signaux visuels et olfactifs attirants spécifiquement le frelon asiatique chez une plante carnivore pour le développement d'un piège biomimétique

TEMPO: TElédétection et Modélisation sPatiale de la mObilité animale

MozARH: Mozambican Arenaviruses at the Rodent Human interface

AprèsInfrastructure: Vulnérabilité des populations riveraines après installation d'interfaces hydroag-ricoles (Senegal)

AdaptGrass: Genomic analysis of crop adaptive diversity for two plant models, rice [C3] and sorghum [C4]

Tackling CC: Tackling Climate Change: Institutionalizing and Articulating Adapted Tools for Integrated Governance of Climate Change Policies

ECOTROP platform

#DigitAg

FOR DIGITAL FARMING

What are the links between artificial intelligence and sensors, and food security, agro-ecology, agricultural advisory services and market access? To tackle the global issues at the heart of the SDGs, #DigitAg, the Institute for the Convergence of Digital Agriculture, associates 17 French players from the research, higher education and private sectors, with a view to analysing and supporting the development of smart farming in both North and South.

The partners in #DigitAg will be working along six lines: the impact of information and communications technologies on the rural world; smart farming innovations; data

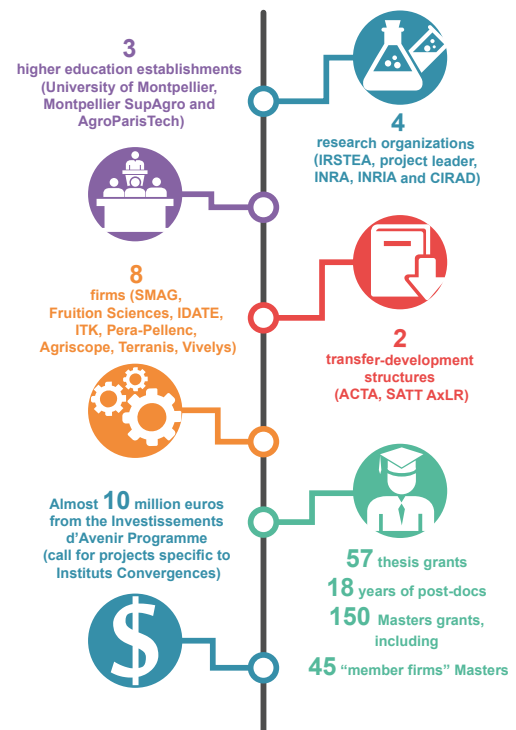
acquisition and management; information systems and data storage and transfers; agricultural big data mining; and agricultural production system modelling and simulation.

CIRAD will be contributing its experience of farming systems in the global South. In particular, it will be leading challenge 8, devoted to the South, focusing on the key factors for the success of innovations in terms of smart farming, particularly the way in which tools and services must be co-constructed if they are to be both useful and used in Africa.

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<https://www.cirad.fr/en/news/all-news-items/articles/2017/science/digitag-launch>



Bonn Challenge. CIRAD IS COMMITTED TO RESTORING FOREST LANDSCAPES

The degradation of tropical forests as a result of reckless logging concerns more than two billion hectares of land worldwide. The Bonn Challenge, launched in 2011 by the German government and the IUCN, set out to restore 150 million ha of degraded and deforested land by 2020, and 350 million by 2030.

CIRAD has been chosen as a technical partner, and is involved in three global initiatives:

- the African Forest Landscape Restoration Initiative (AFR 100), which concerns 100 million hectares;
- Initiative 20x20, which covers 20 million hectares throughout Latin America;
- the GPFLR (Global Partnership on Forest Landscape Restoration), which works on a landscape or territory scale.

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<https://www.cirad.fr/en/news/all-news-items/articles/2017/science/bonn-challenge-restoring-forest-landscapes>



Bushfire in a baobab forest in Senegal J. Bouyer © CIRAD

CLIMATE CHANGE

The 4P1000 initiative has won the World Future Council Future Policy Award. The initiative, which sees agriculture as a solution to climate change, is a vision for the future, according to the World Future Council. The Council recently gave the initiative its prestigious Future Policy Award (Vision category). This year, the award, which is known as the best policy Oscar, highlighted the best global policies to combat desertification and soil degradation.

Since its launch in 2015, more than 280 organizations have supported the initiative by signing the Paris declaration, which set its objectives. The initiative fits in with the global climate action agenda (GCAA) adopted at COP22.

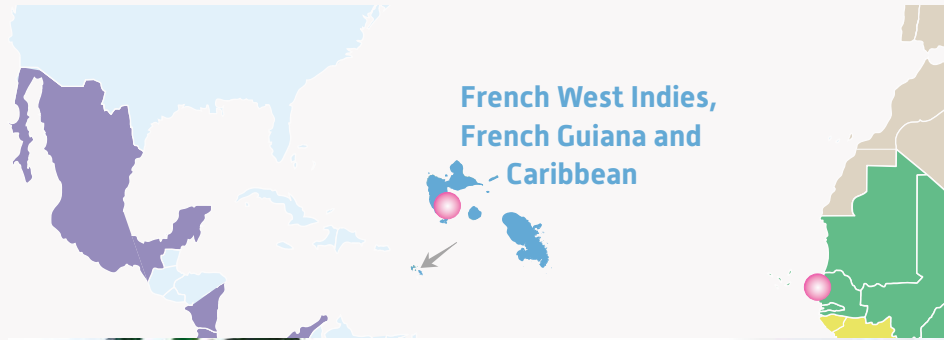
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<https://www.cirad.fr/en/news/all-news-items/articles/2017/science/the-4p1000-initiative-receives-the-world-future-council-future-policy-award>

COP23: making actions speak louder than words. The 23rd Conference of the Parties to the UN Convention on Climate Change (COP23), "Further, Faster Ambition Together", organized by Fiji, was held in Bonn, Germany, from 6 to 17 November 2017. CIRAD, along with its partners, was involved in several meetings, notably relating to the 4P1000 initiative.

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<https://www.cirad.fr/en/news/all-news-items/articles/2017/events/cop-23-cirad-s-participation>



▲ Stéphane Travert tours CIRAD's installations with Dominique Martinez
© D.-L. Aubert, DAAF Guadeloupe

THE FRENCH MINISTER OF AGRICULTURE VISITS CIRAD

During a trip to the French West Indies, the Minister of Agriculture and Food, Stéphane Travert, visited CIRAD's Neufchâteau station on 24 November 2017.

Stéphane Travert took the opportunity of a trip to the French West Indies to talk to agricultural supply chain stakeholders about the situation following the damage caused by hurricanes Irma and Maria, and the issues covered by the États généraux de l'alimentation and the Assises des Outre-mer.

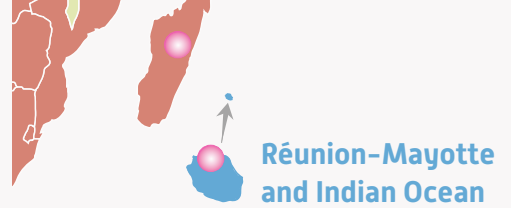
The Minister visited CIRAD's Neufchâteau station to discover its operations in support of farming in Guadeloupe:

- revival of the citrus sector, via the local technical innovation and agricultural transfer network (RITA), following the arrival of citrus greening disease;

- development, with an industrial partner, of sugarcane fibre use to generate energy;
- support of the banana supply chain in terms of disease surveillance and prevention, and development of new varieties and of agro-ecological methods aimed at cutting chemical input use.

For Dominique Martinez, CIRAD Regional Director for the West Indies-French Guiana, "this ministerial visit recognizes the importance of the research being done by CIRAD and its partners, as a driver of agricultural innovation in favour of territorial development".

<https://antilles-guyane.cirad.fr/>



▼ Annick Girardin with Éric Jeuffrault © CIRAD



THE MINISTER FOR OVERSEAS TERRITORIES MEETS AGRICULTURAL PROFESSIONALS

On 9 October 2017, during a trip to Réunion, the French Minister for Overseas Territories, Annick Girardin, took stock of the progress made by the technical innovation and agricultural transfer networks (RITAs).

At a meeting focusing on agricultural transfers with players from the main production chains in Réunion (horticulture, livestock production and sugarcane), Annick Girardin learnt about the progress made by the RITAs (innovation and agricultural transfer networks) centring on agro-ecology that were set up in the French overseas regions by the French government in 2012. CIRAD is one of the founding members of the RITAs and one of the leaders, along with ACTA, on a national level.

"Our RITAs are working on collaborative projects based on involving all stakeholders, who each benefit. Farmers are a pivotal concern for research. RITAs combine science and practice", says Éric Jeuffrault, CIRAD Regional Director for Réunion-Mayotte.

Following their talk, the Minister said she had met "a Réunion that dares, with the whole range of professionals, scientists and organizations. The networks in Réunion are an example to all, and prove the merits of working together. Réunion is the most dynamic overseas region when it comes to agro-ecology."



R. Carayol © CIRAD

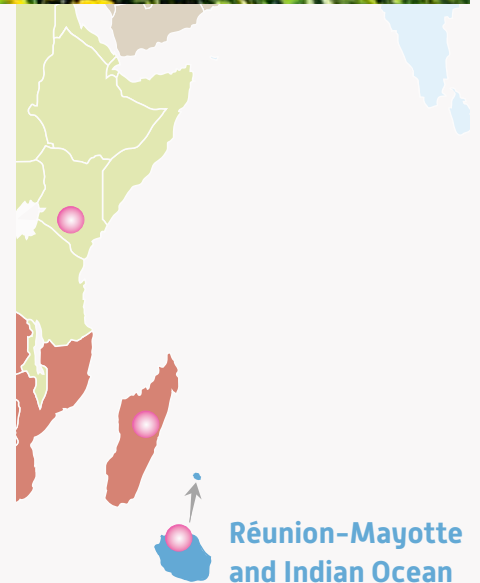
THE RÉUNION PLANT PROTECTION PLATFORM IS EXPANDING

The Plant Protection Platform (3P) in Saint-Pierre is expanding, with the help of the Réunion Regional Council and EU funding.

The aim is to ensure better conditions for researchers, students and partners from the Indian Ocean working on crop protection and natural environments. *"3P has been a victim of its huge success since its inauguration in 2001. It really needs extending"*, says Éric Jeuffrault, CIRAD Regional Director for Réunion-Mayotte. 3P is the only overseas research

technology platform recognized by the Infrastructures en biologie santé et agronomie (IBISA) group.

More than 1900 m² of laboratories will be built between now and the end of 2020, with state-of-the-art chemical ecology and molecular biology facilities. *"These scientific disciplines are absolutely vital"*, Éric Jeuffrault adds, *"to make agro-ecology a sustainable solution for our island farming systems, in a competitive economic context"*.



THE VATEL BRC GETS A SEAL OF APPROVAL FOR ITS QUALITY APPROACH

LThe Vatel Biological Resource Centre (BRC) was granted NF S96-900 certification by SGS, the world leader in certification, in December 2016. That certification guarantees the efficiency of the centre's system for managing its vanilla, tropical garlic and other lontan vegetable genetic resource collections, which are now more secure and more traceable.

The BRC was given its first seal of approval by IBISA in 2009. Its collection managers subsequently launched a quality approach, which was boosted in 2014 by the arrival of a quality specialist, who is herself backed up by the Quality Manager at the 3P (Plant Pro-

tection Platform). The unflinching motivation and efforts put in by the BRC's technicians, quality specialists, collection managers, general management and support services are what have led to the BRC being recognized for its efficient management, seven years on.

This certification means greater visibility and regional legitimacy for the Vatel BRC. The centre is a member of InterTrop, a network of all the tropical plant BRCs owned by CIRAD, INRA and the IRD, which supports BRCs in obtaining certification.

<https://reunion-mayotte.cirad.fr/>

AGRONews, new format

The new AGRONews, launched in 2017 to supplement CIRAD's on-line information offering, reflects the commitment of the CIRAD Réunion-Mayotte (Indian Ocean zone) Regional Office and its research teams to publicizing their activities. The new format will evolve in time to keep pace with readers' expectations.







INTEGRATING KNOWLEDGE

to share and
use it better,
and suggest
possible courses
of action

perspective

The CIRAD
policy brief

Animal and human health: tackling uncertainty through participatory modelling and simulation

Zoonoses, drug resistance and environmental pollution are now causing serious health problems worldwide. New uncertainties are emerging, and nonconventional actors are entering the scene alongside the decision-makers traditionally responsible for public health. In response to these constraints, researchers are using a participatory approach that is described in this issue of *Perspective*.

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<https://www.cirad.fr/en/news/all-news-items/articles/2017/ca-vient-de-sortir/perspective-no.-41-animal-and-human-health-tackling-uncertainty>

Antimicrobials in agriculture: reducing their use while limiting health and socioeconomic risks in the countries of the South

The widespread use of antimicrobials in agriculture is increasing in southern countries, driven by growing demand for animal products. This is creating a serious problem of antimicrobial resistance. This *Perspective* deciphers the complexity and impact of the problem. It suggests possible courses of action aimed at rationalizing microbial use, while respecting farmers in the most vulnerable regions.

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<https://www.cirad.fr/en/news/all-news-items/articles/2017/ca-vient-de-sortir/perspective-no.-39-antimicrobials-in-agriculture-f.-roger-c.-ducrot>

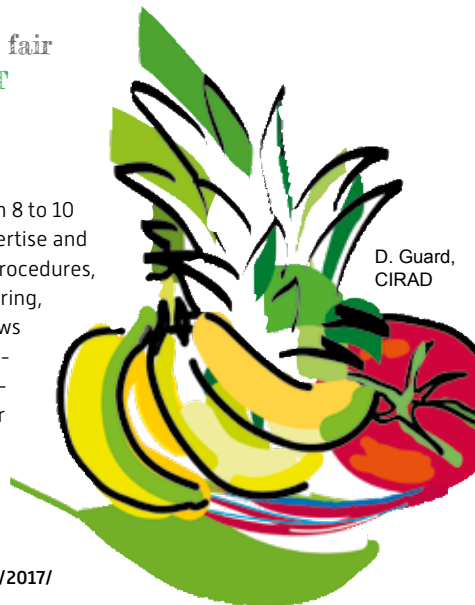


Fruit Logistica 2017 fair
CIRAD, THE EXPERT
IN TROPICAL FRUIT
AND VEGETABLES

CIRAD was at the Fruit Logistica fair in Berlin from 8 to 10 February 2017. It presented a selection of its expertise and innovations, from plant breeding to postharvest procedures, through life cycle assessment. The flagship offering, *Fruitrop*, was presented by the CIRAD Market News Service, a group of economic experts. Fruit Logistica is a global rendezvous for the fruit and vegetable trade, and each year, it brings together almost 3000 exhibitors from some 80 countries and more than 70 000 visitors from 130 countries.

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<https://www.cirad.fr/en/news/all-news-items/articles/2017/events/cirad-at-the-fruit-logistica-2017-fair>



Expertise

GEOGRAPHICAL INDICATIONS: WHAT ARE THE STATE'S ROLES?

The prestigious journal *World Development* devoted a special section to geographical indications (GIs) in late 2017. It was coordinated by two researchers from UMR Innovation, and presented the results of more than 15 years' work by CIRAD and its partners in the global South, in a context of intense global debate about the institutionalization of these quality stamps.

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<https://www.cirad.fr/en/news/all-news-items/press-releases/2017/gis-what-are-the-state-s-roles>

<https://www.sciencedirect.com/science/article/pii/S0305750X17301584>



Communautés locales et utilisation de la faune sauvage en Afrique centrale

This synthesis, published by the FAO, CIRAD and CIFOR, relates and promotes the lessons learnt from the Wildmeat project on participatory management of the local fauna and hunting, which ran from 2012 to 2017 in Gabon, Central African Republic, Republic of Congo and Democratic Republic of Congo.

Communautés locales et utilisation durable de la faune en Afrique centrale. N. van Vliet, J. -C. Nguingui, D. Cornelis, S. Le Bel (eds). FAO/CIFOR/CIRAD. 2017 (266 p.). <http://dx.doi.org/10.17528/cifor/006488>

Technical guides

Diagnostic approfondi pour la mise en œuvre de la gestion communautaire de la chasse villageoise. CIFOR, CIRAD, IUCN, FAO, (80 p.). <http://dx.doi.org/10.17528/cifor/005706>

Développement participatif d'un plan de gestion durable de la chasse villageoise. CIFOR, CIRAD, FAO, (48 p.). <http://dx.doi.org/10.17528/cifor/006489>

Zimbabwe

The RP-PCP platform celebrates its tenth anniversary

To mark its tenth anniversary, the RP-PCP (Production and Conservation in Partnership in Southern Africa) platform worked with its partners to organize a week-long meeting in southeastern Zimbabwe on the matter of Transfrontier Conservation Areas (TFCAs). A consultation workshop on a role-play game, Kulayijana ("learning from each other") was held in situ with rural communities (22-23 May). This was followed by an international scientific symposium (24-26 May) to allow the platform's students to meet international experts and present their research to the community representatives who led the debates and subsequent discussions.

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CENTRAL AFRICA

INTEGRATING WILDLIFE INTO FOOD SYSTEM MANAGEMENT

Hunting has traditionally been a vital source of food and income for many rural families in central Africa, where wildmeat consumption totals between 5 and 7 million tonnes a year. However, growing population pressure and demand for meat from secondary towns and cities have resulted in increased, unsustainable hunting of many wild animals. In response to this threat to conservation and biodiversity, a project, “Sustainable wildlife management and wildmeat in central Africa”, served to lay the foundations of integrated management of hunting by villagers and of meat consumption.

The project, which was led by the FAO and involved CIRAD, ran for five years and was recently completed. The knowledge generated by the network of partners built around the project is a valuable asset for continuing support of the emergence of local, participatory management of wildlife and hunting in central Africa.

The results of the “Wildmeat” project

The aim was to switch from conservation-centred, repressive management of hunting by villagers to sustainable use by means of an adaptive, participatory approach. To this end, local communities were involved in pilot projects and encouraged to organize themselves so as to manage their hunting territories collectively.

The researchers involved developed models and tools for community management of hunting by villagers. They also used innovative tools such as digital apps and cameras to monitor hunting activities. Two technical handbooks and a battery of diagnostic tools were also produced. Lastly, a sub-regional strategy for the sustainable use of wildlife by local communities was drafted. It is led by the Commission of Central African Forests (COMIFAC) and endorsed by the governments of the countries concerned (Gabon, Congo, and DRC).

A paradigm shift

As a synthesis published at the end of the project highlights, reconciling food security and wildlife conservation in central Africa means promoting the emergence of local [territory-based] government of meat-based food systems, covering both domesticated and wild meat sources. This will be a gradual revolution, involving revision of laws and changes in hunting and wildmeat trading practices and in the local diet.

Ongoing collaboration: a consortium for the coming seven years

New projects are planned to carry on from this initial work, including the Sustainable Wildlife Management programme, which began in late 2017. With 45 million euros of funding from the European Commission, the exceptionally long project [seven years] will be conducted in the ACP (Africa, Caribbean, Pacific) countries by a consortium comprising the FAO, CIRAD, CIFOR and the NGO WCS (Wildlife Conservation Society).

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French Académie d'agriculture:
a silver medal for Antoine Ducastel



DR

Antoine Ducastel, a socioeconomist with UMR ART-DEV, was awarded the Académie d'agriculture silver medal for his thesis on cultivating capital: an analysis of the financialization of agriculture in South Africa by the agro-financial subsidiaries of private equity firms. This work was conducted with the University of Pretoria.

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Eighteen institutions
have signed up to the Tropical
managed Forests Observatory

The Tropical managed Forests Observatory was recently formalized by a collaboration agreement signed by 18 institutions, including CIRAD. The confirmation of this unique network will enable it to continue monitoring the world's logged tropical forests and drafting recommendations for sustainable silviculture. The challenge is an urgent one.

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<https://www.cirad.fr/en/news/all-news-items/articles/2017/institutionnel/eighteen-institutions-have-signed-up-to-the-tropical-managed-forests-observatory-tmfo>

RTBfoods: facilitating the adoption
of new root, tuber and cooking
banana varieties in Africa

The RTBfoods project [Breeding RTB Products for End User Preferences] was launched in November 2017, to run for five years. It is intended to facilitate the adoption of new root, tuber and cooking banana (RTB) varieties in five African countries. It will take a novel approach involving consumers, processors and researchers. This 11.5-million-dollar project sees CIRAD link up with the Bill & Melinda Gates Foundation, INRA, CIAT, and the James Hutton Institute.

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<https://www.cirad.fr/en/news/all-news-items/press-releases/2018/rtbfoods>

Montpellier

SOCIOBIOCERRADO PROJECT CLOSING SEMINAR

The closing seminar of the Sociobiocerrado project on the issues and challenges of promoting the Cerrado biome by means of sustainable food systems was held from 12 to 14 December at UMR MOISA in Montpellier, and was attended by Brazilian experts, notably from the University of Brasilia (UnB) and the Federal University of Maranhão (UFMA)

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perspective The CIRAD policy brief

Managing degraded forests,
a new priority in the Brazilian Amazon

The drastic steps taken in Brazil to cut the annual deforestation rate have not had any effect on forest degradation. Degraded forests now dominate the landscape along pioneer fronts in the Amazon. This issue highlights four research priorities for reducing degradation and optimizing these forests.

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<https://www.cirad.fr/en/news/all-news-items/articles/2017/ca-vient-de-sortir/perspective-no.-40-managing-degraded-forests>

Ivory Coast

CIRAD AT THE ABIDJAN AGRICULTURAL SHOW

The Salon international de l'agriculture et des ressources animales (SARA) was held from 17 to 26 November in Abidjan, Ivory Coast. At the event, which attracts the leading African research institutions, CIRAD presented its research activities on a stand shared with the AFD. CIRAD sealed partnerships with research, development and higher education establishments in Ivory Coast and participated in several events, including a workshop on climate change issues, at which the 4P1000 initia-

tive was presented, and an exchange forum on the attractiveness to young Africans of renewed sub-Saharan African agriculture, which proved very popular.



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<https://www.cirad.fr/en/news/all-news-items/articles/2017/events/cirad-a-major-player-at-the-abidjan-agricultural-show>

<https://afrique-ouest.cirad.fr/>

Anne Hébert, CIRAD Communication Coordinator, tours the stand with Mr Alain Richard Donwahi, Ivorian Minister of Water and Forests © CIRAD



Training seminar

STRUCTURING SEED AND PLANT PRODUCTION CHAINS



© CIRAD

Promoting IRAD improved varieties while structuring seed and plant production chains was the topic of a training seminar held in Yaoundé from 10 to 12 April, as part of the C2D (Debt Reduction and Development Contract). Numerous players from the different links in the value chain and the research sector (IRAD, CIRAD, CARBAP, AfricaRice) participated. In particular, they decided, for the coming months, to: establish platforms for talks between the Ministry of Agriculture, producers' organizations and the private

sector; limit free seed and plant distribution by the Ministry so as to foster the emergence of a private sector; train and supervise the seed production inspectors in charge of seed and plant quality checks and certification; and produce a catalogue for farmers.

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<https://afrique-centrale.cirad.fr/actualites/seminaire-cirad-de-formation-dans-le-cadre-du-c2d-par-appui-a-la-valorisation-des-varietes-ameliorees-de-l-irad-queles-cles-pour-la-reussite-des-filiere-de-production-de-semences-et-plants/>

West Indies-French Guiana-Caribbean

A CARIBBEAN COCOA PROMOTION NETWORK KICKS OFF



D. Guard, CIRAD

The Réseau caribéen de valorisation du cacao (RECAVACA) project was launched by the Association Guadeloupe Equitable et Durable (AGED) at CIRAD's Neufchâteau site in Guadeloupe on 24 October 2017. The project, to be implemented by AGED in partnership with CIRAD and the Coopérative Agricole Cacaoyère et de Commercialisation de la Grande Anse (CACCOMA), will be co-funded for two years by the Interreg Caribbean programme (ERDF). It intends to help cocoa producers from Guadeloupe and Haiti produce high-end cocoa that respects the principles of agro-ecology and fair trade.

<https://antilles-guyane.cirad.fr/actualites/2017/reseau-caribeen-de-valorisation-du-cacao>



Madagascar

A WORKSHOP TO SHARE INFORMATION ON THE CONCEPT OF LANDSCAPE

A workshop was held on 6 and 7 September for around thirty participants from the SPAD (Highland Production Systems and Sustainability in Madagascar) and Forests and Biodiversity platforms in partnership (dPs), on the concept of landscape. The aim, for the dPs, was to be in a position to make proposals for the PADAP project, launched by the Malagasy government in the hope of boosting agricultural productivity while ensuring sustainable natural resource management within specific landscapes.

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<https://www.dp-spad.org>



<https://www.forets-biodiv.org/>



Illustrations: Myriam Merch





SHARING
KNOWLEDGE

to build skills
among
development players,
scientists,
policymakers
and producers

Scientific and technical information at CIRAD KEY FIGURES FOR 2017

Shared information resources

€ 662 502 of journals, books and databases purchased

OR
€725 per full-time research post equivalent



Journals
59%



Database
34%



Books
4%

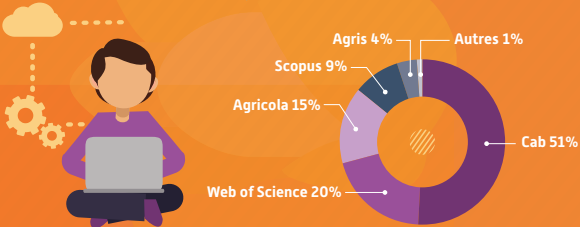


Tools and hardware
3%



223 322 articles read on line

193 161 database searches



Ciradimages - 15 900 photos

844 new photos

including 226 glass plates

Training

29 training sessions
for 350 researchers and PhD students

Analysis of publications

9 bibliometric studies
for teams and management

Accessing of DIST services

361 requests handled by the
Questions en IST site

14 069 visits to the DIST intranet site

63 143 visits to the CoopIST website

Allocated information resources

€ 52 514 170 journals ordered
and funded by research units

Digitization of CIRAD collections

120 books and 34 journals

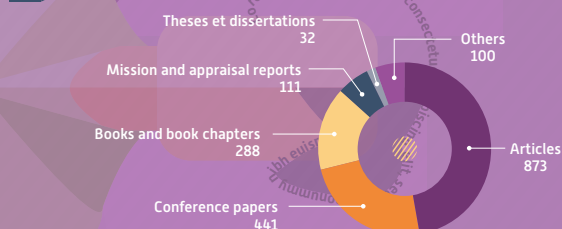
ie 300 000 pages in Gallica
(French National Library)

Agritrop - 100 000 documents

2 844 documents recorded

56% in full-text, open-access versions

1 845 publications in 2017



873 articles published in 478 journals
including
250 in 119 open-access journals

61 articles with datasets (Figshare, NCBI, Dryad, etc)

Support for publication

67 manuscripts edited

61 articles in English edited
for a total of € 15 410

214 journals added to the 2045
in OÙ publier [DIST intranet site]



11 works with CIRAD authors published by Quae

478 copies of Mémento de l'agronome sold

Agritrop is 7th in the French open archive rankings

After just two years, Agritrop, the open archive for CIRAD publications, is 7th in the French open archive rankings. It has also been highly successful on a European and global level. This is a remarkable result for CIRAD, reflecting its determination to improve free circulation of scientific knowledge worldwide. In Europe, Agritrop is 172nd out of 900 open archives. Globally, it is 396th out of 2284.



Marie-Claude Deboin, Scientific and Technical Information Coordinator

"This 7th place after just two years confirms the visibility the open archive gives CIRAD's publications and co-publications. It also proves the commitment of our researchers, who trigger the promotion process by uploading full-text versions of their publications."

Malaysia

PRESTIGIOUS STATUS FOR ONE OF CIRAD'S PARTNERS

In Malaysia, the Institute of Tropical Forestry and Forest Products (INTROP) at Universiti Putra Malaysia has been designated a "Higher Institution Centre Of Excellence" (HICOE) by the government, with the help of CIRAD and its BioWooEB research unit. This is the result of active collaboration, since 2009, on biofuels, biomass, and the financialization of agriculture and the forestry sector. This joint laboratory is an international platform for training through research, with a number of Masters and four PhD students. HICOE status is reviewed every three years, and brings with it a financial incentive of MR 3 million (€ 600 000).

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<https://intranet.cirad.fr/les-rubriques-du-portail/les-actualites/2017/actus/malaisie.-un-prestigieux-statut-delivre-a-un-institut-grace-au-cirad>

DIGITAL REPUBLIC

CIRAD IS COMMITTED TO OPEN ACCESS TO SCIENTIFIC PUBLICATIONS

Following the vote on 7 October 2016 in favour of a digital republic, the French scientific community and its member organizations launched several initiatives aimed at fostering open access to publications, text and data mining (TDM) and editorial innovation. CIRAD joined the movement through the signing, by its President Managing Director, alongside other research and higher education players, of several texts intended for Parliament and the Minister of Higher Education, Research and Innovation, following the negative advisory opinion expressed by the Conseil d'État on the decree implement-



ing article 38 of the law on text and data mining. They are calling on the European Union to commit fully to open science and open access. The *appel de Jussieu* dated 17 October, calling for open science and

biodiversity, led by the AllEnvi and Aviesan alliances and their members, insists on the need to support innovation to ensure an in-depth reform of publishing activities.

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CIRAD is committed to open access to knowledge (pdf available at: <https://www.cirad.fr/en/publications-resources/cirad-publications>)

BURKINA FASO

A COMMUNITY OF CROPPING SYSTEM SIMULATORS IS BORN

From 6 to 17 November, 30 agronomists, ecologists, hydrologists, ecophysicists and soil scientists from West Africa, all working with CIRAD, went back to school in Burkina Faso. The aim was to train in dynamic modelling of cropping systems and in database management.

Over ten days of hard work, the researchers learnt why there are so many different models and how

to identify or build the model best suited to their field of study. The trainers, from CIRAD and the IRD, and the participants were delighted to take part in the birth of a community of cropping system modellers in West Africa.

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© Rik Schulling / TropCrop-TCS

HIGHER
EDUCATION

CIRAD AND THE ENVT JOIN FORCES
TO TRAIN ANIMAL HEALTH MANAGERS
IN THE SOUTH



▲ Isabelle Chmitelin, Dean of the ENVT, and Michel Eddi, CIRAD President Managing Director, signed a general agreement on 27 February for cooperation on training, research and expertise over the coming five years © CIRAD

Michel Eddi and Isabelle Chmitelin, Dean of the Ecole Nationale Vétérinaire de Toulouse (ENVT), signed a general agreement on 27 February for cooperation on training, research and expertise over the coming five years.

As members of the French Agricultural, Veterinary and Forestry Institute (Agreenium), the ENVT and CIRAD have contributed for many years to the training and research structure in the new Occitanie region. Moreover, they are working together within the platforms in partnership for research and training (dPs) set up in southern countries.

In 2015-2016 alone, their links resulted in the development of two international Masters,

GIMAT (Integrated management of tropical animal diseases) and InterRisk (Health risk assessment and management at the interface between man, animals and ecosystems), and a MOOC (Massive Online Open Course) on the basics of the epidemiology of animal diseases.

The partnership will give rise to an annual action plan and may lead to more specific agreements targeting joint operations of major, shared strategic interest for the two establishments, or for Agreenium.

<https://www.cirad.fr/en/news/all-news-items/press-releases/2017/signing-cirad-envt-training-for-animal-health-managers-in-the-south>

AQUACULTURE, PROSPECTS AND SOLUTIONS. A UNIQUE TEACHING RESOURCE

Almost half of the fish intended for human consumption are now farmed. Aquaculture is a vital source of jobs, food and economic opportunities, and by 2030, is scheduled to account for two thirds of the fish produced worldwide. However, it is increasingly under fire because of its environmental impact, social consequences, etc. Yet there are innovative technologies and development methods that provide hope for sustainable production in the future.

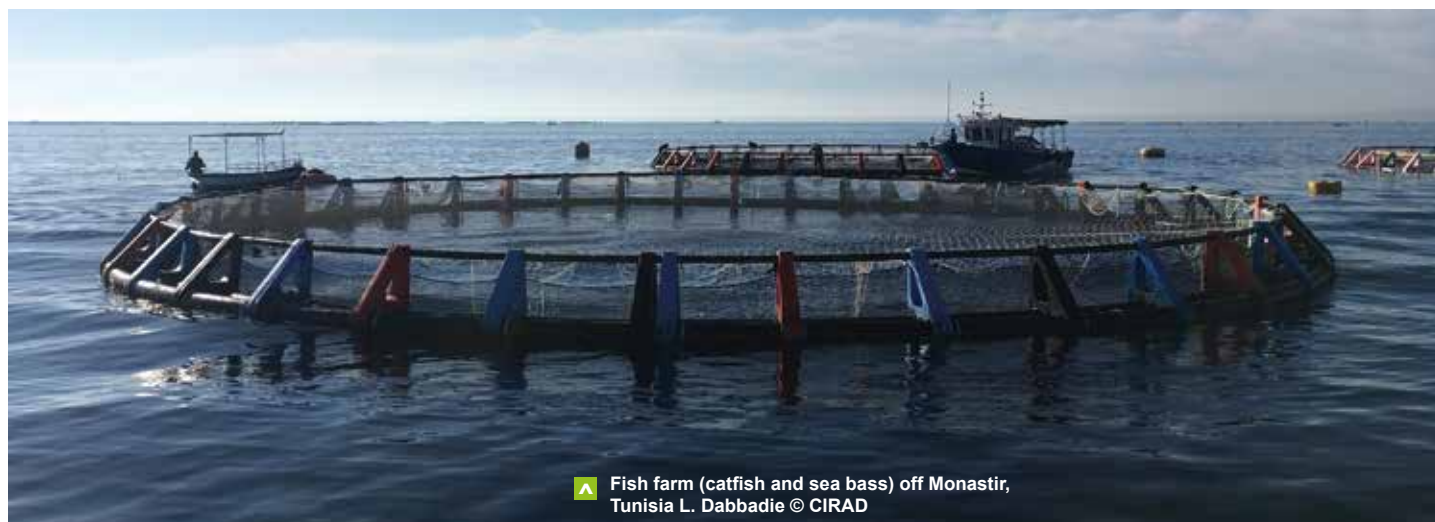
These new forms of aquaculture are presented in this teaching resource. *Aquaculture, perspectives et solutions* comprises eleven chapters with contributions from international specialists, and is a mine of information and educational references for anyone interested in the issues surrounding aquaculture worldwide.

The resource, produced in January with support from the *Université Virtuelle Environnement et Développement* (UVED), was coordinated by the CIRAD-FVI joint team for teaching and training in livestock produc-

tion and veterinary medicine in warm regions, including its MUSC (MULTimedia for Science at CIRAD) platform. It was designed by researchers from CIRAD, IFREMER, the IRD, IRSTEA and AgroParisTech.

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<https://www.cirad.fr/en/news/all-news-items/articles/2017/ca-vient-de-sortir/aquaculture-prospects-and-solutions-a-unique-teaching-resource>



▲ Fish farm (catfish and sea bass) off Monastir, Tunisia L. Dabbadie © CIRAD



AUF AND CIRAD RENEW THEIR PARTNERSHIP

CIRAD and the Agence universitaire de la Francophonie (AUF) signed a general agreement on 14 April, with a view to strengthening partnerships within the French-speaking world.

CIRAD is a member of the French Agricultural, Veterinary and Forestry Institute (Agreenium) and of MUSE (Montpellier University of Excellence), and is keen to work with countries in the global South to develop intervention frameworks and training courses tailored to their requirements. The AUF helps structure and develop research within a national and international framework, and supports the involvement of its members in this approach. Its partnership with CIRAD is one example of this

www.cirad.fr

<https://www.cirad.fr/en/news/all-news-items/press-releases/2017/auf-cirad-partnership-renewed>

AGREEN U, THE DIGITAL AGRO-BIOSCIENCE UNIVERSITY

Agreen U, which was launched in 2015 by Agreenium, opened its doors in 2017. It is a veritable virtual campus, which offers a range of digital resources and information and training services in the field of agro-bioscience. This is fostering the creation of education communities, centring on agro-ecology amongst other things.

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https://www.agreenium.fr/sites/default/files/dossier_de_presse_agreen_v_web.pdf

CIRAD is a founding member of Agreenium and MUSE



dP CANSEA. Regional agro-ecology workshop

The CANSEA platform in partnership for research and training (dP) organized a workshop in Vientiane on 10 January. The aim was to hold discussions with all the platform partners on the future

of the dP and how to broaden its scope with a view to supporting the agro-ecological transition in Southeast Asia.

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Population and economic pressure has speeded up agricultural intensification in Southeast Asia. It has also exacerbated the pressure on the available land, and soil degradation. Conservation agriculture (CA) serves to preserve and restore soil fertility.

The major potential for dissemination of these innovative systems is bolstered by the wide range of players involved. The CANSEA platform is working to structure these initiatives on a regional level. Drawing M. Khamla, Laos

THE SUDBIOTECH WORKSHOPS ARE TEN!

The SudBiotech initiative (CIRAD, IRD, CNRS, Paris Saclay University), which was launched to lay the foundations for a permanent network of teacher-researchers in biotechnology, molecular biology and bioinformatics in Africa, works to introduce innovative educational pathways at universities. In ten years of classroom teaching, SudBiotech has been deployed in Benin, Burkina Faso, Algeria and Tunisia.

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Interview with Alain Rival, Coordinator, for CampusMag:



<https://www.youtube.com/watch?v=q25ESYq92wY>

Film *Comprendre et maîtriser les biotechnologies au Sud*:

<http://www.ird.fr/la-mediatheque/videos-en-ligne-canal-ird/comprendre-et-maitriser-les-biotechnologies-au-sud>

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SUPPORTING SOUTHERN COUNTRIES

to make
scientific research
a prime driver
in societal
transitions

IMPACT OF AGRICULTURAL RESEARCH

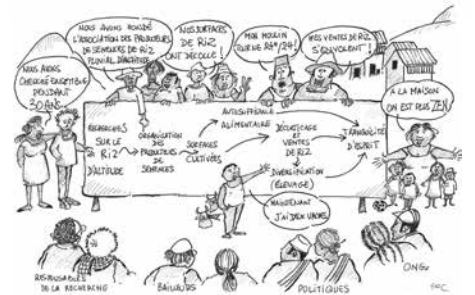
THE DEBATE IS ON BETWEEN SCIENTIFIC ORGANIZATIONS AND DONORS

How can we measure the impact of agricultural research? How can we contribute to research governance in such a way as to maximize its impact in the field, in terms of gains in productivity, environmental quality, efficiency all along the agrifood chain, social relations, etc? These questions were addressed by two projects, ImpresS and Impresa, the results of which were presented, on the initiative of CIRAD, in Brussels on 18 November. The presentation was followed by talks with representatives of three European Commission Directorates General [Research and Innovation, Agriculture and Rural Development, and Development and Rural Cooperation] and the International Fund for Agricultural Development (IFAD). This unprecedented meeting between scientific organizations and donors paved the way for a renewal of the way in which we assess impact, a debate on the place of impact in competitive funding, and a research and agricultural development policy rethink.



Impact illustrated by Eric Vall, CIRAD researcher

ImpresS and Impresa push researchers to switch from a “culture of promises to a “culture of impact”. However, this change in culture will not be possible without the help of the donors who determine the framework for research funding.



THE IMPRESS EX POST METHODOLOGICAL GUIDE

The ImpresS (Impact of Research in the South) ex post method was developed by CIRAD to document the economic, societal and environmental impacts that research helps to generate in the long term. It establishes causalities between research activities and those impacts by involving the various players concerned, whether they are drivers of or impacted by innovation.

ImpresS methodological guide. Methodological guide to ex post evaluation of agricultural research in developing countries. Barret Danielle, Blundo Canto Genowefa, Dabat Marie-Hélène, Devaux-Spatarakis Agathe, Faure Guy, Hainzelin Etienne, Mathé Syndhia, Temple Ludovic, Toillier Aurélie, Triomphe Bernard, Vall Eric (illus.). 2017. Montpellier: CIRAD, 96 p. ISBN 978-2-87614-736-2 <http://agritrop.cirad.fr/587552/>

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<https://www.cirad.fr/en/news/all-news-items/articles/2017/institutionnel/impact-of-agricultural-research>

Sustainable palm oil

CIRAD AND THE FRENCH ALLIANCE FOR SUSTAINABLE PALM OIL HAVE AGREED ON A THREE-YEAR PARTNERSHIP

On 27 February, during the Paris International Agricultural Show, Michel Eddi and Guillaume Réveilac, President of the French Alliance for Sustainable Palm Oil, announced the signing of a three-year partnership agreement, in front of an audience of NGOs and representatives of public authorities.

Through the agreement, the French Alliance for Sustainable Palm Oil will be supporting research projects to be conducted within the SALSA platform. This group of French firms already buys 100% RSPO [Roundtable on Sustainable Palm Oil]-certified palm oil, of which 73% is classed as “segregated”, the highest RSPO classification. It is now aiming for “zero deforestation” by 2020.

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<https://www.cirad.fr/en/news/all-news-items/press-releases/2017/cirad-and-the-french-alliance-for-sustainable-palm-oil-have-agreed-on-a-three-year-partnership>

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Sustainable
tree crop-based
value chains

LAUNCH OF
THE SALSA
PLATFORM IN
PARTNERSHIP
IN SOUTHEAST
ASIA



French president François Hollande; Malaysian Prime Minister Najib Razak; CIRAD President Managing Director Michel Eddi; UPM Deputy Vice Chancellor Prof. Renuganth Varatharajoo (L to R)
© Alain Rival/CIRAD

CIRAD President Managing Director Michel Eddi accompanied French President François Hollande on his tour of Southeast Asia. During the tour, he joined several of CIRAD's partners to launch the SALSA (Sustainable Agricultural Landscapes in Southeast Asia) platform intended to improve the sustainability of tree crop-based value chains in the region.

According to Michel Eddi, "the aim is [to be able to offer the authorities and economic and social players in North and South policy frameworks and instruments] to enable substantial progress towards the target of sustainable tree crop-based production systems, which has not yet been achieved".

Tropical value chain sustainability is central to the debate

The question of tree crop sustainability is a major issue in Southeast Asia. The recurrent public debate about the impact of growing oil palm in particular polarizes opinions and has direct consequences for relations between France and producing countries. With over 60 years' experience of tropical agricultural research, CIRAD is in a position to support vital changes in the value chains concerned, in terms of the three aspects of

sustainability: economic, social and environmental.

A network of partners in Malaysia and Indonesia

In Malaysia, CIRAD has built a network of partners resulting, since 2009, in the assignment of researchers to Universiti Putra Malaysia (UPM). The inner circle of members involved in building the platform comprises UPM, the ASEAN ASAIHL and the University of Montpellier.

In Indonesia, the founding members of SALSA are two plantation companies, PT SMART and PT Socfindo, which are long-standing CIRAD partners (oil palm and rubber), the national plantation crop research network PT RPN, and the Asian Pacific Coconut Community, an institutional

Jean-Pierre Caliman, Division Head of SMART RI, with Michel Eddi © Alain Rival/CIRAD



partner under the aegis of the United Nations.

New partners—institutions, universities, research centres, private firms and NGOs—including some from other countries in the region, such as Thailand and Singapore, will gradually form an outer circle around this nucleus.

Training, a major part of SALSA

SALSA is a platform for the co-construction of scientific and training projects that will centre on three priorities:

- initial and continuing academic training with a view to laying the foundations of a community of beliefs and ideas regarding sustainable development;
- producing reliable results intended to strengthen and improve current and future sustainability standards in the main production chains;
- the production of knowledge and innovations of international standard, capable of delivering reliable answers to the questions posed by producers, civil society and decision-makers.

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<https://www.cirad.fr/en/news/all-news-items/press-releases/2017/a-successful-launch-for-the-salsa-partnership-platform-in-malaysia-and-indonesia>

CIRAD at EDD 2017

FUELLING DIALOGUE WITH DEVELOPMENT PLAYERS

For its third participation in European Development Days, on 6 and 7 June, CIRAD organized/participated in five initiatives: a workshop on the sustainability of platforms in partnership for research and training (dPs); two debate lab sessions, one on territorial development and the other on the 4P1000 initiative; a stand representing seven projects in partnership between the European Union, staffed by four CIRAD researchers; and an exhibition of artworks by local artists, illustrating the dPs. All these initiatives served to fuel dialogue with the various development players.

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<https://www.cirad.fr/en/news/all-news-items/articles/2017/events/a-look-back-at-european-development-days-2017>



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perspective

The CIRAD policy brief

The resilience of ecological and social systems: taking account of uncertainty for development

The term resilience is used by development and humanitarian actors to establish a framework for sustainable development implementation in regions affected by recurrent crises. Another approach, social and ecological system resilience, sheds a different light on adaptation pathways. This issue of *Perspective* demonstrates that collaboration between the schools would be useful.

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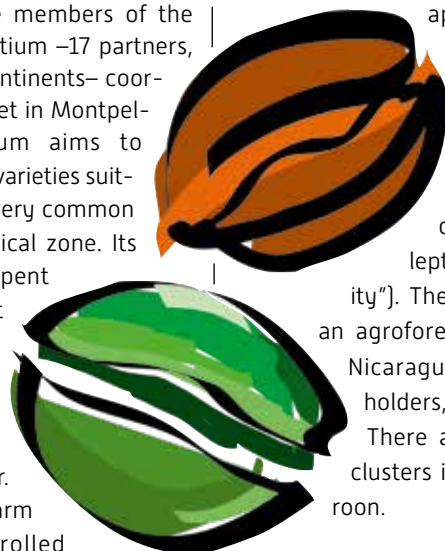
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<https://www.cirad.fr/en/news/all-news-items/articles/2017/ca-vient-de-sortir/perspective-n-43-la-resilience-des-systemes-ecologiques-et-sociaux>

HORIZON 2020

CREATING COFFEE VARIETIES SUITABLE FOR AGROFORESTRY

In July 2017, all the members of the BREEDCAFS* consortium –17 partners, 11 countries, four continents– coordinated by CIRAD met in Montpellier. The consortium aims to develop F1 hybrid coffee varieties suitable for agroforestry, a very common practice in the intertropical zone. Its first six months were spent organizing its activities at various experimental sites in Vietnam, Nicaragua, Costa Rica, Cameroon, French Guiana, Portugal and Montpellier. Tests are scheduled on farm or under semi-controlled (research stations) or controlled conditions (“phytotron”). The initial trials will serve to assess plant functioning and identify relevant breeding targets. The development of specific meta-analysis tools will make it possible to launch systemic biology



approaches for coffee. The first coffee samples from Central America have now arrived in Europe for analysis (biochemical composition, organoleptic quality or “cup quality”). The project is monitoring an agroforestry cluster set up in Nicaragua, associating small-holders, traders and roasters. There are plans for identical clusters in Vietnam and Cameroon.

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*The BREEDCAFS project is funded by the European Commission under the Horizon 2020 - Research and innovation programme [H2020-SFS-2016-2, Grant Agreement Number: 727934].

☑ Marselesa coffee flower. Marselesa is a rust-resistant coffee variety developed by geneticists (CIRAD/IRD).I. Vagneron © CIRAD



D. Guard, CIRAD



▲ Cotton flower bud being attacked (hole) by a *Spodoptera frugiperda* larva P. Silvie © CIRAD

GLOFOODS METAPROGRAMME

IDENTIFYING PLANTS USED AS NATURAL PESTICIDES IN AFRICA

The Knomana [Knowledge management on pesticide plants in Africa] project is one of around fifty projects funded by the GloFoodS [Transitions to Global Food Security] metaprogramme, an INRA-CIRAD initiative aimed at encouraging researchers to review how they address the issue of food security. It set out to study traditional practices among farmers in the global South, who use plants with pesticidal effects to protect their crops or stored goods against pests and diseases. The aim is to identify the plants concerned, their uses, how they work, the organisms they target, and their unintentional effects, and to make that information available via a knowledge base. To begin with, the project concerns eleven countries in French-speaking Africa.

This work will help solve problems such as the recent arrival in Africa of *Spodoptera frugiperda*, an invasive, polyphagous moth whose caterpillars are a threat for various crops worldwide.

It will also back up the development of organic farming in Africa, one of the four ways of intensifying agriculture listed by the PROIntensAfrica project that ended in 2017.

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<https://www.cirad.fr/en/news/all-news-items/articles/2017/science/identifying-plants-used-as-natural-pesticides-in-africa-knomana>

<https://www.divecosys.org/actualites/le-projet-knomana-demarre>



▲ Preparing neem (*Azadirachta indica*) leaf extracts in Senegal for application on cotton crops © Matar Dione

<https://www.divecosys.org/>

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WORKING TOGETHER FOR A BETTER FUTURE

because
there are ways
—through
cooperation
and solidarity—
of resolving
political,
economic
and social
tensions

BRAZIL AND SOUTHERN CONE COUNTRIES TWO MAJOR COOPERATION AGREEMENTS

Michel Eddi was in Brazil from 23 to 29 November. During his visit, he met the main Brazilian partners in the Amazonie platform (dP) in Belém, Pará State, and signed two major new cooperation agreements for ongoing research with Brazil. The first puts the seal on the renewal of a partnership with EMBRAPA dating back more than thirty years. It confirms the importance of platforms in partnership for research and training (dPs) as the preferred instrument of this collaboration. The two organizations are planning new lines of cooperation, such as a project on the sustainability of semi-arid agro-ecosystems in Nordeste, the creation of a new research centre dedicated to "Food-Nutrition-Territories", and the development of a new agro-climatic risk model, if

possible in a tripartite project with African partners.

The second agreement cements CIRAD's recent collaboration with Brazil's National Council for Scientific and Technological Development (CNPq). It gives CIRAD recognition as a leading scientific cooperation organization in Brazil, making it eligible for certain types of federal and national funding.

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<https://www.cirad.fr/en/news/all-news-items/articles/2018/institutionnel/brazil-cooperation-agreements-with-embrapa-and-cnpq>

<https://bresil.cirad.fr/actualites/visite-au-bresil-du-president-directeur-general-du-cirad>

TUNISIA

A TRIPARTITE COOPERATION AGREEMENT HAS BEEN SIGNED WITH THE GOVERNMENT

CIRAD signed a five-year scientific cooperation agreement on 18 October with the Tunisian Ministry of Higher Education and Scientific Research (MESRS) and the Institut de Recherche pour le Développement (IRD). The aim is to drive research and innovation in agriculture and the agrifood industry in Tunisia.

Left to right: Michel Eddi, CIRAD President Managing Director; Slim CHOURA, DG for International Cooperation at the MESRS in Tunisia; Jean-Paul Moatti, IRD Director General
© D. Bazile, CIRAD



This dynamic will go hand-in-hand with the possibility of conducting joint projects within the framework of EU H2020 programmes: EMORI, in support of education, mobility, research and innovation, and PRIMA, on water management and agrifood systems.

This is the first time that CIRAD has signed an agreement with the Tunisian government, although it has been working in Tunisia for more than ten years, in several fields: water governance and management, soil conservation and agro-ecology, animal health, livestock production and agro-pastoral system management, fruit trees, and geographical indications.

CIRAD and the IRD will be setting up a joint representation in Tunisia. The IRD representative in the country will be CIRAD's relay on site, in liaison with the CIRAD Regional Director for the Mediterranean and Middle East, based in Montpellier.

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<https://www.cirad.fr/en/news/all-news-items/articles/2017/institutionnel/tunisia-a-tripartite-cooperation-agreement-has-been-signed-with-the-government>

AGRO-ECOLOGICAL PRACTICES IN OIL PALM PLANTATIONS

This article gives several illustrations of the agro-ecological practices used in the oil palm plantations of Southeast Asia. They highlight the importance of the many co-products derived from oil palm for reducing external input use both in plantations and in oil mills, and for maintaining and even improving soil quality.

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Agroecological practices in oil palm plantations: examples from the field, Bessou Cécile, Verwilghen Aude, Beaudoin-Ollivier Laurence, Marichal Raphaël, Ollivier Jean, Baron Victor, Bonneau Xavier, Carron Marc-Philippe, Snoeck Didier, Naim Mohd, Ketut Aryawan Anak Agung, Raoul Francis, Girardoux Patrick, Erwanda Surya, Sihombing Edison, Caliman Jean-Pierre, 2017. OCL. Oilseeds and Fats, Crops and Lipids, 24 [3], eD305 [16 p.].

<http://doi.org/10.1051/ocl/2017024>



D. Guard, CIRAD

Zero hunger

PATRICK CARON SPEAKS AT THE UN

As Chair of the UN Committee on World Food Security High Level Panel of Experts on Food Security and Nutrition, Patrick Caron was called upon on 11 July as a commentator in the review of Sustainable Development Goal 2 (Zero hunger), at the High-level Political Forum on Sustainable Development organized at UN HQ.

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<https://intranet.cirad.fr/les-rubriques-du-portail/les-actualites/2017/actus/odd.-faim-zero-patrick-caron-intervenu-a-l-ONU>



Patrick Caron © CIRAD



The action plan for the platforms in partnership for research and training (dPs) initiated by CIRAD entered its second phase in 2017. The state of play and changes to come, with Jacques Pagès, Partnerships Coordinator at CIRAD

THE ROADMAP FOR THE PLATFORMS IN PARTNERSHIP FOR RESEARCH AND TRAINING

What operations were conducted in 2017?

The overall dynamic of CIRAD's involvement in the dPs shifted towards associating partners with decision making earlier on. As regards the dP label, a "dP" stamp has been designed, to promote a symbol shared by all the dPs and illustrate the existence of a community; a charter is currently being drafted.

Several dPs are involved in operations linked to the issue of climate change: either the development of agro-ecological practices (dPs ASAP, DIVECOSYS, CANSEA, etc) or the preservation of natural resources and biodiversity (dPs HRPP, FAC, F&B, etc).

What about the visibility of the 22 existing dPs?

Some of the recommendations made following the review of the dPs concerned the need

to make operations in partnership more visible, notably by translating them into elements of use in high-level decision making.

Certain projects, through the CIRAD researchers involved, serve to promote the contributions of several dPs to various operations. They boost the visibility of the network as a whole insofar as they enable donors to grasp the regional and even global scope the network offers.

As regards capacity building, training courses associating players involved in different dPs, centring on communication and led by CIRAD, have been provided in the global South (website production and management, social media visibility).

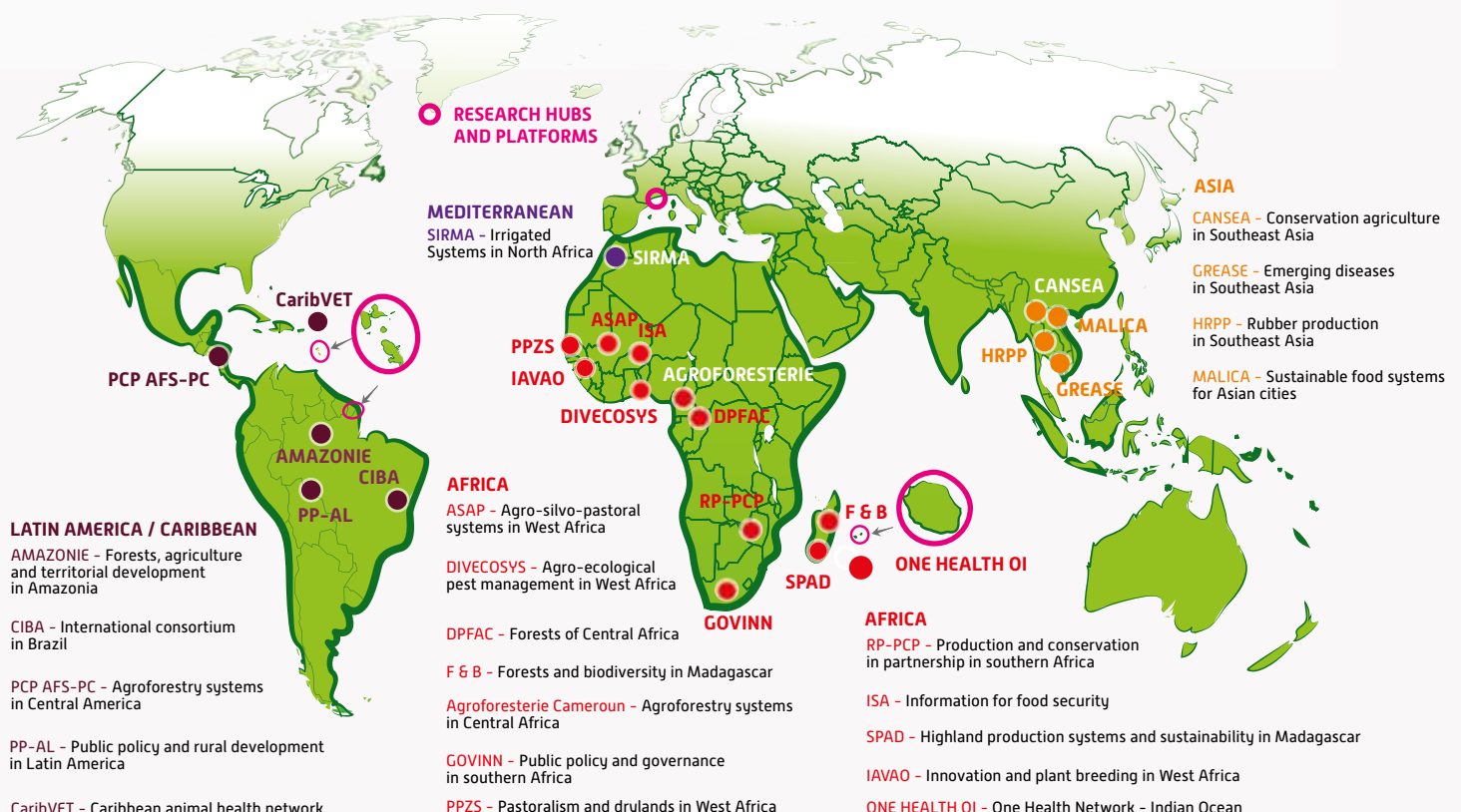
Lastly, the active participation of dP partner organizations in major international events such as European Development Days in Brussels has also served to promote the dPs.

How do you see the future of the dPs? How can they attract new partners and convince international donors?

To prepare for the next stage of the dP action plan and take account of the 2018-2028 CIRAD Strategic Vision, the consultation with partners in the main three regions (West and central Africa, Latin America and Southeast Asia), begun in late 2016, has continued. The aim is to give substance to the dP network by consolidating the partners' sense of ownership, to make the global community aware of what these platforms have to offer and how they can support the decisions to be made on global issues, but on a local level.

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PROIntensAfrica

BUILDING EFFECTIVE, INNOVATIVE PARTNERSHIPS BETWEEN EUROPE AND AFRICA

The PROIntensAfrica project held its final seminar at African Union Headquarters in Addis Ababa, from 13 to 15 March. This ambitious project set out to build a strategic research partnership between Europe and Africa, to work for sustainable development. After two years' work, the project partners have built a consortium of partners who know and appreciate each other, and identified a research agenda and appropriate funding mechanisms (the first of which is the European LeapAgri initiative).

These results were achieved through case studies conducted across the continent, which PROIntensAfrica used to validate the idea of the co-existence of different agricultural intensification pathways in Africa, from conventional to organic farming. Those pathways illustrate the richness and variety of agricultural management options that are open to African farmers. Above all, they cement the idea that there is no single path to sustainable intensification of agriculture.

Public policy in both Africa and Europe is now in a position to seize that diversity and make informed decisions as to which options to support, between organic and industrial farming.

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<http://www.intensafrica.org/fr>

<https://www.cirad.fr/en/news/all-news-items/press-releases/2017/prointensafrica-building-blocks-for-a-research-partnership-between-europe-and-africa>

<http://www.intensafrica.org/fr/diverses-voies-conduisent-a-une-intensification-durable-de-lagriculture/>

✓ The seminar participants © CIRAD

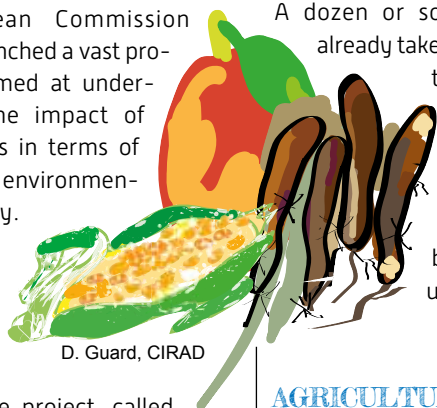


Agrinatura

ANALYSING VALUE CHAINS FROM A SUSTAINABLE DEVELOPMENT PERSPECTIVE (VCA4D)

The European Commission recently launched a vast programme aimed at understanding the impact of value chains in terms of economic, social and environmental sustainability. CIRAD, which is a member of the coordinating consortium Agrinatura, played a major role in designing the project, called Value Chain Analysis for Development [VCA4D]. It is now applying its expertise in in-depth analyses, notably in the field, to several value chains being assessed by the programme.

Mango in Burkina Faso, maize and soybean in Zambia, cassava in Ivory Coast, and so on... eight value chain analyses have already been completed and three others are under way.



D. Guard, CIRAD

A dozen or so CIRAD researchers have already taken part in the appraisals. Each team comprises a sociologist, an economist, an LCA specialist and a local expert from the value chain.

An information system will be built to structure, archive, update and visualize the data

gathered. That data, which will thus be universally accessible, will be a valuable resource for researchers, but also for policy-makers and value chain stakeholders in the countries concerned.

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<https://www.cirad.fr/en/news/all-news-items/articles/2017/science/vca4d-analysing-value-chains-from-a-sustainable-development-perspective>

AGRICULTURAL INNOVATION AND CLIMATE CHANGE, A JOINT INITIATIVE BETWEEN THE EUROPEAN UNION AND THE GATES FOUNDATION

The European Union and the Bill and Melinda Gates Foundation, along with France, Germany, Italy and Spain, are to work on a joint initiative [DESIRA] to foster agricultural research and innovation in developing countries, with a view to tackling the challenges posed by climate change. The European Commission has promised 270 million euros over

the coming three years (2018 to 2020), to which the Gates Foundation will add 255 million euros over the same period. The details of how this funding will be managed are to be decided in 2018.

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CIRAD EXTENDS ITS HISTORICAL PARTNERSHIP WITH ARMEFLHOR

CIRAD President Managing Director Michel Eddi and Alain Dambreville, President of Armefflor, a technical institute specializing in fruit, vegetable and horticultural production in Réunion, have signed a general agreement between the two organizations. The signing was held during the Paris International Agricultural Show, on 3 March 2017.

"The agreement revisits the links between our two structures, in terms of both project governance and steering, and management and pooling of resources", Eric Jeuffraut, CIRAD Regional Director for Réunion-Mayotte, explains. The aim is to build research and experimental capacity within the fruit, vegetable and horticultural value chains in Réunion.

<https://reunion-mayotte.cirad.fr/actualites/2017/parteneriat-avec-l-armefflor/%28language%29/fre-FR>

Alain Dambreville, Armefflor President



R. Carayol © CIRAD

RITAs FOR STRONGER EXCHANGES BETWEEN OVERSEAS REGIONS



At the request of the French Ministry of Agriculture and Food, CIRAD, along with ACTA, has headed the technical innovation and agricultural transfer networks (RITAs) in the French overseas regions since their creation in 2011.

CIRAD and ACTA's main responsibility in this respect is to facilitate exchanges of information and encourage research, training and agricultural development players to share their experiences so as to facilitate the transfer of agro-ecological innovations and their adoption by farmers.

CIRAD organizes meetings in the tropics, via the AgroEcoDom project funded by the Réseau rural national and the European

Union. After Martinique in 2016, 150 people from the French overseas regions and metropolitan France met in Mayotte and Réunion in 2017. They compared their perspectives and shared their experiences of shared issues such as the fight against varroa mites, use of service plants, prairie management, and animal welfare and health.

Coatis is the RITA information system, which CIRAD was responsible for developing. It offers public access to a range of resources such as fact sheets, videos, a directory, and various other tools of use to agronomists. It also offers restricted access for collaborative operations, and can be adapted to requests from RITA stakeholders by adding functions.

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Réunion-Mayotte-IO

PRERAD-OI PROMOTES COLLABORATIVE AGRICULTURAL RESEARCH OPERATIONS



Inter-CROST, the regional science and technology steering committee of the Indian Ocean regional agricultural research for development platform (PRERAD-OI*), met on 27 and 28 September 2017 at Indian Ocean Commission (IOC) HQ in Mauritius.

The regional platform set out to foster the emergence of collaborative agricultural research, innovation, development and training operations in the Indian Ocean. "Above all, PRERAD-OI is a tool for the use of IOC member countries, which is intended to be federative and participatory. One of the issues at stake is pooling and harmonizing collective intelligence, to ensure development that is both global and tailored to each and every territory", Christelle Monier, implementation and regional cooperation

officer at CIRAD, and PRERAD-OI coordinator, stresses.

Inter-CROST confirmed the relevance of the PRERAD approach and the commitment of the various partners involved. A potential second phase could look at skill building and

the establishment of an Indian Ocean agriculture observatory.

* The PRERAD-OI project is co-funded by the European Union (ERDF INTERREG V) and the Réunion Regional Council.

<https://reunion-mayotte.cirad.fr/>

The regional science and technology steering committee of the Indian Ocean regional agricultural research for development platform © C. Glad, CIRAD



Haiti

IMPACT OF A SYSTEMIC ANALYSIS OF THE AGRICULTURAL SECTOR

Thanks to the longstanding links forged between CIRAD researchers, Haitian teacher-researchers and civil servants, and staff members from various international aid agencies, a team led by CIRAD, funded by the Inter-American Development Bank (IDB), completed an in-depth systemic study of the agricultural sector in Haiti in 2016.

The impact of this type of research in a country in the throes of multiple crises can only be determined through direct information sharing and discussion. In 2017, at the suggestion of Paul Latortue, a professor at the University of Notre-Dame d'Haïti (UNDH), two CIRAD researchers led:

> a training course on agriculture in Haiti and the challenges for public- and pri-

vate-sector managers, as part of the MBA course at UNDH;

> a day of political dialogue, co-organized by P. Latortue and Gilles Damais (IBD, Haiti), with 50 participants;

> a work session with Mr Jean Baden Dubois, Governor of the Bank of the Republic of Haiti, and members of its Board of Directors.

This collaboration is ongoing and takes many forms, including participation in calls for research proposals launched by the Ministry of Agriculture, Natural Resources and Rural Development (MARNDR) in Haiti, funded by the IDB; the design of a project on transitions in Latin America and the Caribbean with Colombian researchers; and the forging of links between senior staff members at MANRDR and the National Coordination for

Food Security (CNSA), and Haitian and Brazilian researchers from several universities through the GAPRA project. The project is studying food governance and agricultural household practices by looking at food supply flows and scattered families and is funded by the GloFoodS programme (INRA, CIRAD).

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Van Vliet G., Pressoir G., Marzin J., Giordano T. (eds.). 2016. *Une étude exhaustive et stratégique du secteur agricole/rural haïtien et des investissements publics requis pour son développement* (Final version, 29 June 2016). BID/IDB Convention C00075-15. Montpellier: CIRAD, 648 p. (<http://agritrop.cirad.fr/580373/>).



▼ Rice paddies in Descapelles, Haiti Airmaria © Adobe Stock

SPOTLIGHT
2017

LIVING TERRITORIES



At a time when the ever-faster changes on our planet,
particularly urbanization, are raising many issues,
there is renewed interest in rural territories.

CIRAD is working on the capacity of these territories to contribute,
on a local and global level, to the Sustainable Development Goals.

This was the annual theme chosen for 2017.

“RURAL TERRITORIES ARE FORCES FOR SUSTAINABLE DEVELOPMENT”

How can rural territories contribute, on a local and global level, to the Sustainable Development Goals? Patrick Caron, a geographer with CIRAD and Chair of the United Nations High-Level Panel of Experts on Food Security, takes a new look at this question.

Why bother about rural territories?

Patrick Caron: In recent years, a great deal of attention has been paid to urban growth issues and the role of towns and cities in implementing sustainable development. These questions are obviously hugely important. However, they should not make us forget rural territories.

They are areas in which new types of governance are being invented, and which supply economic, social and environmental services that are essential for peace and social cohesion.

At a time when the ever-faster changes on our planet, particularly urbanization, are raising many issues, we feel it is important to look into the capacity of rural territories to contribute, both locally and globally, to reaching the Sustainable Development Goals. The idea is that there can be no prosperity or peace, including in urban zones, without flourishing rural areas

In concrete terms, what are we talking about?

P.C.: The aim is to understand and exploit territorial dynamics and riches better. For instance, we need to know how, on a territorial level, we can rely on collective constructs to organize agricultural production and manage land, water, grazing and forest resources. The strong hypothesis behind the book is that territories are major spaces for technical, organizational and political experimentation and innovation, and that this makes them a force for change with a view to achieving the SDGs.

However, we are not looking to idealize territories. They are also battlefields that can engender the exclusion and marginalization of some stakeholders. What we are interested in is determining when and how they



© FAO, Alessandra Benedetti

can demonstrate that they are indeed a force for sustainable development.

What is the more important lever for action on a territory scale, between the private sector and public policy?

P.C.: When we talk about regulating for sustainable development, we often think about the State on one side and markets on the other. In the late 20th century, Elinor Ostrom, holder of the Nobel Prize for Economics, put forward the theory that commons were a third way of regulation. The way in which territories are seen here is similar to that concept. Territories, like States and markets, offer another space for regulation that complements and does not exclude these two spheres.

In our last book on agri-chains and sustainable development, we showed that it is at the intersection between agri-chains and territories that we can trigger virtuous circles, notably by upping the involvement of stakeholders. This new book confirms this: it is vital that territorial stakeholders control economic dynamics. By coordinating the economic dynamics of agri-chains and the capacity of territorial stakeholders to control those dynamics and make them into some-

thing positive, we can come up with original innovations and make territories a form of regulation for sustainable development.

Should donors be revising their strategy to take account of territories?

P.C.: The aim of the book is to share with donors and other development stakeholders our belief that we are really onto something. Investing in supporting territories is clearly all the more important in that agricultural and rural issues have been largely overlooked in recent years, with the drastic reduction in public support of the sector. Global withdrawal of public funding from rural zones has already been discussed in a report on the state of world development, published in 2008 by the World Bank, just before the so-called hunger riots in 37 countries worldwide as a result of excessive cereal price volatility and limited purchasing power in urban areas. In 2013, a report by the UN High-Level Panel of Experts on Food Security also stressed the dangers of such disinvestment.

In addition to donors, this question also concerns governments. The African Heads of State have made substantial commitments, notably in Maputo in 2003: they promised to devote at least 10% of public expenditure to agriculture. That commitment was repeated in 2014 in Malabo, but is not yet a reality in most of the countries concerned.

Text initially published on 21 February 2017 on the ID4D blog.

REPORT

Atlas

RURAL MIGRATION IN SUB-SAHARAN AFRICA

African migration primarily concerns the continent itself. International migration rates are stable, at around 2% of the population, and in the sub-Saharan part, 70% of migrants do not leave the continent. A new atlas coordinated by CIRAD and co-published with the FAO gives an overview of the dynamics of and factors in this migration.

Population movements have a key role to play in the structural transformation of the continent, particularly in response to demand for jobs.

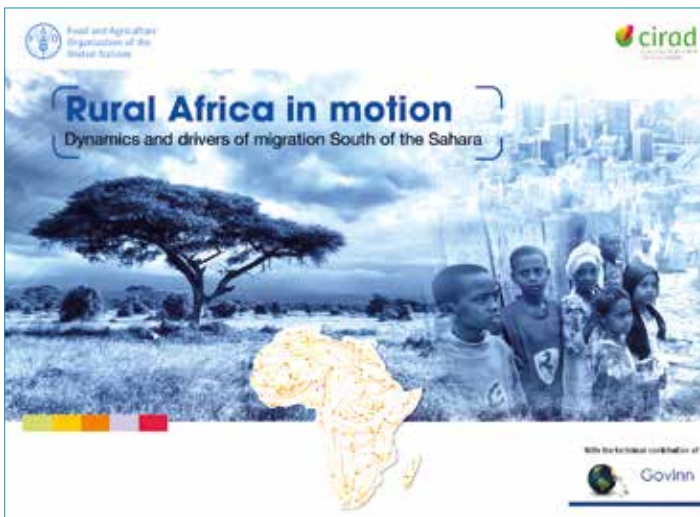
In response to climate change, migration is one way of diversifying livelihoods and managing risks. Rising temperatures will almost certainly shape migratory flows, at least in part, and the

atlas anticipates a global shift towards the coast, upland areas, and the South of the continent.

By taking stock of the issue and suggesting a new comprehensive approach to a somewhat controversial topic, the atlas fuels the policy debate between local players, governments and the international community.

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<https://www.cirad.fr/en/news/all-news-items/press-releases/2017/a-first-atlas-on-rural-migration-in-sub-saharan-africa>

<https://www.cirad.fr/en/news/all-news-items/articles/2018/questions-a/sara-mercandalli-rural-migration-africa>

LIVING TERRITORIES TO TRANSFORM THE WORLD

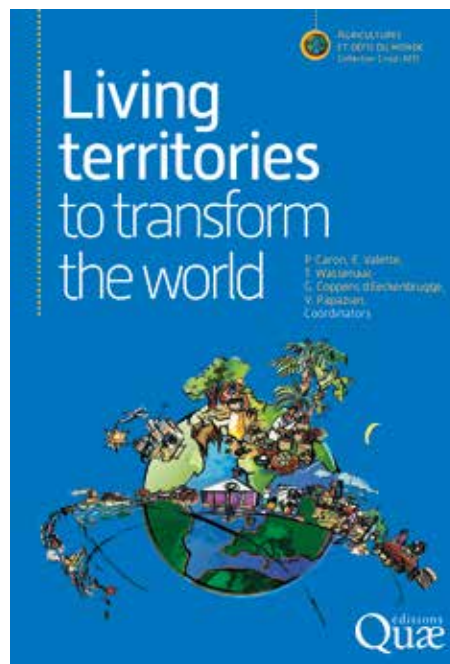
How can rural territories contribute, on a local and global level, to the Sustainable Development Goals? A book set out to look into this question. It highlights the interactions between the different stakeholders, scales and scopes of intervention. It is a compilation of the experiences and views of more than 150 researchers and experts from CIRAD, the AFD and their partners.

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Living territories to transform the world. Caron Patrick, Valette Elodie, Wassenaar Tom, Coppens D'Eeckenbrugge Geo, Papazian Vatché [eds.]. 2017. Versailles: Quae, 274 p. [Agricultures et défis du monde collection] ISBN 978-2-7592-2732-7

<http://agritrop.cirad.fr/583571/>

<https://www.cirad.fr/en/news/all-news-items/articles/2017/ca-vient-de-sortir/living-territories-to-transform-the-world>



perspective

The CIRAD policy brief

Sub-Saharan Africa | Envisioning the future of territories to tackle demographic and employment challenges

In sub-Saharan Africa, the magnitude of the demographic challenge implies anticipating targets to be reached within the next generation, in all sectors of activity. Researchers from CIRAD and their partners propose a method to envision the future. It enables collective thinking on sustainable paths and provides a framework for monitoring and steering public action.

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<https://www.cirad.fr/en/news/all-news-items/articles/2018/ca-vient-de-sortir/perspective-44-sub-saharan-africa-future-territories-and-demographic-and-employment-challenges>

Read the report on

Living territories

on www.cirad.fr

> “Our research” tab

> Under “Research topics”



REPORT

CIRAD AT THE PARIS INTERNATIONAL AGRICULTURAL SHOW

Once again, CIRAD and the AFD had a joint stand at the Paris International Agricultural Show from 25 February to 5 March. It highlighted the Sustainable Development Goals (SDGs) set by the United Nations. The aim was to publicize the key role of agriculture as a tool for sustainable development, and to broaden the debate on development and global solidarity, with activities for the general public and a reception area for institutional partners. A conference and the book "Living territories to transform the world" looked at the topic of territories.

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<https://www.cirad.fr/en/news/all-news-items/press-releases/2017/cirad-and-the-afd-at-sia-2017>



▲ The CIRAD-AFD stand at SIA © M. Adell, CIRAD



USING RURAL TERRITORIES TO CHANGE THE WORLD

An international conference, "Living Territories 2018", held in Montpellier, brought together 280 participants to discuss their vision and experiences of territorial development.

Using territories to tackle the challenges of sustainable development was the idea behind three days of experience sharing and top-level discussions at an international conference, "Living Territories 2018". The conference, organized on the initiative of CIRAD and its partners and held from 22 to 24 January

2018, brought together more than 280 researchers, key players in territorial development, the private sector, donors and policymakers from more than 35 countries.

Research in support of territorial dynamics has long been a major topic for CIRAD, and one of its strong points. At a time when almost half of all people still live in rural areas, territorial development relies on the capacity of all actors to take the changes they experience at the local level to an international level. It also relies on the capacity of territories, through their vitality, to propose new

▼ Frédérique Causse, SIA Coordinator
© M. Adell, CIRAD



"DES TERRITOIRES RURAUX VIVANTS POUR TRANSFORMER LE MONDE"

Territories are secure places in which stakeholders are rediscovering their power, places for dialogue and social cohesion, and places for innovative economic partnerships, and bear witness to the resurgence of the local level in an increasingly fragmented world. These were the key messages put across at a conference, "Des territoires ruraux vivants pour transformer le monde", organized by CIRAD and the AFD on 27 February 2017 during the Paris International Agricultural Show. It brought together more than 140 participants who came to listen to the talks by and debates between contributors from the public and private sectors and civil society.

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<https://www.cirad.fr/en/news/all-news-items/articles/2017/events/a-look-back-at-a-conference-on-living-rural-territories>

modes of governance, connecting the local, national and international levels. Faced with environmental and climate change, population growth and heavy pressure on resources, CIRAD and its partners believe this is the only path guaranteeing responses that are adapted to needs.

<https://www.cirad.fr/en/news/all-news-items/articles/2017/events/living-territories-2018>



<https://twitter.com/hashtag/LVT2018>

CIRAD IN 2017: INDICATORS

This section analyses the evolution of the main indicators that reflect CIRAD's activities.

While remaining consistent with the monitoring mechanism for the 2014-2018 Contractual Objectives and CIRAD's key ambitions set out in its 2012-2022 Strategic Vision*, the analysis proposed retains the same structure and indicators used in previous years within the framework of the 2014-2018 Contractual Objectives.

*** AMBITION 1**

To serve as a global reference for our scientific priorities

AMBITION 2

To co-build strategic agricultural research for development partnerships

AMBITION 3

To establish the conditions for effective innovation

AMBITION 4

To evolve in order to achieve our ambitions.

THE AMBITION OF SHARING SCIENCE TO MEET THE CHALLENGES FACING THE COUNTRIES OF THE SOUTH

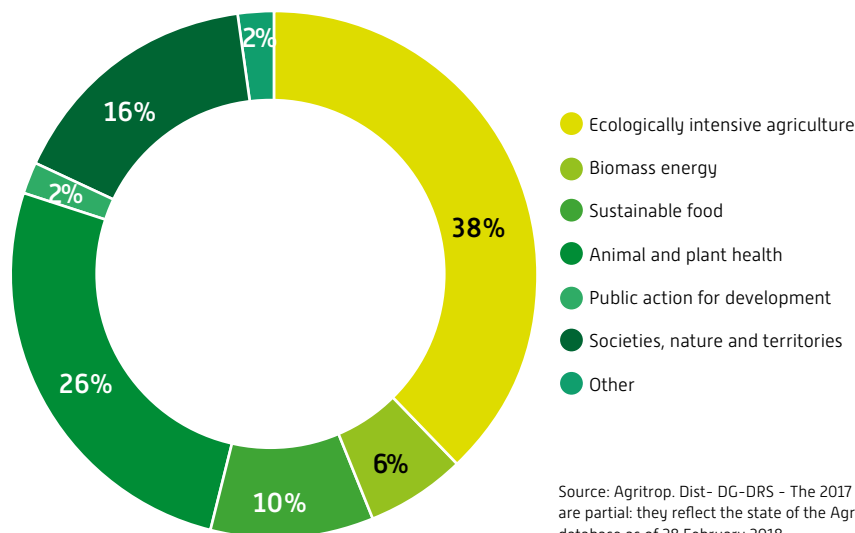
The establishment's priorities, expressed via the six strategic lines of research set out in the 2014-2019 Scientific and Partnership Strategy Objectives (SPSOs)¹, are largely reflected in its scientific output in terms of publications. Most of CIRAD's publications in peer-reviewed journals are referenced as per those lines of research, as shown in the figure opposite.

The distribution of articles in peer-reviewed journals between the various strategic lines of research – just one line per article – varies very little from one year to the next. In 2017, as in previous years, three lines were predominant, with almost 80% of articles in terms of volume: **Ecologically intensive agriculture** [38% of the annual volume of articles], **Animal and plant health** [26%] and **Societies, nature and territories** [16%], with relative stability in distribution but an increase in the overall volume of publications.

Once again this year, CIRAD has proved its determination to build balanced, sustainable partnerships with its scientific partners in the South. Co-publications with at least one author from the South made up the majority [54%] of all publications, with a steady increase in the number of these co-publications between 2011 and 2017 (from 362 to 432).

The number of PhD students supervised by CIRAD, 293 in 2017, fell significantly this year. The proportion of PhD students from the South remains very high, at almost 60% of the total.

Distribution by line of research of articles in peer-reviewed journals, with or without impact factor ²



Source: Agritrop. Dist- DG-DRS - The 2017 data are partial: they reflect the state of the Agritrop database as of 28 February 2018.

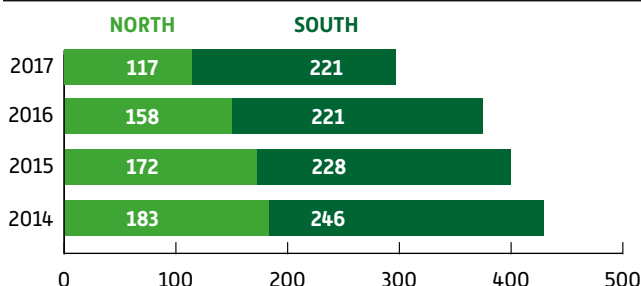
Co-publications with operators in the countries of the South*

<i>Data smoothed over three years</i>	2014	2015	2016	2017
Articles published with at least one author from the South	424	423	409	432
Total number of peer-reviewed articles	829	824	802	805

Source Agritrop. DIST- DGD-RS

*A country is classified as a southern country if it is on the OECD/DAC list of official development assistance recipient countries.

Supervision of PhD students by CIRAD researchers



Source: DGD-RS

1. Approved by the Board of Trustees on 26 June 2014.
2. Following the redefinition of the lines of research from 2014 onwards, only data for publications in 2014 and 2015 can be given.

DIVERSIFIED, HIGH QUALITY SCIENTIFIC OUTPUT

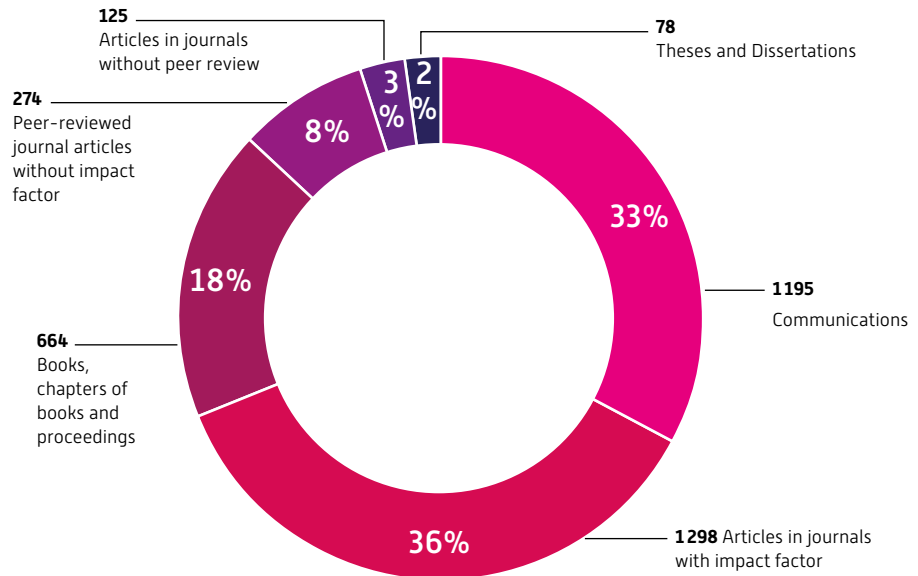
The efforts made by CIRAD to improve the quality of its scientific publications, ensure scientific recognition of its teams and broaden the range of its outputs so as to reach different audiences are reflected in the results below. CIRAD is continuing to work with its partners in the South and all over the world to ensure academic recognition of science for development anchored in the field and co-constructed with its partners in the South, which lies at the heart of its mandate.

Over the period 2016-2017, articles published in impact factor journals (1298 or 36%) and conference papers (1195 or 33%) accounted for the majority of publications, proportions that remained stable with a slight decrease in the overall number of publications of all types. Annual volumes, smoothed over three years, of articles published in peer reviewed journals, with or without impact factor, were down slightly (705 in 2017).

The number of Directors of Research is once again on the up, reflecting the efforts made by researchers to gain academic recognition.

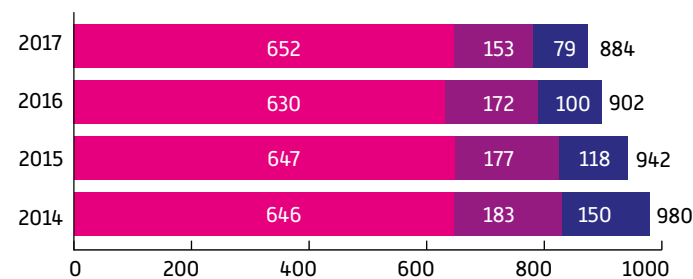
The total number of applications for patents by CIRAD is declining, with only a small number filed, explained first by the high cost of filing and maintaining patents and the difficulty of subsequently protecting them from counterfeiting and, second, by the growing impact of CIRAD's outreach strategy involving the transfer of confidential know-how.

Distribution, by document type, of CIRAD's publications for 2017



Source: Agritrop, DIST-DGDRS
The 2017 data are partial: they reflect the state of the Agritrop database as of 28 February 2018.

Change in the number of journal articles between 2014 and 2017
(data smoothed over three years)



Research training for CIRAD's senior scientific staff

	2014	2015	2016	2017
Number of research directors at CIRAD	162	170	172	178

Source: SIRH, DGD-RD

Outreach: patents, proprietary variety protection certificates and software programmes

	2014	2015	2016	2017
Number of applications for patents, proprietary variety protection certificates and software programmes (in brackets: number of patents)	8 (3)	9 (1)	6 (3)	5 (1)

Source: DelValo, DGD-RS

NATIONAL AGRICULTURAL RESEARCH OPEN TO EUROPE AND THE REST OF THE WORLD

In line with its previous commitments, CIRAD is continuing its agricultural research in partnership activities: on a French regional level; on a national level, notably through its collaboration with INRA on scientific and international cooperation issues, as well as with other French research and training organisations for environmental and agricultural issues within the AllEnvi alliance and the IAVFF-Agreenium national consortium; on a European level with key initiatives (ERA-NET Cofund LEAP-Agri), to structure agricultural research for development operators; and on an international level, with a special focus on the 23 platforms in partnership for research and training (dPs).

More than 60% of peer-reviewed journal articles, with or without impact factor, were co-published with an international institution outside the European Union (EU), pri-

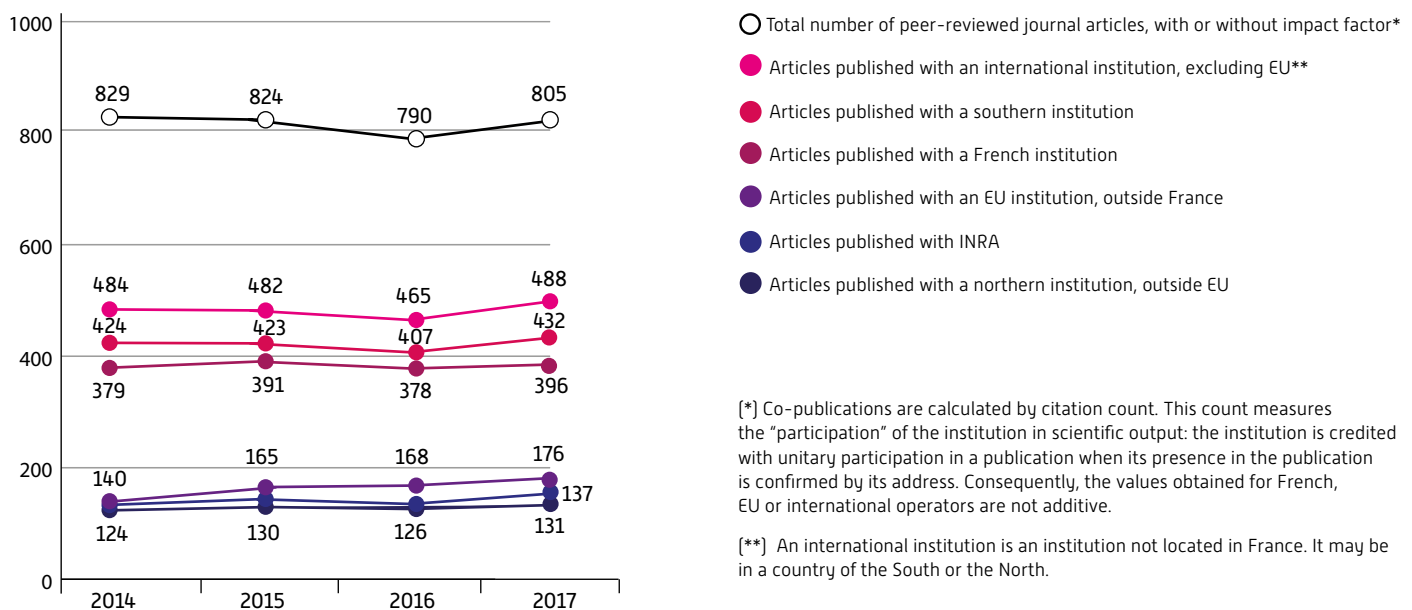
marily with institutions in southern countries (54%), as mentioned above. The number of co-publications with institutions in France (48%) was also significant and stable. The increase in the number of co-publications with INRA, reflected in the table below for the years since 2011, remained stable in 2017 (17%).

Geographical mobility of CIRAD staff members was slightly down in 2017 (almost 320 full-time equivalents), but nevertheless higher than in 2015, in line with the priority given to placing CIRAD researchers abroad and in the French overseas regions. After significant growth in dPs between 2012 and 2013, the number of senior scientific staff members posted to dPs is stable, with the same trend observed in the French overseas regions. Of the 23 dPs, 13 are located in Africa and the Indian Ocean, five in Latin America, four in Asia, and one in the Medi-

terranean. The total number of overseas missions stabilised in 2017 (almost 80 full-time equivalents), with a slight decrease for Asia and a slight increase for Sub-Saharan Africa. Sub-Saharan Africa remains the principal destination (34% in volume terms), with 27 full-time equivalents. CIRAD's presence in the field in the South has therefore stabilised, with almost 400 full-time equivalents (all posts and missions).

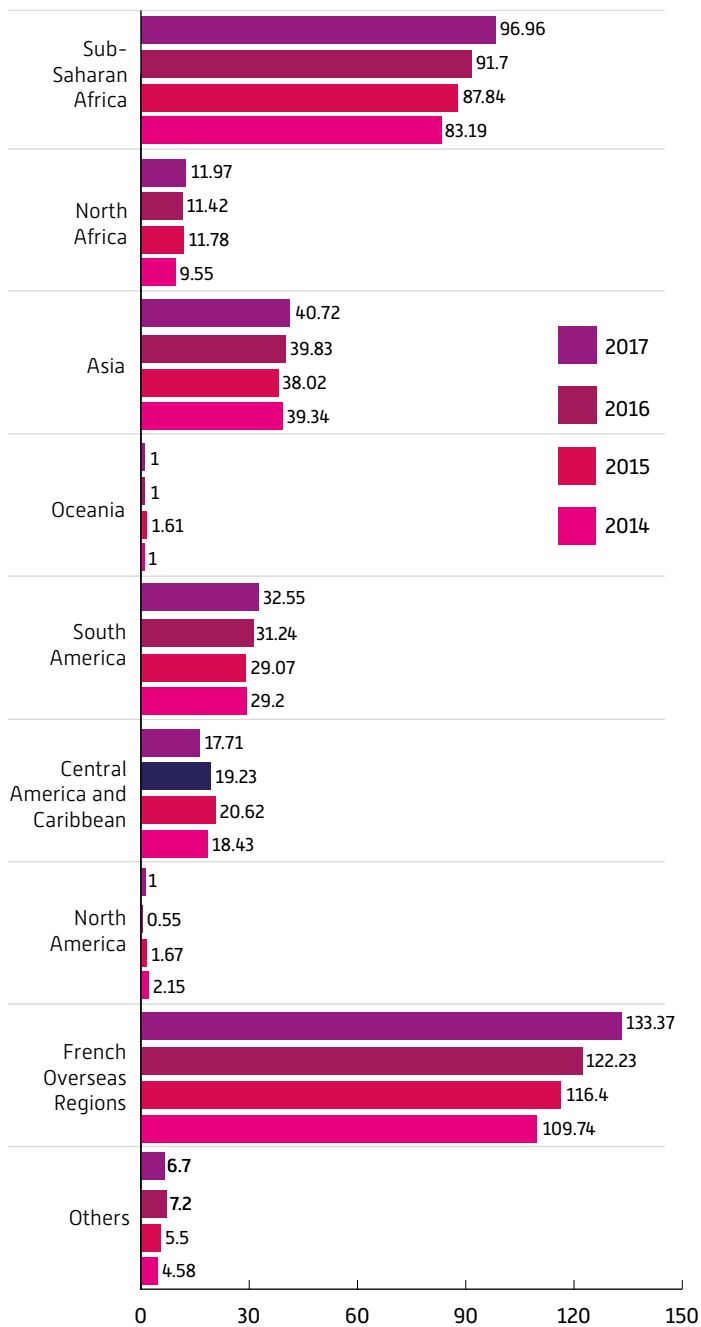
In 2017, CIRAD's success rate for FP calls for proposals was down slightly (13.8% in 2017), but in the current highly competitive context, it is still higher than the average success rate of 12% in Europe. These results may reflect greater familiarity with the operating methods and demands of the H2020 programme and the stress placed on supporting project design within the framework of the Resource Development Pact.

Change in number of CIRAD co-publications between 2014 and 2017 (data smoothed over three years)



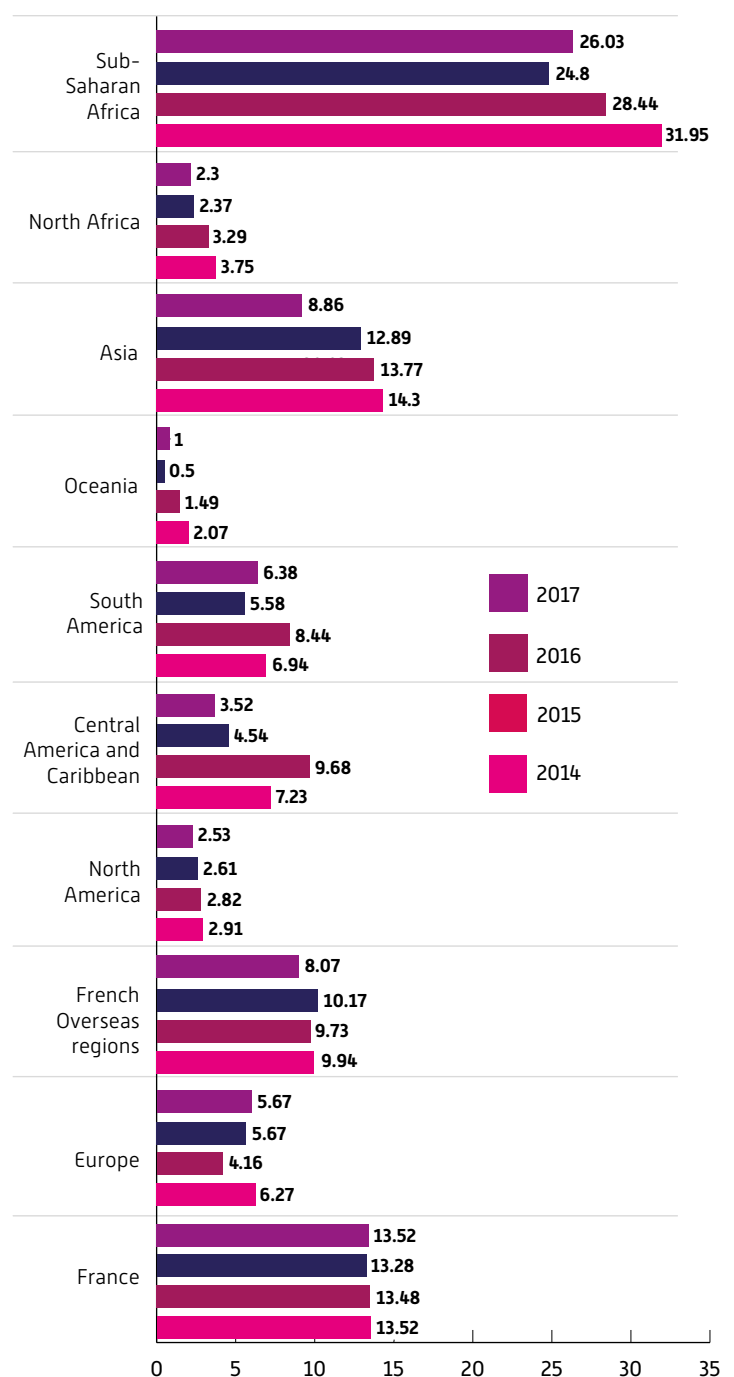
Source: Agritrop. Dist- DGD-RS- The 2017 data are partial: they reflect the state of the Agritrop database as of 28 February 2018

Distribution of overseas postings, according to destination
(in full-time equivalent)



Source: SIRH-DG-DRD

Distribution of missions, according to destination
(as % full-time equivalent)



Source: SIRH-DG-DRD

Number of CIRAD senior scientific staff members on assignment/number of senior staff members assigned to platforms in partnership (dPs) and the French overseas regions (in full-time equivalent)

	2014	2015	2016	2017
No. of scientific staff members on assignment	297	313	325	317
No. of scientific staff members assigned to dPs	127	131	133	128
No. of scientific staff members assigned to French overseas regions	110	116	122	122

Source: SIRH, DGD-RD

Table of platforms in partnership for research and training (dPs)

Region	National platforms in partnership (dPs)	Regional platforms in partnership (dPs)
AFRICA		
	PPZS - Senegal- Lines 1, 5, 6	ASAP - West Africa - Lines 1, 4, 6
	RP-PCP - Zimbabwe - Lines 1, 4, 6	DPFAC - Central Africa - Lines 1, 6
	Forests and Biodiversity - Madagascar - Lines 2, 5, 6	ISA - West Africa - Lines 3, 5, 6
	PCP Agroforesterie - Cameroon - Lines 1, 5, 6	DIVECOSYS - West Africa - Line 1
	GOVINN - South Africa - Lines 5, 6	One Health OI - Indian Ocean- Line 4
	SPAD - Madagascar - Lines 1, 6	IAVAO - West Africa - Line 1
ASIA		
	HRPP - Thailand - Lines 1, 6	CANSEA - Southeast Asia - Lines 1,6
	MALICA - Vietnam - Lines 3, 5	Grease -Southeast Asia - Line 4
LATIN AMERICA		
	PCP AFS-PC - Costa Rica - Lines 1, 5, 6	AMAZONIE - Amazon Basin - Line 6
	CIBA - Brazil - Line 1	PP -AL - Latin America (10 countries) - Lines 5, 6
		RéSA-CaribVET - Guadeloupe-Caribbean - Line 4
MEDITERRANEAN		
		SIRMA - North Africa - Lines 1, 5, 6

Source: Partnerships Office, DGDRS

Line 1. Ecologically intensive agriculture. Line 2. Biomass and non-food uses. Line 3. Sustainable food supplies.

Line 4. Animal and plant health. Line 5. Public action for development. Line 6. Societies, nature and territories.

CIRAD's EU research and development projects (FP) between 2014 and 2017

	2014	2015	2016	2017
Number of projects submitted	24	30	32	29
Number of projects funded	3	6	5	4
Success rate (%)	13	20	15,6	14
Number of projects coordinated by CIRAD	30	1	1	1*

Source: Europe Office, DGDRS; * Marie Curie grant, non-collaborative project

A STRUCTURE AND RESOURCES TAILORED TO NEW CHALLENGES

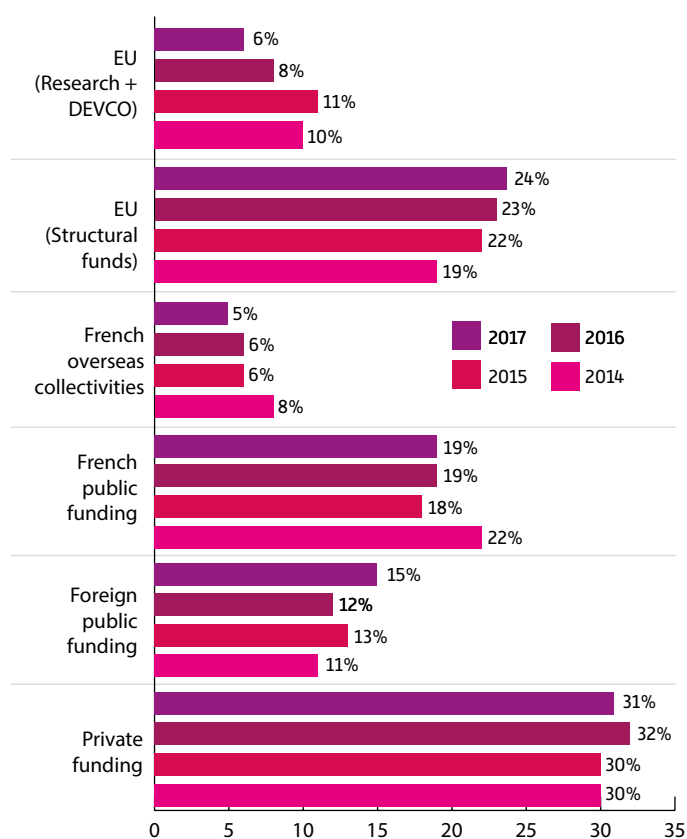
The work begun by the organisation within the framework of its Resource Development Pact with a view to consolidating its economic model and the efforts made by its staff to boost its contractual resources are reflected in an overall increase in contractual activity, as shown in the chart below, with an increase in 2017 compared to 2016. The proportion of private resources stabilised at 30%, with an increase in the propor-

tion of European structural funds, a marked increase in the proportion of foreign public funding and a decrease in that of the French overseas regions. The reduction in operating costs observed in 2016 continued in 2017, primarily by cutting operational expenses, despite a slight increase in the payroll.

CIRAD has embarked upon a dynamic employment policy, with a view to building the skills required by its scientific and geo-

graphical partnership strategy. However, efforts to make up the fall in staff numbers were not effective in 2017 for "classified paid" staff members [-25 full-time equivalents in 2017]. The number of grant-funded research students increased in 2017 after a constant decline in previous years, although the proportion stabilised at between 3 and 4% of total staff numbers.

Resources generated by CIRAD: amount and annual breakdown as a percentage [excluding joint contracts]

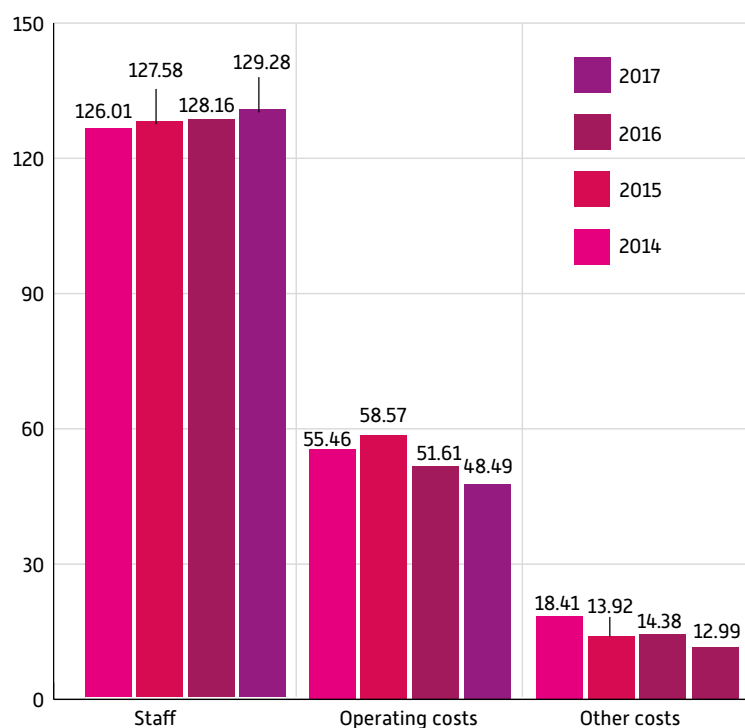


Total CIRAD staff numbers
(full-time equivalent)

	2014	2015	2016	2017
Number of "classified paid"	1635	1627	1639	1614
Number of grant-funded PhD students	64	58	55.5	63

Source: SIRH- DGD-RD

Operating costs, excluding internal subcontracting 2014-2017, in million euros



Source for both graphs: Dcaf, DGD-RD (see "Management report")

Annual breakdown of "classified paid" jobs (%) per category
(including grant-funded research students with CIRAD contracts)

	2014	2015	2016	2017
Senior staff	64.1	65.9	67.3	68.2
Grant-funded PhD students	3.8	3.4	3.3	3.8
Supervisors	30.6	29.4	28.5	27.3
Associates	1.5	1.3	0.9	0.7

Source: SIRH- DGD-RD

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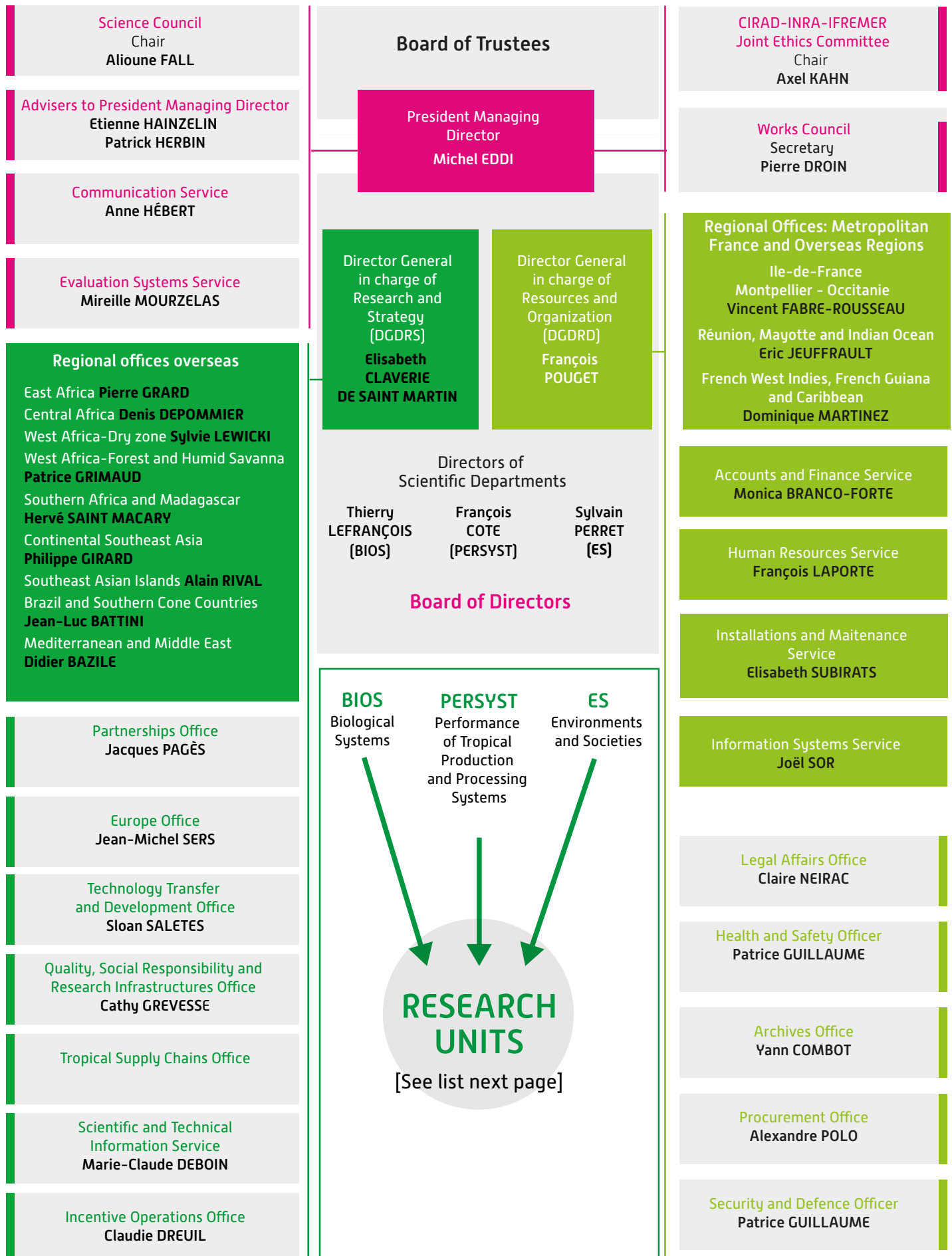
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Sandrine Dury, Assistant Director

ORGANIZATION IN SEPTEMBER 2018



SCIENTIFIC DEPARTMENTS AND RESEARCH UNITS

Biological Systems (BIOS)

The Biological Systems Department conducts research on the living world, its characterization and its exploitation.

Animals, Health, Territories, Risks and Ecosystems (UMR ASTRE)

Biology and Genetics of Plant-Pathogen Interactions (UMR BGPI)

Botany and Modelling of Plant Architecture and Vegetation (UMR AMAP)

Centre for Biology and Management of Populations (UMR CBGP)

Crop Diversity, Adaptation and Development (UMR DIADE)

Genetic Improvement and Adaptation of Mediterranean and Tropical Plants (UMR AGAP)

Host-Vector-Parasite-Environment Interactions in Neglected Tropical Diseases due to Trypanosomatids (UMR InterTryp)

Laboratory of Tropical and Mediterranean Symbioses (UMR LSTM)

Pests and Diseases: Risk Analysis and Control (UPR)

Plant Communities and Biological Invaders in Tropical Environments (UMR PVBMT)

Plant-Microorganism-Environment Interactions (UMR IPME)

Performance of Tropical Production and Processing Systems (PERSYST)

The Performance of Tropical Production and Processing Systems Department studies tropical production operations (family farming and cash crops) on a plot, farm and small-scale processing firm scale. Its work is conducted in partnership with local research players in Africa, Asia, Latin America and the French overseas regions.

Agro-ecological Functioning and Performances of Horticultural Systems (UPR HortSys)

Agro-ecology and Sustainable Intensification of Annual Crops (UPR AIDA)

Agropolymer Engineering and Emerging Technologies (UMR IATE)

Biomass, Wood, Energy, Bioproducts (UPR BioWooEB)

Ecological Functioning and Sustainable Management of Banana and Pineapple Cropping Systems (UPR GECCO)

Functional Ecology & Bio-geochemistry of Soils & Agro-ecosystems (UMR Eco&Sols)

Integrated Approach to Food Quality (UMR QUALISUD)

Montpellier Institute of Evolutionary Sciences (UMR ISEM)

Performance of Tree Crop-Based Systems (UPR)

Recycling and Risk (UPR)

Tropical and Mediterranean Cropping Systems Functioning and Management (UMR SYSTEM)

Water, Soil and Plant Analysis (US)

Environments and Societies (ES)

The Environments and Societies Department centres its research on the relations between agriculture, natural resource management and social dynamics, and the links with public policy.

Actors, Resources and Territories in Development (UMR ART-DEV)

Center for International Research on Environment and Development (UMR CIRED)

Ecology of Guianan Forests (UMR ECOFOG)

Forests and Societies (UPR F&S)

Innovation and Development in Agriculture and the Food Sector (UMR Innovation)

Land, Environment, Remote Sensing and Spatial Information (UMR TETIS)

Management of Renewable Resources and Environment (UPR GREEN)

Markets, Organizations, Institutions and Stakeholders Strategies (UMR MOISA)

Mediterranean and Tropical Livestock Systems (UMR SELMET)

Water Resource Management, Actors, Uses (UMR G-EAU)

UMR : unité mixte de recherche

UPR : unité propre de recherche

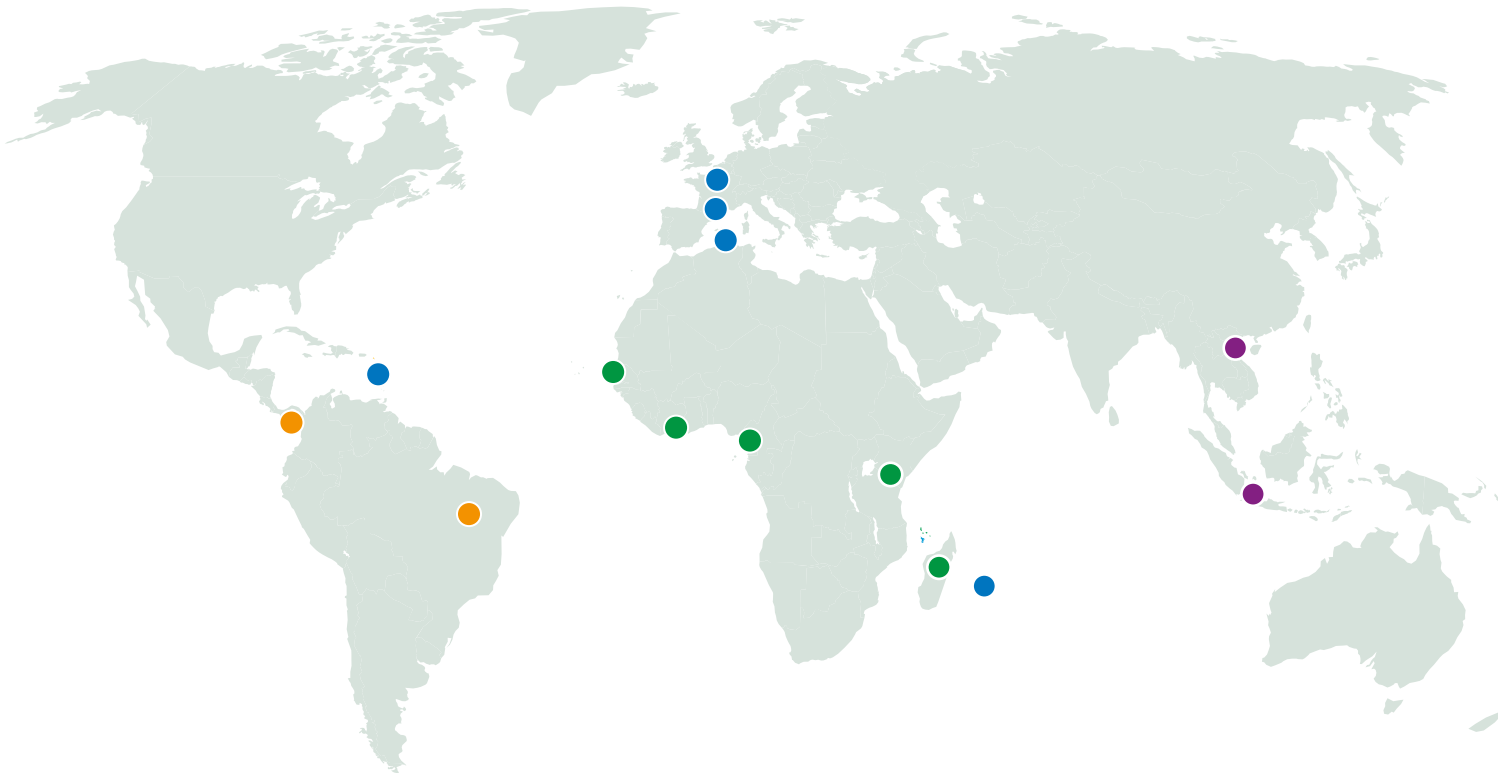
US : Unité de service

UMR: Joint research unit

UPR: Internal research unit

US: Unit Service

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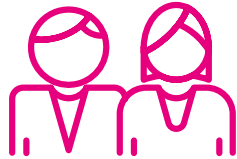
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WORKING TOGETHER FOR TOMORROW'S AGRICULTURE

The men and the women working at CIRAD come up with novel solutions tailored to the needs of rural societies and their environment.

Partnership is both a means and an end for them.

These men and women are committed to building sustainable farming systems capable of feeding nine billion people by 2050.



CIRAD

1 650 staff members

A budget of **€ 198M** in 2017

Main agricultural
research player
in the French overseas regions



PARTNERSHIP

More than **300** researchers
posted abroad and to the French overseas regions

18 000 days
of missions/year

Activities in more than **100** countries
in partnership with **150** organizations



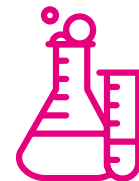
TEACHING

5 400 hours
of teaching each year

400 PhD students

supervised in 2016, 57% from southern countries

Partner in **120** courses
in higher education (Masters to PhD)
in France and overseas



RESEARCH

830 publications per year,
including **425** with researchers from partner countries

More than **20** dPs
(platforms in partnership for research and training)
worldwide

800 researchers
and technicians
from all over the world received each year



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CIRAD is the French agricultural
research and international
cooperation organization working
for the sustainable development of
tropical and Mediterranean regions

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together
for tomorrow's
agriculture**

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