

CIRAD's strategic vision and ambitions 2018-2028



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MAIN CHANGES IN THIS NEW STRATEGIC VISION

'CIRAD's strategic vision and ambitions' is the fundamental document for steering its operations and has been updated earlier than scheduled to account for recent changes in the field of research for development. This document is intended to help CIRAD in its programming operations and to enable it to communicate clearly about its priorities to partners and other development actors.

This update also takes into account the conclusions of the HCERES 2016 audit of CIRAD and of internal and external consultations. It reflects major recent trends in sustainable development challenges, in various world regions, and the expected contribution from science. By fine-tuning its vision of agricultural systems in the global South and the challenges they face, CIRAD intends to boost its contribution to meeting these challenges. This analysis leads to a renewed justification of CIRAD's choice to conduct its research in partnership and to make even greater efforts to ensure that its projects cover a wide range of disciplines. CIRAD has therefore reformulated its four main ambitions and reflected on how the organization must be strengthened in order to achieve them.

Current changes in populations, food security, ecosystem degradation and biodiversity are particularly marked in the global South and the resulting challenges are being compounded by climate change. These challenges for the South explicitly and directly concern the North, in particular through political instability and migration. We are at a crossroads in world history, in which agriculture has a major multi-functional role to play. New elements need to be considered in responding to the urgency of these challenges. In particular, the social and environmental aspects of development must be given priority over the economic elements if we are to ensure the survival of the planet and the human race. Explicit recognition of the role of research for sustainable development, particularly in the Sustainable Development Goals (SDGs), also means building partnerships with policymakers.

These considerations have led CIRAD to refine its strategy in several emerging spheres of action:

- CIRAD is keen to frame its operations within an overall 'transition engineering' focus, based on integrating knowledge and resources at various levels and capable of mobilizing stakeholders and public policy to support their long-term deployment.
- To pinpoint the fields in which it should be concentrating its operations, CIRAD has positioned itself in relation to key major challenges specific to development and identified 15 pledges for addressing them. These pledges set out CIRAD's priorities more clearly. They also contribute to ensuring multidisciplinary and the integration of various levels of knowledge to guarantee more coordinated programming by CIRAD's three scientific departments.
- CIRAD has decided to reinforce the culture of impact among its teams and partners, and to program its R&I activities and projects on the basis of identified plausible 'impact pathways' for research results, even if these may be complex and depend on interactions between the actors concerned and the context of the innovation system concerned. To this end, CIRAD is promoting an ex ante approach and using appropriate tools to evaluate impacts right from the project design stage.
- Innovative research approaches that generate relevant knowledge are vital. In particular, this concerns the development of interdisciplinarity and of new scientific technologies such as genome editing. It also encompasses the digital revolution, which is sure to have a significant impact on research practices and content, generate new products and services, and change scientific productivity. Digital technologies are also significantly changing certain research and training activities. CIRAD will be making digital technology a major part of its own evolution and using it to address complex issues more effectively.
- Lastly, CIRAD has made capacity strengthening its fourth ambition. In response to growing demand from the global South, it is stepping up its actions dedicated to training - particularly vocational training - in all the fields related to agriculture, in partnership with other members of Agreenium and the new MUSE university.



CIRAD, a French public applied research organization, is Europe's leading institution specifically devoted to agricultural research for development¹ in the global South², where the social, environmental and economic situations in the countries concerned vary substantially. In this document, CIRAD sets out its vision of current global change, development issues, the challenges these issues pose and the role to be played by agriculture in addressing them.

It lays down its strategy for using science to contribute to building solutions and sets out its priorities.

The long-term orientation set out in the document will provide a framework for drafting new contractual objectives between CIRAD and the French government and for establishing its programming framework with its scientific departments and research units and its network of partners throughout the world.

This document is a five-year update of the previous strategic vision, and like the previous document, relates to the coming ten years.

1. According to the decree issued on 10 June 2010, CIRAD has a remit to:

- a) Contribute to rural development in tropical and subtropical regions, through research and experimentation, primarily in the sectors of agriculture, forestry and agrifoods;
- b) Provide support, at the request of foreign governments, for national research organizations working in these sectors;
- c) Provide the scientific, economic and cultural communities concerned with scientific and technical information;
- d) Participate in training French and foreign students in and through research;
- e) Contribute to drafting national policy relating to its fields of expertise, notably by analysing the international scientific context.

2. In this document, 'the global South' refers to the countries in the tropical belt and southern Mediterranean. The expression will be used to illustrate CIRAD's remit, despite its obvious limitations in terms of capturing the diversity of these countries' situations with regard to development challenges

3. cf. Scientific and Partnership Strategy Objectives (SPSOs) and *Lettres pluriannuelles d'objectifs* (multi-annual objectives) for research units.

4. This document is a mid-term revision of the 2012-2022 CIRAD strategy, backed by consultations with CIRAD's main partners.



Agricultural systems in the global South are at the heart of development issues

Emergencies and challenges posed by ongoing global change

Over recent decades, globalization has proved a double-edged sword. It has shortened both time and distance, disseminated technologies worldwide, incorporated economies and forms of solidarity, and generated remarkable growth in wealth. However, it has also revealed the persistent extent of poverty, the unacceptable inequalities between people and regions worldwide, and the severe degradation of natural resources and the environment. With current demographic transitions not yet complete, strong growth in the global population will continue over coming decades; Africa will probably be home to more than 4 billion people by the end of the century⁵. The challenges facing humankind are multiplying and come with hitherto unprecedented risks: the ever-present challenge of food and nutritional security, which varies from one continent or country to another; the pressing issue of severe poverty among billions of individuals; unprecedented inequalities that are threatening human rights and drive conflicts, migration and insecurity in most world regions; irreversible degradation of ecosystems and biodiversity; the difficulty of building collective governance of the commons humankind needs to survive, and so on. All of these urgent problems are exacerbated by climate change, which will substantially complicate situations and generate new uncertainties and risks. Development is an issue of universal concern, but in response to the urgent need to transform our production and consumption habits and our relationship with nature, societies are not sure what path to take, with some tempted to withdraw into themselves and ignore the issues. There has never been so much uncertainty about what the future holds and how it should be tackled fairly and sustainably, and one cannot rule out even the most pessimistic scenarios. Humankind has reached a crossroads in its history and is searching for the right path and the transitions required to preserve the chances of sustainable, universally equitable development, the world over.

5. World Population Prospect 2017 <https://esa.un.org/unpd/wpp/>

Agriculture has a substantial role to play in addressing these issues. It covers 40% of the world's land mass and provides jobs and livelihoods for almost 40% of adults worldwide. It sits at the nexus between food production, ecosystem management and health, expectations in terms of biomass use, climate change mitigation, and energy issues. Galloping urbanization means agriculture is being called upon to supply towns and cities in products and services, resulting in new relationships between urban and rural areas and drawing new 'food territories', while blurring boundaries. Rural areas are home to the vast majority of the world's poorest people and primarily rely on the agricultural sector to drive a truly fully sustainable territorial development. Agrifood production is also a field in which women generally play a vital role, and the way in which this type of production is changing could boost their inclusion in the economy. Agriculture, now clearly recognized as multi-functional, has therefore become a major issue, at the heart of the development models required to tackle global problems on a local scale. It is once again one of the priorities for development and high on the political agenda, although investment still fails to reflect this.

Much debate but development continues to be a driving force

The idea that every society can over time build a strategy for change that offers prospects for improvement, in other words progress, was born from the philosophy of the Enlightenment in the 18th century. The considerable role played by science in the Industrial Revolution bolstered this 'progressive' view of the future. While this vision became almost universal during the second half of the 20th century, with economic growth primarily built on technological innovation, the positive concept that had prevailed until the last century was by then called into question by science itself. The affluent human society based on technological progress promised by some ran up against the finite nature of the world's natural resources, which are not necessarily renewable; humankind needs to change its relationship with the living world if it is not to destroy it. Development focusing on economic growth, symbolized by growth in GDP alone, would have an exorbitant environmental cost and would not be viable.

The concept of development is both wide-ranging and exciting, but also vague, shifting and controversial. It has been the object of much research and several schools of thought, which underlines the scientific questions being asked about its reality and its meaning. However, it has been an unavoidable part of almost every political action, whether public or private, particularly in the field of international aid. From its initial primarily economic sense, the concept has acquired a social aspect (Amartya Sen's 'human development' and 'capability') with the inclusion of notions of justice in the light of growing inequality in both North and South. By incorporating the physical finiteness of our planet and the need to use its natural resources responsibly, the concept of sustainable development and its three pillars (economic, social and environmental) has gradually come to dominate the global debate since the Rio conference in 1992. In 2015, this trend led to the adoption by the General Assembly of the United Nations of an historic international agreement, 'Transforming our World: The 2030 Sustainable Development Agenda'. This agreement is remarkably ambitious, as it was built by means of a vast international consultation of countries, civil society and businesses, resulting in 17 concrete 'Sustainable Development Goals' (SDGs). These goals, which apply to every country in both North and South for the next 15 years are also helping to erase the North-South divide.

However, while this provides a global framework for action in all countries, it does not solve the tensions or contradictions that may exist between different objectives, re-examine the development models that should be promoted to ensure success, or provide a political framework for the changes in technical or institutional practices required. Hence the key role of science, which can help overcome such tensions by virtue of its capacity to conduct critical analyses and generate knowledge that is useful for building solutions.

Currently, the possibility of designing sustainable development as the best possible compromise between the different pillars is hotly contested. Setting objectives is one thing but mapping the path to take and the means required to achieve them is another. Bearing in mind the current differences in national development levels, there is no guarantee that in adopting the same economic model, the planet will be capable of supplying the necessary natural resources. With economic considerations tending to take precedence over other concerns, it is often implicitly accepted that growth in terms of economics and social capital can compensate for diminished environmental capital (the biosphere). Yet this compensation inevitably runs up against insoluble antagonisms relating to the viability of the global system, which is primarily linked to the environment but also governed by social and economic conditions.

This means that 'win-win-win' development, designed as the best possible compromise between the three pillars, will remain a pipe dream unless the economic sphere, particularly its financial component, is seen as a means of supporting the social and environmental aspects and not the other way round, as is still too often the case.

These debates are crucial because they refer to the concrete challenges currently facing humankind, such as hunger, extreme poverty, increased inequalities between and within most countries, and countless attacks on human dignity and the environment. Given these challenges, alongside continued growth in the global population and the fact that global warming is now a tangible reality everywhere, what does the future hold? Politically and economically, how can one satisfy people's elementary needs and improve their quality of life, which encompasses freedoms, democracy, culture and creativity? How should we steer our actions, both locally and globally, in order to tackle these challenges? These questions require a new analysis of the development pathways that will prove sustainable for all, particularly for those who most need it.

It is important to recognize that as things stand, there are no ready-made answers to these questions. At the same time, given current crises and tensions, we know that giving up on the possibility of sustainable development based on a vision of collective progress for humankind would mean implicitly opting to think individually. This would mean everyone standing up for their own rights, a choice that would obviously mean only the fittest survives. It is therefore vital to make a collective choice to take those paths that would solve existing tensions through cooperation and solidarity. By using science to pave the way, testing possible solutions locally in the field and building operational pathways from a local to a global level, we are already on the road to achieving the sustainable development that we see as so desirable.

Research has new roles in an uncertain context

This uncertain context means new roles for science. Scientists must help shed light on possible futures, build the necessary transitions, preserve certain equilibria and manage uncertainty. In addition to its vital contribution in terms of innovation, science will also have to lead the debates required to support policymaking in a context of uncertainty and risk management. Within the knowledge generation ecosystem, which is continuing to grow and diversify, research is no longer alone; NGOs, foundations, think tanks and businesses are becoming involved. Access to and control of knowledge, recognized as vital factors for development, are increasingly becoming economic and political issues. New structures are being built to produce, coordinate and promote knowledge, often blurring the boundaries between science, expertise and lobbying. Research also has a specific responsibility to act at the interface between science and politics, by reaffirming and strengthening its ethical principles, and by helping to construct and monitor policies.

Just as agriculture has shown itself to be at the crossroads of a range of development issues, the agricultural sciences also need to evolve and broaden their vision, while boosting their predictive capacity. In addition to producing knowledge and innovation in the life sciences, designing new techno-

logies remains crucial if we are to produce more and produce it better. It is important to take account of the environmental footprint and quality of products, the capacity to renew resources and the effects of production systems on sustainable, equitable territorial development, particularly in terms of creating jobs and reducing rural inequalities. We need to explore the whole range of biological resources, whether agricultural or not, involved in production and environmental issues and the way in which they are managed. We also need to look at the food and health crises of the past decade, which highlight the political, institutional and financial causes of global food imbalances and epidemics. Agricultural research communities have also been mobilized by the global issues surrounding the management of the living world and by the systematic search for one-size-fits-all solutions. This is particularly true for private-sector research, which currently dominates certain technological fields. The research system is multi-polar, open and ever evolving. The balances between countries are shifting and some emerging countries, such as Brazil and China, have become major scientific powers. By encouraging approaches that hinge on competition, the new ways in which research is structured at the global scale risk excluding countries with, as yet, limited scientific capacity and increase the need for cooperation to tackle challenges collectively, particularly with countries in the global South.



A strategy to help tackle development challenges

One central conviction for the future: development through research

The sustainable development of a society involves many factors and fits into a specific historical and cultural pathway. There is no 'standard' model, but development everywhere clearly relies on technical and social innovation capacity based on appropriate knowledge and human resources. Research is therefore one of the prime drivers of change in societies faced with the complex objectives of sustainable development and growing unpredictability. Merely importing knowledge and technology built elsewhere, even in the best laboratories in the world, is not enough. However generic knowledge may be, its use in resolving issues is inevitably largely dependent on the local context. Knowledge generation and capacity building within structures involving research and political, economic and social actors are steps in development, and serve to shed light on the issues, to understand the dynamics of change and to design innovations and development pathways tailored to the context in question.

This type of research for development does not differ from other types of research through the science involved, but by the fact that it is built and implemented in partnership, which makes it 'politically and socially committed'. In addition to knowledge production, it is also a type of research that must aim to build capacity among development actors, whether they are scientists or producers, and not restrict itself to striving for excellence and knowledge transfer. Lastly, it must think constantly about its impact, how it operates and how it communicates the knowledge it generates. The development culture, the ability of researchers and teams to reflect on their activities and contributions to innovation, and the involvement of other actors and their expertise are its outstanding features.

Furthermore, in today's globalized world, there is growing intertwined competition and cooperation between countries, which drive the exchange of resources, ideas and data. In science, it is important to avoid any widening of the gaps between countries. Overcoming the institutional differences that result from varying development levels requires active scientific cooperation policies. These policies must compen-

sate for the effects of competition and foster partnerships that enable stakeholders to master more quickly not only the knowledge and innovations required for their countries to develop, but also the processes through which such knowledge and innovations are generated. This also requires orchestrating research on a global level. It is this reality that makes research institutions so useful in both ways: producing knowledge and innovations relating to development issues and building long-term partnerships with organizations in developing countries.

This type of research, contextualized by development issues and the expertise it serves to build, can also support political processes and thereby contribute, through scientific diplomacy, to drafting appropriate public policies on a national and international scale. The lobbying, expertise and advisory services on offer to authorities are of particular importance in international talks on the environment, climate change and global food security.

How science can engineer transitions

In addition to the conceptual debates outlined above, the 17 SDGs are a major shift in the political paradigm. They are a quantified expression of the collective targets to be reached in order to tackle, on a global level, the major issues surrounding development in its broadest sense. Starting from its current situation, every country is expected to define how it can move towards these targets via a pathway tailored to its own specific situation, using a roadmap that also takes climate change into account. For the world's richest countries, this will of course mean greater restraint, while in the poorest, priority will be given to satisfying people's basic needs, ensuring greater dignity and alleviating poverty. The fact that these different development pathways will be explicitly formulated is a real step forward, since every country, both North and South, will be expected to contribute, in line with its specific needs and capacity to participate in global dynamics. While the SDGs are shared, the priorities and pathways differ, while all fitting into a process of global transformation marked by a series of major transitions — population, climate, food, ecology and energy — each with its own uncertainties and local specificities.

While the 17 SDGs are a political step forward in terms of the break with the past on a global scale, they cannot be seen as research objectives. Science must remain fundamentally critical of such 'political constructs' if it is to help build development pathways, since they obviously will not naturally converge towards an ideal solution that satisfies universal sustainability criteria in every corner of the world.

Given the context of profound transformations in societies both North and South, science must take specific responsibility for mobilizing the whole range of stakeholders to 'engineer transitions' over time, in particular by integrating knowledge and resources on various scales. The challenge for CIRAD is to become a recognized "transition engineer", on a meso- and micro-scale within landscapes and territories, where practices and environments are to be transformed. To do this, CIRAD must continue to broaden its approaches beyond designing new technologies to produce more and produce better. It must incorporate these approaches into a vision of the economic, political and social development pathways that facilitate transition, the actors' dynamics and capacities they require, and the public policies necessary to support their long-term deployment. These pathways will differ depending on the country and context, but the generic lessons drawn from their implementation will fuel the stock of knowledge and experience within CIRAD and among its partners, and boost their capacity to promote transition engineering. To this end, CIRAD will also have to make use of foresight tools and pay constant attention to the impact it wishes to generate by conducting more systematic *ex ante* appraisals.

To help build these pathways and cover the whole range of issues, CIRAD has opted to base its scientific programming on fifteen pledges that set out its contribution > [\[see box on next page\]](#).

Contributing to solutions through innovation and production of commons

Science's contribution goes beyond producing new knowledge and should also include translating that knowledge into development activities within innovation systems. Participating in the definition and roll-out of innovation systems, combined with debate on the conditions in which impact occurs, also has a high generic value; it serves to anticipate the future and the status of scientific outputs within those systems.

Regarding innovation, research needs to look into the nature and status of its outputs in relation to its targets. Research outputs help build 'goods' whose status varies depending on their nature and how they are used⁶. Working in favour of communities of actors, particularly the least favoured as CIRAD does, can mean producing public, private and common goods (commons). These are not intrinsic qualities set in stone and relating to these goods, but depend on the socioeconomic, political and legal contexts in the countries where they are used and promoted. They do not automatically mean anything regarding the equity and public interest in their use. Taking private goods as an example, these are theoretically appropriated by a small number of actors but can also generate development benefits for many others (investments, economic dynamism, jobs, etc). Conversely, public goods, which imply the public interest, can be 'hijacked' through corrupt governance in their use or the power of a few economic actors. Commons require a truly participatory system of governance to ensure equal access and use. Between actions by markets, which promote exchanges of private goods, and by the State, which safeguards public goods and the public interest, managing commons on a territorial level is a 'third way' that fosters innovation and change in favour of sustainability, consultation and mobilization on scales that local actors can cope with (value chains or territories).

This distinction between the nature, status and purpose of research outputs is needed in order to understand the different types of partnership required depending on the target set. Generally speaking, CIRAD must foster free access to its results and large-scale appropriation of its products, but it also has to consider their status in terms of their potential use by different actors within innovation systems and their effects for the majority. There is no single position, since CIRAD may work to produce goods of all three types, depending on the impact pathways of its outputs and the partnerships concerned.

6. Conventionally, the following categories are defined, based on rivalry and excludability criteria: private goods (rival and excludable), common goods (rival and non-excludable), public goods (non-rival and non-excludable), and club goods (non-rival and excludable).

CIRAD's contribution in 15 pledges

Societies in the global South are undergoing substantial changes in population, socioeconomic, environmental, climate and health terms, and face several major challenges: ensuring sustainable agrifood production, processing and consumption; conserving, restoring and promoting biodiversity and natural resources; mobilizing actors to draft and implement appropriate public policies and territorial and institutional frameworks; eradicating severe poverty; and anticipating, managing and adapting to risks.

To this end, CIRAD has pledged to:

1. Work with stakeholders and promote sustainable production and processing systems based on multi-criteria assessments of performance and innovations, notably involving agro-ecology, within cropping, livestock and forestry systems.
2. Promote sustainable food systems that satisfy the demands of urban and rural inhabitants, be they producers or consumers, in terms of diverse, accessible products, optimizing the efficiency with which renewable and non-renewable resources are used, reducing losses and environmental impact, and exploring appropriate marketing methods.
3. Help those who rely on agriculture for a living, particularly the most vulnerable, adapt to climate disruption, boost their resilience and examine the mitigation capacities of agricultural, pastoral and forestry systems in the global South.
4. Help control the sanitary and epidemiological risks linked to crop and animal production systems at various scales and to environmental conditions, by developing diagnosis, surveillance and prevention systems, anticipating emergence and outbreaks, and developing biocontrol and alternatives to chemical control and antibiotics that preserve human health.
5. Conserve, characterize and manage biodiversity at various scales (genome, plant, animal and microorganism populations, agro-ecosystems, landscapes and territories), by fostering collective action and their management as commons.
6. Mobilize biodiversity for future livestock and crop production and to develop resilient, sustainable production systems.
7. Help improve water use efficiency in agriculture, notably collective use, and facilitate coordination between actors with regard to sharing water between different uses and preserving water quality.
8. Contribute to improving or restoring the biological and agronomic aspects of ecosystems, particularly soils, and examine ways of capturing carbon within agricultural, forestry and pastoral systems.
9. Use different types of agricultural and forest biomass, including residues and waste, for energy, agronomic and industrial purposes, to reduce reliance on fossil fuels and foster local development.
10. Support innovation and build technical, institutional and organizational instruments to ensure sustainability on both - territory and value chain - scales, in response to issues surrounding jobs, technical change and management of shared resources.
11. Contribute to building compromises that highlight social and environmental aspects, on a local and global level, through public policies, collective action and concerted development of economic, legal and institutional instruments, new modes of governance and multi-scale information systems.
12. Help local, national and global actors and decision-makers, against a backdrop of growing inequality, land grabbing and various types of crises, to anticipate and manage socioeconomic, sanitary and environmental risks more effectively, notably by forecasting harvests, losses and the impact of climate on resources.
13. Contribute to human health through agricultural production and processing systems whose products, practices and standards ensure nutritional quality and sanitary and environmental safety.
14. Document and analyse situations that promote the key role of women in agricultural development and in innovation, food security, and rural development in general.
15. Ensure that farming systems in the global South benefit from tools and services from the on-going digital transition and technological developments in the fields of food and non-food production and processing.

CIRAD's plus points for tackling the challenges posed by transition

CIRAD's remit fits into a long history of French tropical agricultural research and has guided its activities since its creation in 1984. It has led it to build a supportive vision of the world to which it is committed and an innovative culture of partnership with the global South. This active presence in the field in the South, in direct contact with the rapid transformations these societies are undergoing, and the fruitful synergy between its research and partnership approaches, are the cornerstones of its operations. Through its 15 pledges, CIRAD intends to contribute further by consolidating its partnerships and bringing together every category of stakeholder working to produce knowledge and innovations useful to countries in the global South. By virtue of its novel position, it plays an active role in the global orchestration of an ever-changing multi-polar agricultural research system, taking care in particular to include scientific communities of southern countries. It has undeniable advantages for achieving this.

First and foremost, CIRAD's dual role in research and development — in other words, generating scientific knowledge and putting that knowledge into practice with its partners — means it produces scientific outputs that are both useful and relevant for subsequent action. With more than 70 years of experience, the vast stock of knowledge it has accumulated and its institutional culture of partnerships provide CIRAD with real added value that makes it stand out within the national and global research landscape.

CIRAD also benefits from a vast research and experimentation network based on facilities in both mainland France and the country's overseas regions, alongside those offered by its partners in the global South. This global network offers major advantages compared to other agricultural research organizations. 'Platforms in Partnership' established by CIRAD and its partners in the global South are novel tools that provide the possibility for research activities within long-term partnerships and in direct contact with local development issues. CIRAD's research in France's overseas regions is another major asset. In the tropics, it contributes directly to agricultural development in these regions and also complements and enhances the research conducted in mainland France and southern countries as part of CIRAD's global mandate.

Most of CIRAD's research is notable for its inter-disciplinarity. By their nature, CIRAD's research topics are complex and require the combination of a range of disciplinary expertise and methodologies. This capacity for disciplinary excellence combined with an ability to engineer the integration of knowl-

edge and innovations is constantly being proven and strengthened by CIRAD's teams as they manage projects dealing with development issues both within Platforms in Partnership and in the field in the global South.

CIRAD therefore has some key advantages for tackling the challenges set by the profound changes the world is currently undergoing. Its vocation as an applied research organization has seen it move into the agricultural sphere in its broadest sense. It has established and maintains a vast and unique network of partners, both North and South, and has built a wealth of knowledge and expertise in terms of tropical species, value chains and production systems that can be used to transform agricultural and food systems. These precious assets can be mobilized in various ways and for a wide range of beneficiaries. The diversity of CIRAD's methodological approaches and outputs is a boon in contributing to innovation systems. Furthermore, international recognition of its expertise and the originality of its approach, combined with its unique position in Europe as an organization dedicated to agricultural research in partnership with developing countries, makes it a key actor in a position to influence the debate on the coordination of agricultural research for development.

In drafting its strategic vision, and in particular through its 15 pledges, CIRAD has chosen to centre its scientific programmes on a limited number of research topics over the coming five years. These topics will be set out and explained in its priority lines of research for development, the contents of which are defined within a new version of the Scientific and Partnership Strategy Objectives (SPSOs). These priority lines provide a coherent, stable framework for monitoring and reporting on the organization's scientific and partnership activities. As such, they are a place in which to consolidate the projects conducted by CIRAD's researchers and a toolkit for reporting and capitalizing on their results. All of CIRAD's operational programming, whether based on proposals from its teams and collective projects, objectives set for its research units or its operating priorities, will fit in with these priority lines of research, as will its external communication and lobbying activities.



CIRAD's four ambitions

On the basis of its 15 pledges, CIRAD is working towards four ambitions. These ambitions will be at the heart of its advocacy operations with all the actors concerned and in every arena in which it is called upon to intervene.

Ambition 1

Being a reference on scientific priorities with an impact on development

Depending on the fields concerned, from the most fundamental to the most applied research, this ambition focuses on promoting the production of top-level scientific and technical knowledge in step with the development debate. Through a renewed approach focused on clearer priorities, this production should allow CIRAD to strengthen its position as a reference in the global scientific debate and at the interface with policymaking. Defining priority lines of research in the SPSOs serves to identify the topics and fields concerned.

Pinpointing the priorities on which CIRAD should be concentrating

The analysis of current issues and the urgency with which they must be addressed, combined with increased involvement in foresight exercises and appraisals, have led CIRAD to target its priorities more effectively since 2007. By 2012, it was obvious that it was necessary to take account of the growing importance of issues concerning the vulnerability of societies and ecosystems in line with their capacity to adapt: biodiversity erosion, impact of climate change, the energy challenge, food insecurity, emerging diseases, land grabbing, migratory processes, etc. This requires a broadening and shifting of the approach to agriculture and an understanding of its interactions with other sectors (food, health, environment, energy, etc). The aim is to pinpoint the roles played by sustainable food systems, above and beyond agriculture and primary production, and how those systems may contribute to development. This also requires support for the disciplines that can provide the answers to these questions. In turn, with agriculture and the environment appearing to be more inextricably linked than ever, CIRAD must offer a space in which it is possible to go beyond the disciplinary silos found in science and participate in developing solutions that take account of the inherent tensions between the economic, social and environmental aspects of the various issues, and between local and global processes. Interdisciplinarity remains an ambitious challenge to be strengthened in the scientific practice of CIRAD's research teams.

Integrating innovative research approaches to generate relevant knowledge

In the second half of the 20th century, cognitive and technological advances ensured substantial progress in the field of living organisms. This turned the approaches used in agricultural research and in the modernization of the agricultural sector, which had previously been dominated by specialized production and input use, on their heads. The negative impacts of farming practices on natural resources and the environment, and the cognitive advances made in the fields of scientific ecology and biotechnologies have prompted a broadening of the field of investigation, from the biological and environmental conditions for the expression of genetic potential to the production and processing techniques used by value chain stakeholders. At the turn of the millennium, the links between these factors were strengthened by the opening-up to the human and social sciences, not merely to foster the transfer of inventions, but to consider the economic and social sphere as a research field and activity in its own right. This encompasses the various social, economic and political changes led by various stakeholders, specifically the institutional, local, national and international dynamics which shape changes in production performance. With a view to sustainable development and to better determine the modes, conditions and consequences of change, one of the future scientific challenges will be to understand the interactions between all these elements and between processes occurring at different levels. Simultaneously, technological developments are playing an increasing role in the scientific dynamic itself, particularly in the life sciences. The impact of new technologies, such as those emerging from the digital revolution and genome editing, are likely to open up new research prospects that scientists would never have thought possible even a few years ago. CIRAD intends to organize its collective work by conducting analyses of the three research scales on which its complementary departments focus: biological systems, technical systems and institutional systems. The aim is to engineer innovation by fostering and supporting the necessary changes to food systems and policy frameworks, which includes the new farming practices that should be promoted.

Adjusting CIRAD's analysis frameworks and outputs to current scientific challenges

CIRAD will be strengthening the integrative and systemic approaches being promoted within its teams, in particular by fostering interdisciplinarity and the consideration of complexity. This type of approach means redefining key concepts such as that of sustainable performance, which when applied to agriculture, value chains and food systems, must take into account the ecological and social services and drawbacks generated and the vulnerability of the systems concerned, which is central to policymaking. It is also vital to understand the processes in which crises develop and are then triggered, accelerated or slowed, and to identify their impact on actors' behaviour and agro-ecosystems. To this end, the role of diversity, whether biological or social, will be explored to determine its role in terms of regulation. Even more than before, the aim is to design conceptual frameworks, tools and monitoring and evaluation mechanisms (indicators, norms and information systems) to support decision making at local and global scales. In addition to combining biological, technical and institutional approaches, tackling these scientific challenges means analysing how processes on a local to a global level are coordinated, considering territories as a vital level for ensuring coherence. CIRAD will work to incorporate digital transition and the emergence of big data into its research and to support its mission, while continuing to exercise the essential ethical caution.

Ambition 2

Building scientific partnerships

The establishment's latest audit⁷ has confirmed the importance of research in partnership, a source of synergy between science and cooperation with countries in the global South, open to a wide range of actors, from producers through to national and international public policymakers. Partnerships form a real matrix for CIRAD's research operations and could be strengthened still further through an innovative partnership approach.

Seeing partnerships as a fundamental asset for development

Fuelled by the concept of development through research, the status of partnerships has changed, becoming an end rather than a means. Rather than being restricted to a specific project, partnerships must establish the conditions in which countries in the global South, particularly the most

fragile, can generate knowledge⁸. This aim, wholly in step with SDG 17 (sustainable development through global partnerships), is ambitious, since it means measuring and subsequently reducing the asymmetries between partners in a world with increasingly conflicting mechanisms favouring both competition and cooperation. The current rapid digital transition is an opportunity for partners in the global South, and CIRAD must bear this in mind. The aim is to ensure quality scientific and technical outputs capable of boosting the long-term policymaking and programming capacity of the institutions involved.

To address this challenge, CIRAD has adjusted its partnership policy and instruments. In particular, in 2008 it established, with its partners, a number of Platforms in Partnership for research and training (dPs) that bring together human and financial resources on strategic priorities in order to build a critical mass that ensures greater efficacy and visibility over the longer term. Almost ten years on, these platforms now concern more than 1,000 researchers from almost 200 institutions in the global South with which CIRAD is working on topics of joint interest, often at regional scales. The recent audit of these platforms painted a positive picture of this first phase. It showed that partners were playing an ever-greater role in strategic decision-making and in promoting the platforms. The next step is to ensure the stable functioning of these structures – national or regional platforms and hubs, transnational thematic networks etc. – which have already generated broad expertise anchored in their knowledge of the reality found in the field. These platforms are programming bodies and points of contact for policymakers and funding agencies. Starting with sites in the West Indies and Réunion Island, which are European strategic advanced platforms in the tropics, the approach has been extended to new regional cooperations through the creation of thematic hubs that also have a remit to host researchers from other organizations and whose international reputation is growing rapidly.

This range of partnerships is set to change continually, in consultation with the partners involved, so as to concentrate on particular topics of considerable interest, in particular relating to major international programmes, such as the 4 per 1,000 initiative, and to build a joint offer from research organizations, French and others, in countries in the global South. As part of the reinforcement and harmonization of this scientific cooperation offer supported by France, the construction of closer links between the Platforms in Partnership for research and training involving CIRAD and the international joint laboratories (IJLs) promoted by IRD will continue, in consultation with platform partners.

7. HCERES, 2016.

8. See the two statements on partnerships, one from the INRA-CIRAD Joint Consultative Committee on Ethics in Agricultural Research and the other from the CIRAD Science Council.

Fine-tuning the choice of target countries and partners

As a public-sector establishment, CIRAD is part of the French authorities' geostrategic vision. Africa remains a strong priority and activities will be focused on countries eligible for public development aid. CIRAD will continue to choose its geographical partnerships based on the state of the research system in a given country, its level of development, the generation of global commons and the activities of the European research sector, which operates in different ways in emerging and least advanced countries. These distinctive criteria have even greater importance given global issues such as the mitigation of climate change, sustainable management of natural resources, sound political governance and poverty alleviation.

In a context where scientific diplomacy is backed up by major global agreements, dPs also offer a framework for CIRAD and its partners to build a joint partnership offer. This is being done with a view to participating together in structuring the international consortiums required to organize the global sharing of the research necessary to provide the solutions expected by governments in terms of public policymaking and implementation monitoring.

In re-examining the priorities for its overseas operations, CIRAD will be taking into account changes in European and global investments and financial transfers, and new forms of scientific cooperation and agrifood chain operations. This will involve the conduct of both comparative studies and analyses of cross-border and global processes (emerging diseases, globalized value chains, the financialization of agriculture, trade etc.). In a situation that merits new multilateral initiatives, it is necessary to consider the issue of how global scientific networks are organized. It is also important to broaden the circle of partners to include public or private institutions working for development (NGOs, foundations, businesses and professional organizations) in order to boost the impact of Platforms in Partnership.

Promoting a new national, European and global research structure

CIRAD will use its position as Europe's leading research organization specifically devoted to agricultural research for development to bring together research efforts and ensure that the relevant issues are recognized at the highest levels of French and European strategies. To this end and in close partnership with INRAE and IRD, it will work within the bodies responsible for institutional coordination (Agreenium-IAVFF, FRB), national research programming (AllEnvi), funding (AFD⁹, ANR, foundations, ERA-NET) and auditing (HCERES).

Lastly and more broadly speaking, CIRAD aims to help design a new structure for an open, inclusive global agricultural research system¹⁰. In particular, it intends to play an active role in managing and supporting the integration of partners from the global South in networks of excellence, in particular through the Montpellier University of Excellence (MUSE) project and in association with the Agropolis Fondation, so as to transform global agricultural research networks and issues. To foster multilateralism, which will help renew the global agricultural research community, it sees its role as falling under the auspices of the Global Forum on Agricultural Research (GFAR), in association with agricultural research organizations in Europe and emerging countries and the CGIAR organization. This ambition will mean CIRAD engages more systematically in three fields: global strategic intelligence, working collectively to prioritize research issues; establishing a global agenda and programming tools to enable shared long-term objectives, notably through major global initiatives (for example, the 4 per 1,000 initiative and the AU EU FNSSA Partnership); and the debate on the status of scientific outputs, in particular intellectual property (IP) rules and access. Given the nature and importance of the challenges faced, it means that as far as possible political support for scientific cooperation initiatives should fit into a European framework. Cooperation with Africa, which is of major interest for the future and security of Europe, must fit into a broader framework of long-term strategic dialogue aimed at ensuring the deployment of a universally beneficial co-development policy.

Playing a substantial role in debates at the interface of science and policy

The originality and pertinence of CIRAD's approaches and its development experience means it can participate in and influence debate at the interface of science and policy. Given the confirmation of the major role of research for development in the 2030 Agenda and the fact that scientific groups are being encouraged to contribute, this role is increasingly important and requires clearly targeted scientific outputs and active participation in the bodies that shape development thinking and policy. This contribution fits perfectly into the concept of 'scientific diplomacy' which is now recognized internationally, including by the European Commission. As far as CIRAD is concerned, there is a requirement to communicate more and to communicate better about global development policy (COP21, HLPE). CIRAD can already claim several successes in this respect: cooperation with the FAO, the United Nations Committee on Food Security and the European Commission on issues such as land investments, price volatility, global monitoring systems etc. The aim is to

10. Towards an orchestration of global agricultural research: a CIRAD proposal. CIRAD, July 2011.

9. Following the 30 November 2016 CICID meeting.

step up its participation in debate so as to inform national, European and global policymaking. This will bolster the advocacy remit that is an integral part of CIRAD's culture and heritage and recognized by its partners. This remit means influencing the political debate in terms of sustainable development and on more controversial issues, by virtue of its experience of the role played by agriculture, food systems and the management of living resources in the global South and, as a consequence, worldwide.

Ambition 3

Establishing a novel offer in capacity strengthening

Putting human capital at the heart of development

No country can build its own development pathway without contributing to the production of the knowledge and innovations it requires, and the same goes for the updating and enrichment of its human capital, from basic through to professional and higher education. For countries in the global South, the capacity to build the skills required to roll out their development policies is an absolute priority. At a time when population growth in Africa means that vast numbers of young people are entering the job market each year, training and building capacities are vitally important. The whole range of actors in the global South are currently expressing their interest in this fundamental need and are keen to see a substantial increase in international cooperation in this field in order to satisfy the legitimate expectations of future generations.

Broadening CIRAD's training operations

Since CIRAD was founded, its training operations have centred on training in and through research. Following requests from partners and the development of links with higher education establishments over the past two decades, these operations have broadened to include other types of training, in particular vocational training and Bachelors and Masters degrees. In France, the founding of Agreenium in 2009, the Institut Agronomique Vétérinaire et Forestier de France

(IAVFF) in 2015 and the increasing importance of higher education establishments as a result of alliances and consortiums have boosted CIRAD's interactions with basic training operators. However, the French's systems capacity to respond still falls short of what is required, which is not the case in better-equipped countries such as the Netherlands, the UK and the USA. Without going beyond its remit, CIRAD alone cannot meet all the expectations expressed, notably in French-speaking countries, whether they be from research actors seeking a major renewal of their scientific expertise, or economic actors and States with urgent needs for vocational training in the field of agriculture in its broadest sense. The response to this demand must be built within long-term institutional partnerships capable of working with and for countries in the global South and of building the capacities required by operators over and above one-off opportunities. This requires a training policy that sets global objectives, built on strong alliances with a number of research and higher education establishments.

One major element in achieving this ambition with and for the global South will be mobilizing members of Agreenium and Agence Française de Développement (AFD), the latter having been given an explicit higher education remit at the last meeting of the Comité Interministériel de Coopération Internationale et du Développement (CICID). However, CIRAD should also build on the virtuous circle that exists in Montpellier following the success of the MUSE I-Site centred on agriculture, environment and health. This new thematic research university aims to be a European portal to the global South. This is an exceptional opportunity for CIRAD to work with its partners in Montpellier to build ambitious training projects. These projects may take the form of strategic collaborations between universities in Montpellier and France's overseas regions, European universities working in the same fields as CIRAD and higher education establishments in the global South, seeking to foster joint degrees, new training courses, e-learning and internships for teaching staff. Lastly, and most importantly of all, it is essential to build an action framework based on identifying the requirements of certain strategic countries in the global South which are keen to make a high-level political commitment in this field, and to establish long-term partnerships with training organizations. This debate will form the heart of the new version of CIRAD's SPSOs.

Ambition 4

Establishing the conditions for innovation with impact

Because of its applied research remit, CIRAD must ensure that its scientific and technical outputs contribute to innovation and impact. Working for sustainable development means producing knowledge which is useful in building capacities for adaptation, learning and action among actors and societies, and also understanding what it takes for those actors to take that knowledge on board in the long term. CIRAD must be accountable for this.

Playing a full role in building innovation systems with stakeholders

CIRAD's contribution to innovation will take into account the whole range of stakeholders: farming communities, technicians and researchers, NGOs, political, economic and financial actors, businesses and so on, each with a specific role and influence. Taking local visions and expertise into consideration is vital for successful research. This is why CIRAD must engage in approaches that involve each and every stakeholder: research-action, research trials, participatory research, technical institutes etc.

The relevance and usefulness of CIRAD's research work and results obtained in relation to particular issues is crucial. It cannot be met merely by juxtaposing fundamental research and transfer operations. Working with actors to build research topics and thereby meet their needs is a vital starting point in ensuring relevant research programmes. This means identifying the problems to be solved, translating them into research topics, analysing the available expertise and know-how, conducting joint foresight exercises and taking ethical concerns into account. It also means working to build projects with the actors who require solutions. It anticipates the paths that will be taken by research outputs, right up to their eventual impact. CIRAD's longstanding territorial partnerships with France's overseas regions, recently boosted by the development of technical innovation and agricultural transfer networks known as RITAs, is one illustration of this collective intelligence that combines science and practice and serves to fuel innovation systems and steer public policy in France's overseas territories and internationally.

CIRAD has identified people in rural areas as the main target of its work. It is important to understand what this means when drafting research programmes, not only in terms of programming and building innovation pathways but also taking ethics into account, in particular human dignity, gender issues, respect for local expertise and equitable development in the fullest sense of the term. This aim must be considered when building research projects, wherever possible with *ex ante* assessments of the impact of the knowledge generated on rural populations.

Building an impact culture and providing the tools to implement it


CIRAD's capacity to impact reality through its scientific outputs gives it credibility in the eyes of those commissioning its expertise and funders. The aim is to work to foster a shared innovation and impact culture. Regardless of their discipline and in addition to promoting outputs through publications, CIRAD's researchers must ensure the social utility of their projects and the impact of their research, and take care to use credible tools to explain and monitor the impact pathways of their outputs.

First and foremost, boosting the contribution to innovation means assessing and drawing lessons from the way in which knowledge building influences societal change. The ImpresS method developed and tested using *ex post* case studies as part of CIRAD's 'innovation-impact' programme has provided valuable lessons on the programming perimeters to consider, the multiple interactions to promote, the capacities to build and the political actors to involve all the way along the impact pathway. Because of the long timespan involved, research programming cannot be directly determined by the promise of a short-term impact, and must take these lessons on board at both a project and institutional level in order to maximize the chances of having an impact. This requires a certain stability in the duration of research questions and building project clusters that make use of interdisciplinarity and plot coherent impact pathways for the future. It also means opening up CIRAD's partnerships to various innovation actors and fostering the interactions that are crucial for generating impact, such as those that build capacity. Lastly, concern for impact and the impact culture must be reflected in research practices. Given that research plays a range of roles and has varying degrees of control over innovation trajectories all along impact pathways, it is vital to adopt an *in itinere* method to anticipate intervention methods and critical points for interactions with the various stakeholders in innovation in order to encourage maximum impact.

The development of an impact culture will also fuel reflection and debate on the impact of agricultural research for development. While it is necessary to address the legitimate

demands of donors, it is also important not to take the easy option of thinking that all impacts can be measured and that causality can always be unequivocally established. Through this debate, CIRAD will be able to improve its accountability and contribute to global discussions on the complex relations between different types of knowledge and the roles of knowledge, science and technology in social change at the interfaces between science and society and science and policy

Developing a foresight approach

CIRAD is a member of the Futuribles foresight centre and the Prosper network, and has long used foresight to define its strategy, programme its research, manage territories more effectively and support societal change and governance. Foresight exercises have been conducted by groups of researchers from CIRAD¹¹ or with INRAE¹², and CIRAD is involved in several monitoring systems, such as World Agriculture Watch and others focusing on value chains. These exercises have enabled it to anticipate and adapt to change, identify new research questions and raise awareness of and train its researchers in foresight thinking. This serves to draw an 'instructive' link between expertise and socioeconomic and political actors to explore possible change scenarios, analysing the degree of viability of intended transformations in a context marked by growing uncertainties. Building a vision of possible pathways of change within territories like this is already a form of participatory governance. To further this, CIRAD intends to develop foresight exercises within its research units and in partnership, using various tools and methods including monitoring and observatories to warn of regional and global change. The conclusions of these exercises will be translated into strategy recommendations and proposals for action for decision-makers. They will fuel an analysis of the boundaries of science and scientific programming. 

11. For example, the CIRAD company project (1991), the foresight and strategic options group (1995), the revival and strategic plan (2001), and CIRAD 2015 (2006).

12. Agrimonde (2010), DuALine (2011) and Agrimonde-Terra (2016).



Changing CIRAD's organization to achieve its ambitions

To ensure its sustainability and fulfil its remit in a changing world, CIRAD must continue to modernize and be capable of changing the way in which it is structured, just as it always has. It cannot achieve its four ambitions without the collective commitment of the people who make up and sustain the organization. Being an exemplary institution and a beacon to social commitment is crucial in this respect. For example, CIRAD has committed to gender balance among management staff and to appointing women to positions of responsibility. It also intends to make progress in terms of environmental responsibility. This policy must be reflected in all its internal practices, such as the management of energy consumption, waste management, what is expected of science and partnerships in the global South, and changes to its internal governance. Given greater budgetary pressure, it also needs to manage its human, financial and material resources more efficiently and build new skills tailored to its ambitions, in particular by being more proactive in terms of adjusting what it has to offer to satisfy both donors and political decision-makers. Lastly, CIRAD must boost the visibility of its activities and their impact through effective global communication, promoting the values and practices supports.

Strengthening the financial resource development strategy

As a public sector research organization with a specific position, CIRAD operates within a mostly non-commercial sphere: its main, but not only, source of income is the State. Despite the current strong pressure on the public purse, its strategy assumes that State funding will continue. If this was to change, the scope of CIRAD's operations would inevitably shrink substantially.

CIRAD will need to adopt a proactive financial resource development strategy if it is to maintain or even increase staff numbers in the medium to long term, as its strategic ambitions require. It sees a proactive, determined drive to diversify and attract new resources as a major priority, though not without internal discussion. The organization's official position is that the search for external funding to satisfy the need for financial equilibrium is not inconsistent with its scientific and partnership ambitions and could in fact help serve those

ambitions. CIRAD's outputs are mainly the fruit of its research teams' work in response to issues raised by actors and partners in the global South. However, CIRAD believes that it is possible to more systematically match its exceptional scientific expertise to current demands, particularly from donors, by promoting its 'comparative scientific advantages' and its institutional capacity to tackle complex issues with tangible impacts in the field.

This approach is facilitated by the fact that the major issues on which CIRAD works, such as adaptation to climate change, food security and sustainable value chain development, are now at the top of the global political agenda, resulting in substantial demand for its services from which it could generally profit. Within the French research ecosystem, CIRAD has a comparative advantage in that its financial, budgetary and accounting framework allows it to generate contractual resources. Despite its status as a public sector industrial and commercial enterprise (EPIC), CIRAD has a private accounting system, appropriate operating rules and a derogatory investment regime. These factors give it greater international flexibility, and above all a management framework and culture more rooted in economic reality. CIRAD intends to build on these regulatory advantages and use them as a lever to develop its commercial activities.

CIRAD intends to step up its operations designed to formalize and manage its offer and to understand and satisfy donor demands. It has plans for a proactive integrated support service dedicated to marketing its research and partnerships, and to decompartmentalize and simplify promotion of its research, expertise and training services.

In the coming years, CIRAD will maintain a close eye on its three objectives –scientific, partnership and financial– striving continuously to balance them. Its research and partnership marketing operations will help researchers build and shape their research projects and enable CIRAD to fulfil its ambitions and resume a more dynamic policy to employment and better recognition of the contribution of staff members to achieving its ambitions. This rationale will affect both its overall activities and individual careers, since no staff members will be exempt from contributing to the development of its commercial activities. In line with CIRAD's priorities, management must make greater use of individual expertise for activities that generate contractual resources, and this aspect must be recognized when analysing career

paths. While the ability to take the initiative and show creativity must continue to drive researchers' activities, it is also vital that CIRAD ensures that the internal resources required to fulfil its research and expertise contracts are used more effectively. This is particularly important since each contract engages the responsibility of the organization and its credibility in its partners' eyes: fulfilling its commitments on both a collective and an individual level should be a major priority.

Communicating to boost international reputation

CIRAD must improve its external communication by renewing both the content and methods to promote its activities in a convincing way, both to the public as part of the dialogue between science and society and to research organizations in the global North and South, institutional partners and donors. Its recognition by research commissioners and donors is increasingly dependent on how it communicates. CIRAD needs to shed its diffidence in this respect and demonstrate clearly how the topics on which it works are at the heart of the huge transitions transforming the world. To fulfil its remit, CIRAD must make its activities and impacts more visible and boost its reputation. CIRAD intends to give much greater priority to institutional and scientific communication in the coming years, to explain what makes it unique, what added value it provides and what impact it has, particularly now that new technologies are set to change beyond all recognition the way in which it communicates.

The organization will be modernizing and totally overhauling its communication strategy in the next few years. In terms of content, it must boost the visibility of the knowledge pro-

duced, especially when that knowledge forms part of a concrete solution to major development issues through its application and impact. However, CIRAD must also explain how it sees development through research and its belief in the importance of scientific partnerships, without oversimplification. The target audience for this communication is made up of all the actors likely to act as levers in the global debate about agriculture and development, be they big think tanks, multilateral bodies or, more generally, anyone at the interface between science and policy internationally.

Committing to the digital revolution

The digital revolution is one of the most tangible elements of the major changes set to have an impact on scientific practices, research content and how research organizations are structured. The first consequence of the digital transition will be a profound change in the practices and tools used, which will undoubtedly trigger significant gains in productivity in many fields, notably support activities. CIRAD must commit fully to this revolution and use it to simplify upstream processes and think actively about how it is structured. The digital revolution will also have a profound effect on the very heart of what CIRAD does, well beyond the growing need to store data and boost its computing capacity. Digital technology is substantially changing certain research and training activities, and even their outcomes. New products and services will emerge, some of which raise many ethical and legal questions (open science, open data etc.). While the digital revolution is nothing new for CIRAD, it needs to make an even greater commitment to it and make it a major principle of its own development.



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