

Science and civil society in the fight against desertification



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Comité Scientifique Français de la Désertification
French Scientific Committee on Desertification



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French Scientific Committee on Desertification

The creation in 1997 of the French Scientific Committee on
Desertification (CSFD) has met two concerns of the Ministries in
charge of the United Nations Convention to Combat Desertification.
First, CSFD materialises the will to involve the French scientific
community versed in desertification, land degradation, and
development of arid, semi-arid and sub-humid areas, in generating
knowledge as well as guiding and advising the policy makers and
actors associated in this combat. Its other aim is to strengthen the
position of this French community within the international context.
In order to meet such expectations, CSFD is meant to be a driving
force regarding analysis and assessment, prediction and monitoring,
information and promotion. Within French delegations, CSFD also
takes part in the various statutory meetings of the organs of the United
Nations Convention to Combat Desertification: Conference of the
Parties (CoP), Committee on Science and Technology (CST),
Committee for the Review of the Implementation of the Convention.
It also participates in meetings of European and international scope.

CSFD includes a score of members and a President, who are appointed
intuitu personae by the Ministry for Higher Education and Research,
and come from various specialties of the main relevant institutions
and universities. CSFD is managed and hosted by the Agropolis
International Association that gathers, in the French town of
Montpellier and Languedoc-Roussillon region, a large scientific
community specialised in agriculture, food and environment of
tropical and Mediterranean countries. The Committee acts as an
independent advisory organ; it has neither decision-making powers
nor legal status.

Its operating budget is financed by subsidies from the French
Ministries of Foreign and European Affairs and for Ecology and
Sustainable Planning and Development. CSFD members participate
voluntarily to its activities, as a contribution from the Ministry for
Higher Education and Research.

More about CSFD:

www.csf-desertification.org

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fully supported by this Committee through the backing of relevant French
Ministries. Les dossiers thématiques du CSFD may be freely downloaded from the
Committee website.*

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Man kind is now confronted with an issue of worldwide concern, i.e. desertification, which is both a natural phenomenon and a process induced by human activities. Our planet and natural ecosystems have never been so degraded by our presence. Long considered as a local problem, desertification is now a global issue that affects us all, including scientists, decision-makers, citizens from both the South and North. Within this setting, it is urgent to boost the awareness of civil society to convince it to get involved. People must first be given the elements necessary to better understand the desertification phenomenon and the concerns. Everyone should have access to relevant scientific knowledge in a readily understandable language and format.

Within this scope, the French Scientific Committee on Desertification has decided to launch a new series entitled '*Les dossiers thématiques du CSFD*', which is designed to provide sound scientific information on desertification, its implications and stakes. This series is intended for policy makers and advisers from the North and South, in addition to the general public and scientific journalists involved in development and the environment. It also aims at providing teachers, trainers and trainees with additional information on various associated fields. Lastly, it endeavours to help disseminate knowledge on the combat against desertification, land degradation, and poverty to stakeholders such as representatives of professional, non-governmental, and international solidarity organisations.

A dozen reports are devoted to different themes such as global public good, remote sensing, wind erosion, agro-ecology, pastoralism, etc, in order to take stock of current knowledge on these various subjects. The goal is also to set out ideological and new concept debates, including controversial issues; to expound widely used methodologies and results derived from a number of projects; and lastly to supply operational and intellectual references, addresses and useful websites.

These reports are to be broadly circulated, especially within the countries most affected by desertification, by e-mail (upon request), through our website, and in print. Your feedback and suggestions will be much appreciated! Editing, production and distribution of '*Les dossiers thématiques du CSFD*' are fully supported by this Committee thanks to the backing of relevant French Ministries. The opinions expressed in these reports are endorsed by the Committee.

Jack Wilkinson
President of the International
Federation of Agricultural Producers (IFAP)

How can farmers and researchers develop a win - win collaboration? Farmers have been insisting for many years that agricultural research be farmer-centred and focused not only on production problems but also to help overcome both their marketing problems. In many developed countries, agricultural research does respond to farmers' needs because farmers have been contributing to the funding of agricultural research through commodity levies or through nominating representatives on the governing bodies of national research institutes. However, this is not the case all over the world, and particularly for small-scale producers who do not have yet organised into farmers' organisations to represent them.

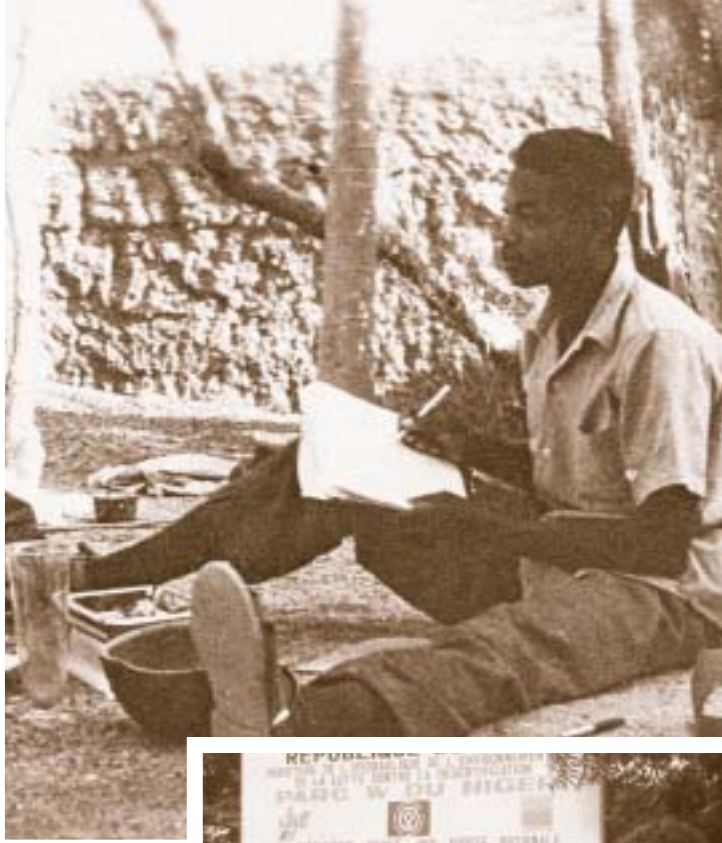
Representation of farmers on the boards of research institutes is a positive step in the development of a successful collaboration. However, it must lead to change on the ground. This change can be measured by improvements in the types of projects that are given priority, the inclusion of producer groups in determining their design, and efforts made to make the technology available to producers. Market concentration upstream and downstream of the farming sector represents a growing challenge for the survival of farmers. If rural poverty is to be reduced, farmers must be able to live from their farming activities. The position of the farmers in the market needs to be strengthened relative to other actors in the food chain. In addition, in the arid areas, poor farmers cannot invest and they need official development aid. The research community can play a major role in collaborating with farmers on identifying innovative mechanisms to link farmers to markets by improving the organisation of agricultural production.

Researchers can support farmers by providing analysis on their situation and the conditions for their success, e.g. the regulatory and legislative environment. Farmers will then have the knowledge to be able to replicate, adapt or scale up successful experiences in their own country.

Another critical issue, where farmers and researchers must collaborate, concerns the new constraints posed by climate change world-wide especially in arid and semi-arid areas. Farming practices should be adapted to these variabilities. This will demand renewed vigour by governments to support this adaptative research embracing farmer's key partners. How can farmers improve their access to research results? Strengthening extension systems in rural areas is the key for the modernisation of the farming sector. Farmers' organisations need to have access to solid extension services at the grassroots level. Unfortunately, government extension services around the world have been run down as a result of financial cuts. There is therefore a real need for farmers to establish local effective extension services themselves, putting research findings into farmer-friendly user forms and disseminating the information throughout the farm community. Extension services should work in close collaboration with research centres and farmers' organisations.

Finally, governments should finance agricultural research properly. Most statistics show that governments have significantly reduced funding for agricultural research and for sustainable land management. There is an urgent need to reverse this trend. Governments should not fully cede their responsibilities for agricultural research to the private sector. They should continue to develop their own projects so that farmers are given choices in new technologies, and do not become unduly dependent on private suppliers for seeds or technologies. Governments have a critical role to play in ensuring that indigenous knowledge should continue to be developed and made available to those who want to use them. Farmers therefore seek effective partnerships with researchers, both public and private so that they can continue to innovate on their farm, improve the well-being of the farming sector and maintain their natural capital.

I would like to thank the CSFD for devoting this thematic report to relations between scientists and civil society actors in arid zones, and in particular to farmers who are at the forefront of the fight against desertification.



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Scientific research in arid areas



It is difficult to determine with any certainty who first undertook research in and on arid areas and when. The first farmers and livestock breeders had accumulated a lot of experience on their environment over the ages. The constraints of arid areas had forced societies and farmers to develop irrigation systems in Mesopotamia, in the Nile valley, in China and in India. The problems they had to face then are still with us today, such as the salinisation of soils. Then, other issues have emerged such as the climate, soils, vegetation, the use of grazing land by nomadic herdsmen, followed by the need to fertilize, prices, labour, and access to land. Progress was achieved over the centuries in successive leaps and bounds, so that production could meet the increasing needs of populations for both food and currency.

The problem of land degradation started becoming blatantly apparent in the 20th century. Population densities had increased rapidly, while agricultural and livestock breeding practices had not kept apace. Successive droughts moreover aggravated arid conditions, which were already quite restrictive, particularly in North Africa and Sub-Saharan Africa but also in many parts of Asia and Latin America.

In order to adapt to the pernicious process of desertification and fight it, we first have to understand it. It is necessary for this to go beyond the age-old observations of peasant farmers and breeders to understand the phenomenon and anticipate the future: this is precisely the role of scientific research.

Sciences of the environment

Scientific research in arid environments only truly began at the beginning of the 20th century, in Mediterranean countries, in the United States, in Australia and in a few countries in Asia and Latin America as well as in the ex-USSR. African and South

American countries mainly had a colonial status at the time and the metropolitan powers stimulated research in order to develop their colonies. This is when the first research and studies were undertaken, in particular into geology, climatology, hydrology, geography, botany, biogeography and agronomy. Most of the time, it was conducted by colonial technical departments, such as for agriculture and mining.

At the same time, a quasi 'colonial science' developed in France under the sponsorship of the *Académie des sciences coloniales*, the *Muséum National d'Histoire Naturelle*, the *Musée de l'Homme*, then with support from more specifically oriented institutions such as the IFAN at Dakar in Senegal (*Institut Français d'Afrique Noire*), created by the Governor of the AOF (*Afrique Occidentale Française*). The English and the Belgians did the same with their colonies. Consequently, between the two world wars, researchers emerged, now renowned, to whom we still owe a lot in the field of natural sciences: Chevallier, Gaussen, de Martonne, Emberger, Cailleux, Monod, Köppen and Aubréville, the father of tropical ecology, who was the first to use the term 'desertification' in 1949 in his famous work '*Climat, forêt et désertification de l'Afrique tropicale*'*.

* Aubréville A., 1949. *Climat, forêt et désertification de l'Afrique tropicale*. Société d'éditions géographiques, maritimes et coloniales, Paris.



Family hut made of woven fibres,
of a Peul nomad in Udalan,
Burkina Faso.
M. Langlois © IRD

Then, in sciences of the natural environment, several schools of thought emerged in France, for instance, for ecology, in Montpellier at the CEPE (*Centre d'Études Phytosociologiques et Écologiques*, which has since become the CEFE (*Centre d'Écologie Fonctionnelle et Évolutive*) and at ORSTOM (*Office de la Recherche Scientifique et Technique Outre-Mer*), which became the IRD (*Institut de recherche pour le développement*), in 1998 for pedology, hydrology, entomology and geography. The priorities at the time were on making inventories, also on specialised research into the exploitation of resources and highly applied research, particularly in the food and health fields. Scientists began to understand the constraints of the natural environment, particularly in arid areas and this knowledge was gradually disseminated in the development 'world'.

In France, at the beginning of the 1960s when African countries started to gain their independence, ORSTOM and other institutes which had specialised in tropical farming, underwent a period of intensive growth with the emergence of international cooperation, including its intrinsic ambiguity. What this really meant was that highly technical and applicable knowledge was being developed, without any effort being made to understand traditional know-how. The main approach then was to use highly centralised, State development

models and **top-down approaches**. This also meant that the young States remained under the control of the previous colonial powers with respect to scientific activity and that their national research capacities, within both specialised organisations and universities, remained limited. For a long time, scientific cooperation was 'substitution cooperation'.

Social science

The social sciences developed differently. At the beginning of the 20th century, they were also widely influenced by the colonial context: the best observers of the colonial world were first of all the colonisation agents, civil or military administrators and missionaries. The task of the first ethnographers was also to enlighten the metropolitan powers on local, social and political organisations. This quickly led to the development of schools of thought on Asia, the Arab world, the Latin-American world and the African world, around scientific societies. Following this, decolonisation activists were often university personnel and researchers in social science. We might note, among others, the historians Julien and Braudel and also *l'école des Annales*, the French anthropology school led by Lévi-Strauss and finally Balandier.

After the 2nd World War, the Bretton Woods institutions* were set up. The dominant school of thought was then Keynesian, under-development was considered to be a development lag. Just before its colonies gained their independence, France set up so-called 'French' national accounting and planning systems for them. The economists of the time followed the way opened by Perroux, Lebret and Malinvaud.

* The World Bank and the International Monetary Fund



History of research at IRD from 1944 to 1994.
Food survey for research in the human sciences.
Togo (1954).
D.R. © IRD

The war in Algeria and the events of May 1968 then profoundly affected this community. Marxist economic anthropology was then dominant, whether at the EHESS (*École des Hautes Études en Sciences Sociales*), at the CNRS (*Centre National de la Recherche Scientifique*), at ORSTOM or at the University. This radicalisation was also to be found in economics. The French tradition oriented these disciplines more towards the study of systems and structures. **Colbertism** persisted a long time, attributing the role of the State as the first actor of development and regulator of economic life whereas schools with liberal tendencies left this role to the market.

Nowadays, the neo-liberal theories are dominant in international institutions: the emphasis is placed on macro financial equilibriums and the market at the expense of long-term projects. The collapse of so-called socialist systems and the end of the cold war reinforced this ideological domination. However, a regulation school persists, in particular in France. Much work is being done on the organisation of societies, the conventions which govern them and the rights and obligations of people; it is thus possible to state that the market is not the exclusive means for coordinating economic activity. The market and the State, a minimum of protectionism, investment in training, the economy and the environment, the stability of a State based on law, are themes which are currently being investigated by French researchers and some of their colleagues in developing countries.

Focus

Sustainable development in a few words

"Sustainable development means meeting the needs of the present without compromising the ability of future generations to meet their own needs" (Brundtland, World Conference on the environment and development, 1987).

The Rio conference in 1992, Agenda 21 and the United Nations Convention on the environment have helped to popularise this concept which is based on an integrated and long-term approach to the ecological, economic and social aspects of sustainable development. The objective is the harmonious development of what is referred to as 'natural capital' (all of the services provided by ecosystems and renewable and non-renewable resources), the 'human capital' (capacity of men and women), the 'societal capital' (capacity of social organisations) and the financial capital.

For a decade, the question of the management of natural resources and that of their degradation has become increasingly urgent, in a context of an increase in population, climate crises and the new concept of sustainable development, around which several schools of thought have developed: ecodevelopment, sustainable development, the ecological economy, the taking into account of 'social capital' and human capacity and also of 'natural capital'. The latter is particularly significant in arid areas, first because most of the people who live there draw their resources from it, and secondly, because any deterioration of this capital, beyond the fact that it may be irremediable, leads to a deterioration of the other capital resources: loss of know-how and destructuring of society.

Towards multi-disciplinary and participatory approaches

In France, two major events marked research on development, in particular for drylands:

- The major droughts of the 1970s in the Sahel which led to the DGRST of the time (*Délégation générale à la recherche scientifique et technique*) creating a special programme.
- In 1981, the creation of the mobilising programme 'cooperative research on development' by the new Ministry of research with the intention of reforming research and of the orientation and programming Act promulgated at the time.

The major long-term programmes and work were then undertaken, which led to significant results in all agronomic sciences and sciences of the natural environment, as evidenced for instance by the collective work published in 1992 by the IRD *'L'aridité, une contrainte au développement'* [*Aridity, a constraint on development*]. The fact that their results were taken into account along with the results of previous work such as the study of *terroirs*, which had been undertaken since the 1960s, on the initiative of the geographers Sautter and Pélissier and the sociologist Balandier, influenced the new approaches and financial backers began to become aware of the negative effect of 'top-down' approaches.

One should note in particular the emergence of projects called 'management of *terroirs*' (the French term is used in English) and of the concept of 'integrated

management of natural resources'. Research was also undertaken on themes such as food security, the quality of food, the transformation and certification of local products. Scientists were thus able to influence decision-makers. This movement occurred around the time civil society began to emerge.

Today, it is difficult to conceive of specialised, multi-disciplinary research in social sciences and sciences of the environment which are not 'participatory', in other words decided without considering the opinion of the final users of the research in question. States are no longer the only decision-makers. Likewise, scientific issues are no longer restricted to scientists.

There are two approaches to innovations and the dissemination of progress:

- The one, from the English-speaking world, is based more or less explicitly on a 'teacher-student' relationship and offers farmers a 'management' type approach which consists in getting them to adopt the benefits of research in order to satisfy market needs.
- The other, more rooted in French and Latin-American societies, is based on the experience of farming cooperatives and targets groups rather than people. Farmers are considered as actors and not simply as beneficiaries of progress. This implies that there are intermediary organisations adapted to the dynamic needs of the rural world, such as groups of farmers, management centres, cooperatives which pool equipment, the purchasing of input and the selling of products.

Focus

The causes of under-development according to ...

- *The Marxist school* (Samir Amin, A. Gunder-Franck, P. Baran, etc.) considered that under-development was produced by the development of the capitalist system: contemporary societies are part of a world system formed around a centre (the most developed countries) and the peripheries (the under-developed countries) and based on an unequal exchange and a relationship of dependency between the centre and the peripheries.
- *The structuralist school* (C. Furtado, R. Prebisch, etc.) also considered that under-development was a result of the structural domination by the industrialised countries of the others, thus essentially economic in nature and it suggested that development depended on industrialisation.

- *The F. Perroux school* was based on concepts of domination, of treating economic issues without considering social and cultural issues, of human costs which should take into account all needs (economic, cultural, religious, etc.).

- *The classic or liberal or neo-liberal schools*, considered that development requires an accumulation of capital and that the market naturally regulates the allocation of resources; under-development is thus just late development.

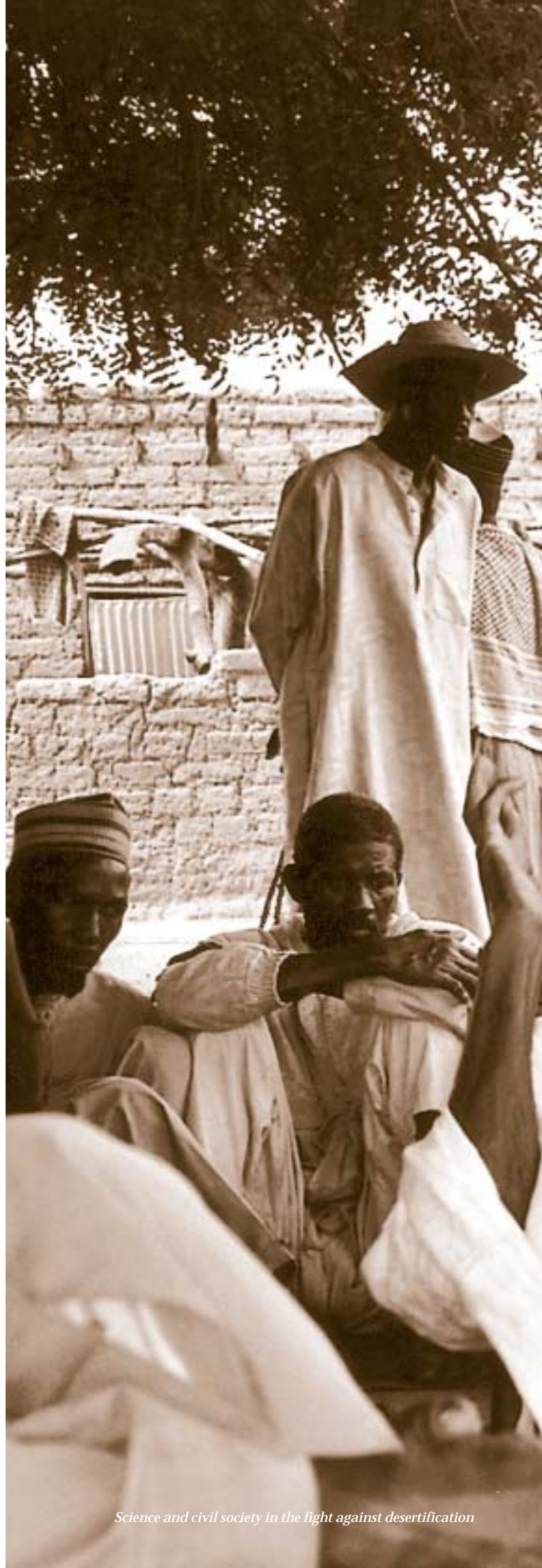
- *The Keynesian school* considered that the intervention of a powerful State is necessary to modernise the economies of under-developed countries, to accumulate capital and to mobilise labour.

This raises new questions for research. For instance, are today's major currents of international research, strongly influenced by modelling—whether for climatology, ecology or economics—capable:

- of finding practical solutions for rehabilitating degraded environments and restoring fertility as well as solving the problems raised by an increase in poverty, insecurity and migrations?
- of providing tools to enable administrative, technical and political representatives of the countries concerned to have a dialogue with their populations and organisations, forming the vast entity we refer to as 'civil society', and which has a much more important role to play than it did thirty years ago?
- of contributing systems for environmental, social and economic monitoring, which are capable of providing relevant information to ensure that suitable decisions are taken?
- of developing convincing arguments for financial backers—bilateral, multilateral and private—so that they invest in drylands?

This issue attempts to shed light on the new social contexts in which the fight against desertification is taking place. It develops the concept of 'civil society' and more generally describes all of the stakeholders in the fight against desertification. By analysing decision-making processes examined at the user level (farmers and livestock breeders) and the political level (Ministry of Agriculture), it distinguishes between the role of scientists and that of intermediaries between research and civil society. Finally, it considers the social utility of 'real time' research-development operations and their scientific products, by analysing a few projects undertaken in cooperation with several countries located in drylands, financed by the French Ministry of Foreign Affairs (MAE)* and conducted by the French Scientific Committee on Desertification (CSFD).

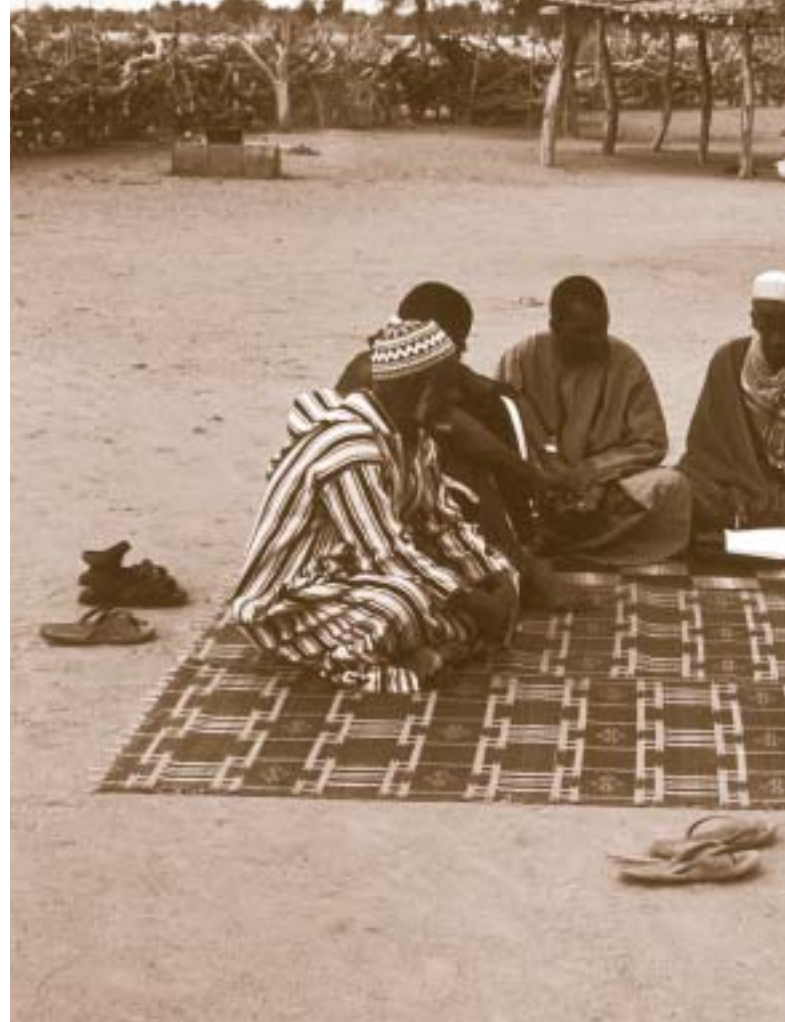
* In 2007, it became the Ministry of Foreign and European Affairs (MAEE).





Training in communication techniques in Niger. Students at the Institut de formation aux techniques de l'information et de la communication (IFTIC, Niamey) during an interview in a village on the banks of the Niger. These interviews were conducted as part of the second seminar on 'Sustainable development extension' organised jointly in Niger by the IRD and the IFTIC with French cooperation aid.
M-L. Sabrié © IRD

Civil society and its partners in the fight against desertification



The civil society in developing countries concerned by the fight against desertification, includes all men and women, rural and city dwellers, farmers and/or livestock breeders, businessmen, as well as traditional village organisations or other organisations with a legal status, professional groups and special interest groups, unions, local, national and international non-governmental organisations (NGOs) working in the country, political parties and companies. The civil society in developed countries is similar, but is generally better organised.

This concept of civil society is evolving: it is often described as a social entity which is distinct from and may even oppose the State. Our aim here is to describe the relations between civil society and the State in a dynamic and interactive way, since the components of civil society change very quickly: in the following sections we attempt to describe these components, including people and their organisations, in countries affected by desertification.

The partners in civil society are on the one hand, the State and its central and decentralised administrative departments and on the other hand, local and national elected officials and their assemblies, village and regional councils, as well as parliaments. Finally, special attention is paid to those who produce and disseminate knowledge: teachers, researchers, trainers, facilitators of extension programmes, may be considered to be members of civil society but their activity is in most cases supported by the State; they should thus be a privileged partner of civil society when negotiating with the State.

Actors in civil society who are involved in the fight against desertification

In countries affected by desertification, the first actors are people, men and women, who are immediately confronted with the degradation of land: farmers, livestock breeders and foresters. Their organisations are also actors, in particular NGOs. These actors are decision-makers who choose crops and grazing lands. They also include private companies.

The people: rural dwellers, livestock breeders and farmers

These people live in family, cultural and institutional environments which vary greatly. Their family environment is either the nuclear family or the extended family. More generally, the nuclear family and the extended family act within a specific cultural framework for each people which in turn determine clearly defined social practices. These practices govern the mechanisms for access to natural resources and user rights. Land tenure issues, the rights to use cultivated and grazing lands, the use of wood and non-wood forest products, are defined by these practices. What actors do thus depends on their daily social practices. Their decision-making power involves a combination of social practice, constraints of the natural environment as well as the economic, social and political environments.



Peasant farmer organisation. Meeting of the executive board of an economic interest group managing an irrigated area. Windécire, Senegal. X. Le Roy © IRD

The basic level of education of these people varies greatly and often in arid and semi-arid regions, we find populations of farmers and livestock breeders who do not know how to read or write and who have no other learning than oral tradition and knowledge of their environment. The techniques and know-how are thus transmitted between generations and do not evolve greatly, which does not mean to say that the people do not perceive their environment. On the contrary, they have acquired and transmitted a great deal of practical observations and useful knowledge of soils, grazing land, vegetation and farmed species.

Moreover, the villagers generally have a traditional form of organisation for managing their *terroir*. It is not possible in all cases to refer to village organisations and/or professional agricultural or livestock breeder organisations but there are assemblies of men and women practically everywhere, who sometimes take decisions according to complex mechanisms, which may even require a consensus. They have generally not made the transition from these traditional forms of social organisation to legal forms such as farmer unions. In many cases, there are groups for certain activities or groups of people, which might take the form of NGOs with backing from other national and international NGOs.

FOCUS

UNCCD and civil society

The text of the UNCCD (United Nations Convention to Combat Desertification) requires of countries that have ratified it that they involve the civil society in all stages of the fight against desertification. It is probably the most committed of United Nations texts on this question. Articles 3, 5, 7, 10, 16, 18 and 19 of the Convention are of particular interest.

In terms of principles, the text stipulates that decisions about the conception and undertaking of anti-desertification programmes must be taken with the populations and local communities and that public authorities should cooperate at all levels with local authorities, non-governmental organisations and farmers. These principles are enshrined in articles referring to national action programmes, to the collecting and exchanging of information, to transfers, to acquisition, to adaptation and to the development of technology and more generally to everything which concerns reinforcing capacities, education and raising awareness of stakeholders and decision-makers at all levels.

For more information: www.unccd.int

The NGOs: basic issues

■ How legitimate are the NGOs?

Legitimacy is acquired through local involvement and relations with partners. It implies links between local commitments and internationally oriented actions. For instance, the NGOs who work with family farming organisations know that unstable farm prices are a cause of poverty, whereas the liberalisation of prices is a dogma. These NGOs sound the alarm and require a moratorium: they are perfectly entitled to do this.

■ Are NGOs representative?

Representativeness is measured by the diversity of the geographic, social and cultural base of NGOs, by their capacity to federate, to form national platforms, to coordinate, to form coalitions nationally and internationally.

■ How independent are NGOs?

The NGOs are normally non-profit associations whose resources come from member subscriptions and external resources. These are often insufficient when NGOs wish to play significant international roles. Their reliance on private donations requires full disclosure of the way in which they are used. Some NGOs are strongly influenced either by governments (GONGOs, Governmental Organized NGOs), or by business (BONGOs, Business Oriented NGOs), or by their donors who have their own agendas to promote (sects, etc.).



Township woman who is a member of a textile painting workshop developed by the Umthathi Training Project, an NGO with a Xhosa name referring to a local tree, synonymous of power and renewed life. Grahamstown, South Africa. E. Deliry Antheaume © IRD

The organisations: NGOs, groups, associations and federations, unions and political parties

The NGOs: a complex world which is sometimes difficult to grasp

In countries affected by desertification, there is increasing proliferation of NGOs of all kinds (of varying legal status, nationality, size, objectives, reliability, interests, etc.). They attempt to work in areas which have been neglected by States, which are sometimes either not fulfilling their duties or are have a liberal attitude; they benefit from increasing financing from financial backers and claim to express civil society. They are sometimes organised into networks and may have a lot of influence. They are sometimes used as alibis by public authorities, in particular in relation to the international community. The increasing power of local NGOs over the last few years is noteworthy, as is the fact that they are more and more professional. These NGOs generally deal with social themes such as education and training, health and nutrition, young people and women. Sometimes, they focus on citizen

education and act as facilitators of civil society—current or future unions or territorial leaders or elected officials. One type of important NGO activity in the fight against desertification concerns hydraulics for rural environments, local development, improvement of agricultural practices, equipment and general economic development.

In developed countries, many people have become aware of the serious consequences of desertification phenomena and the poverty they engender. Most of the time, they are grouped into associations which act in various ways. The associations consist of members who pay a subscription at least once per year and of more committed and active members from all socio-cultural and professional environments. They initially were often people who enrolled for humanitarian interventions following natural disasters, such as for example the major droughts of the 1970s. They do extension work around desertification phenomena, as well as raising international awareness and collecting funds. They may also set up village development projects for themes such as hydraulics, livestock breeding, oasis

A few well known 'environmental' international NGOs ...

■ Greenpeace International

This is a federation of national associations founded in 1971 to fight against nuclear tests. Greenpeace is still very involved in these actions but now covers other themes related to global warming and promotes renewable energies, while demonstrating for the application of the Kyoto protocol. It undertakes spectacular environmental combats such as, for example, against oil companies. It also fights for the protection of biodiversity and forests, against whale hunting, toxic wastes and genetically modified organisms (GMOs), for example by publishing a 'black list' of products likely to contain GMOs. Greenpeace is established in 160 countries and mobilises millions of sympathisers for activist and media-oriented actions against public authorities and companies. Some arguments developed by the organisation do not always appear to be sufficiently backed up by scientific knowledge; other actions sometimes shock the public or even harm the causes they claim to defend.

For further information: www.greenpeace.org/international

■ WWF International, Global environmental conservation organization

The WWF, created in 1961 under the name of World Wildlife Fund, is a worldwide organisation for the protection of nature, which works in about one hundred countries to develop harmonious living between people and nature. It has 5 million members around the world and manages about 2 000 nature conservation projects, involving more than 4 000 people. WWF works both with local populations and at the highest levels of the World Bank and the European Union. WWF international is organised as a federation of national WWF, having a common charter. WWF France has 150 000 members and WWF Netherlands 1.2 millions.

WWF objective is to help protect biodiversity, to promote the sustainable use of natural resources and to facilitate the reduction of pollution. It claims to be politically independent, multicultural, to organise dialogue and partnerships while respecting cultural differences. It has a President, a board of administration and collects private funds and donations. It also acts as a coordinator of development agencies particularly in Africa on protected areas management. An analysis of the make-up of the board of

administration of the WWF shows that many influential manufacturers sit on the board, some of whom come from industries which harm the environment (Lafarge, Chevron, Unilever, etc.). WWF generally has good relationships with researchers and other NGOs.

For further information: www.panda.org

■ Friends of the earth international

This is an international federation of some 5 000 local and 70 national 'Friends of the Earth' organisations, which count about 1.5 million members. It undertakes awareness-raising campaigns on subjects which are often controversial, in that they defy the current globalisation model of the economy and neo-liberal theories by promoting models based on more social justice, respect for the environment and equal rights for all. The 'Friends of the Earth' demonstrate to put an end to the degradation of the environment, to empower indigenous peoples and local communities, to further an evolution towards sustainability and social fairness. They inform the general public and sometimes engage in fierce struggles for the causes they defend.

For further information: www.foei.org

■ IUCN, the World conservation union

The World conservation union was founded in 1948 and is characterised by a combination of individual members (often scientists), institutional members such as public research organisations, NGOs and several thousands volunteers. Its members represent 79 States, 112 public organisations, 670 national NGOs and 67 international NGOs. Its headquarters are at Gland (Switzerland); the IUCN employs 1 000 people and its annual budget is approximately 45 M USD; there are four coordination offices in Africa. The IUCN produced a very interesting strategic document in 2005 on the management of natural resources in arid environments and the fight against desertification in Africa, designed to help States develop their own strategies. This NGO, working closely with scientists, plays a significant role, particularly in biodiversity issues.

For further information: www.iucn.org

management, protection against erosion, reforestation, increasing agricultural production, the transformation of agricultural and forestry products; they also act in educational and basic training sectors or promote hygiene, nutrition and health. They are sometimes involved in training executives for local NGOs. They intervene in the field in developing countries offering support on their own and in partnership with local NGOs, sometimes substituting for them. The same attitude towards populations is to be found in some NGOs as in some technical administrations, i.e. there are those who know and those who do not, in other words "we will decide on their behalf".

These NGOs vary greatly in size from a few people to several tens of permanent members. In this case, they belong to NGO collectives or federations, either national or international. They have become professionalized and sometimes are real engineering firms. They know how to mobilise expertise when needed, rather more for the short term because they are subject to deadlines and other constraints. They do not always have the necessary perspective to make correct diagnoses.

In France, their budgets vary from some tens of thousands of euros per year to more than 50 million euros per year for the biggest ones. Most of the NGOs receive money from private donations, public fund raising and contracts with territorial authorities, sometimes with the State and the European Union. Some NGOs are almost entirely financed by the State while others are independent of public money. Some European countries such as Scandinavian countries and the Netherlands channel a significant part of their public aid for development through NGOs: about 20%, whereas the percentage in France was only 1.1% in 2005.

The NGOs of developing countries, as for those of developed countries, now participate in national and international debates on issue such as public aid for development and how it should be used, on world commerce, on the global environment, on debt and poverty as well as on the role of States. Moreover, the United Nations Convention to combat desertification requires that the parties to the Convention involve civil society in all stages of the fight against desertification.

... and other French NGOs

■ The Working Group on Desertification (GTD)

The GTD was founded in 2001 on the initiative of CARI (*Centre d'Action et de Réalisations Internationales*), a French NGO working in drylands. It federates various NGOs which are active in drylands, such as scientists, the CSFD, trainers, the International Federation of Agricultural Producers, the French development agency and WWF France. Its partners are the French Ministry of Foreign and European Affairs, of Ecology and Sustainable Development, and Scientific research. It works closely with the Desertification convention and groups of European NGOs such as ENID (European Networking Initiative on Desertification). Its main activities involve meeting with French actors—public, scientific and NGOs—and liaising with similar organisations, particularly in Europe; raising awareness through networking; compiling pedagogical files and publications for the general public. It has no legal status and operates as a collective led by the CARI. One of its most significant actions in 2006 was the 'Désertif'action' forum in Montpellier (France).

For further information: www.cariassociation.org/gtd

■ Coordination SUD

Created in 1994, *Coordination SUD* has brought together more than one hundred NGOs in a confederation made up of six collectives: CLONG-Volontariat (*Comité de Liaison des ONG de Volontariat* [Committee for liaising between Volunteer NGOs]), CNAJEP (*Comité pour les relations Nationales et internationales des Associations de Jeunesse et d'Éducation populaire* [Committee for National and International Relations of Youth and Non formal Education Organisations]), Coordination d'Agen, CRID (*Centre de Recherche et d'Information pour le développement* [Centre for research and information on development]), FORIM (*Forum des organisations de solidarité internationales issues de migration* [Forum for international solidarity organisations supporting migrant populations]) and *Groupe initiatives*. Its two principal missions are (i) international relations and support for raising awareness through several working groups, publications and the dissemination of common positions of NGOs on issues such as public aid for development and (ii) support for financing and institution building, by playing a role as a resource centre and pooling some facilities. *Coordination SUD* has ten permanent employees and has made information and capitalisation tools available for NGOs and their partners.

For further information: www.coordinationsud.org

Groups, village associations and unions

Sometimes, various groups or village associations and unions, which are members of civil society, are incorrectly labelled 'NGOs'.

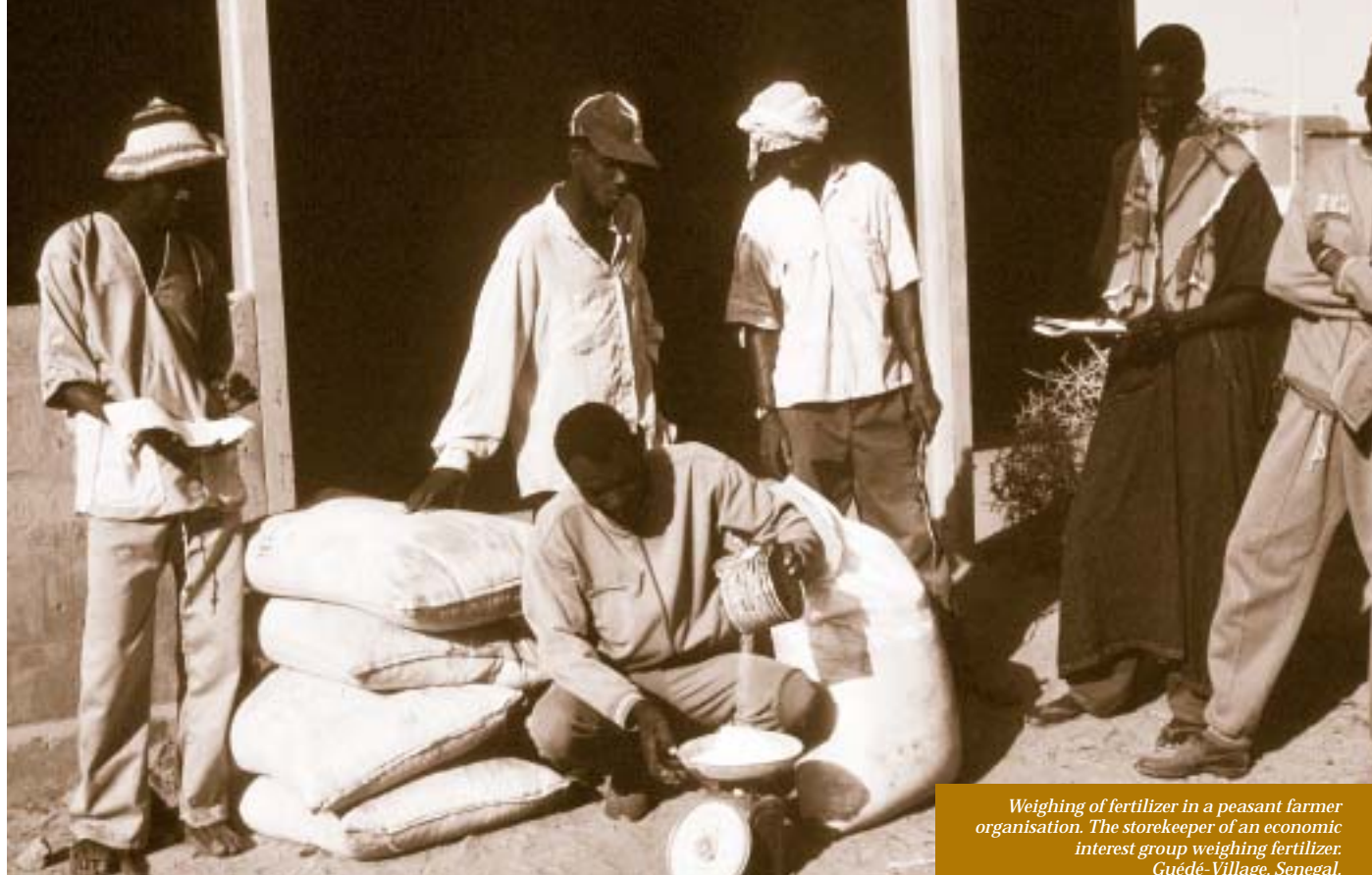
The various groups are, for example, groups of young rural dwellers or groups of women, organised for a specific purpose. For instance, in several Sahel countries, groups of women manage the growing, harvesting and transforming of forest products which are not ligneous such as Shea trees (*Butyrospermum parkii*, an African tree). It sometimes occurs that these groups register as legal handcraft and trading businesses and then negotiate contracts with exporters or manufacturers.

The term 'village association' covers a wide range of possible organisations, ranging from traditional village social organisations to actual legal organisations. The traditional village organisations with their village chiefs, land chiefs and lineage chiefs often have exercise real decision-making power for the whole community, but they are not always recognised by public authorities. On the other hand, there is a trend to give these organisations a legal status to enable them to be partners with whom it is possible to sign contracts. For instance, due to current decentralisation policies, the State may contract out the management of public spaces to local village organisations as well as to rural *communes* (municipalities) which in these cases become legal entities. This means they are much more than NGOs, because each villager can, by definition, belong to a village organisation whereas membership of an NGO is on a voluntary basis.

While union organisations have a long history in developed countries, the same is not true for developing countries and in particular those affected by desertification, whose economic activity is mainly agricultural and pastoral. Unions of farmers and livestock breeders are still rare, though they are beginning to emerge in the form of groups of farmers and livestock breeders. They do not yet have the strength to make demands like their European counterparts but they do benefit from cooperation by having their executives trained, which is often done by farmers and their organisations in developed countries.

Financing is problematic and they have not yet begun to create their own technical institutes. We may note that there are organised networks such as the union network of agricultural organisations in Madagascar (SOA, *Réseau syndical des organisations agricoles de Madagascar*) and regional networks of agricultural organisations in ACP sub-regions (Africa, Caribbean, Pacific) such as the Network of Farmers' and Agricultural Producers' Organisations of West Africa (ROPPA-*Réseau des organisations paysannes et de producteurs de l'Afrique de l'Ouest*), which is currently analysing draft agreements for economic partnership with the European Union.

The ROPPA considers that West Africa is still not ready to open its frontiers to business as planned for 2008 and is working with ECOWAS (Economic Community Of West African States) to get a postponement. These networks are beginning to be influential but they need to be reinforced.



Weighing of fertilizer in a peasant farmer organisation. The storekeeper of an economic interest group weighing fertilizer. Guédi-Village, Senegal. X. Le Roy © IRD

Political parties

A political party is an organised association which brings together citizens united by a philosophy or a common ideology and which have a project for society which they are trying to achieve by gaining and exercising power. Parties contribute to the vitality of democracy by nominating candidates for election at all levels: from *communes* to national parliaments. For a long time, young African States suffered the habits of a 'unique party' in the service of the current President as well as of appointed mayors. Today on the contrary, in some countries, more and more political parties are emerging which should normally be good for democracy. Sometimes however, the opposite effect has been observed, when countries switch from a parliamentary system dominated by one party to national assemblies in which government majorities are uncertain.

The democratic life of a country is in fact a balance between all of the component parts we have just described, individuals, groups, NGOs, producer organisations, unions, parties, to which should be added private economic actors. This huge assembly, whose interests may conflict, will negotiate with the State and its organs.

Private companies: businesses, banks and services

In arid areas, very small companies are active in the handcraft and service sectors. The most numerous of these are traders, retailers or semi-wholesalers and companies who maintain equipment, particularly agricultural equipment. A specific role is played by companies which market local production; they

generally are the only link between local producers and the outside world, which often is beyond their grasp. Services such as banks, insurance, specialised businesses (pharmacies for example) are only to be found in towns or cities and are often inaccessible to rural dwellers, either because they live too far away or because they lack money. Private Banks do not lend to farmers and livestock breeders, because they have no means of guaranteeing repayment of loans. Agricultural companies, livestock breeders and forestry companies are rare and are only found in certain situations in which they exploit products which may be sold in outside markets, such as gum Arabica. The firewood and charcoal businesses are active and may lead to forest stands being grown especially for this purpose, instead of causing deforestation. In some cases, there are cooperatives for producing or selling agricultural or forestry products, which can in particular be exported, such as Shea butter or Argan oil.

In very specific areas, there are non-agricultural activities managed by private companies: this is the case for tourism, which requires specific features of interest (landscapes, cultural heritage, etc.) and consequently the infrastructures, transport companies, hotels, travel guides, service companies, which may also lead to the emergence of handcraft and market-gardening activities.

Generally speaking, the non-agricultural sector is not very well developed in drylands and the role of service companies in the fight against desertification still has to be evaluated.



The President of the Republic of Senegal and the Prime Minister visit the IRD/UCAD/IFAN/ISRA stand. Agricultural Dakar, 4 and 5 February 2005, Senegal. M. Touré © IRD

The partners of civil society

Local and national elected officials: municipal and regional councils and parliaments

In practically all developing countries, people elect their local officials (mayors, municipal councillors) and national officials (members of parliament, senators, etc.), sometimes at intermediary levels such as the province, the region, etc. These elected officials have the power to take decisions on policies to be undertaken locally and nationally, which vary according to the **subsidiarity** of the responsibilities.

Local territorial authorities or municipal or regional councils, may take decisions and vote budgets for the fight against desertification. This is fairly rare, since on the one hand these assemblies generally do not have any proper resources and on the other hand, they have to meet immediate needs, which they believe are more important: health, supplying clean drinking water and sanitation as well as education. In some cases, they get support from the territorial authorities of developed countries in order to invest in the restoration of degraded land and in food security: this is the 'decentralised cooperation', which goes further than simple emergency operations.

National parliaments have the fundamental role of voting the State's budget and hence of committing countries to priority orientations whether or not they are integrated into national programmes. Is the fight against desertification considered to be a priority? In the poverty situations affecting most of the countries concerned, which generally do not have other resources than their natural resources, there are many priorities and emergencies which consequently limit investment to restore land. Governments prefer to depend on external aid for this investment. Moreover, there is frequently a big difference between civil society and the local and national elected officials. There is no guarantee that the elected officials and the party or parties in power reflect the needs expressed by civil society. Nor is it clear that the projects conducted by these elected officials actually meet these needs.

These categories also exist in developed countries where local elected officials may decide to undertake decentralised cooperation actions and to follow them up closely. The national elected officials vote budgets for foreign affairs and cooperation. What proportion of these budgets do they want to devote to the fight against poverty and against desertification? It is not sure that such officials are even aware of these issues.

The State and administrative departments

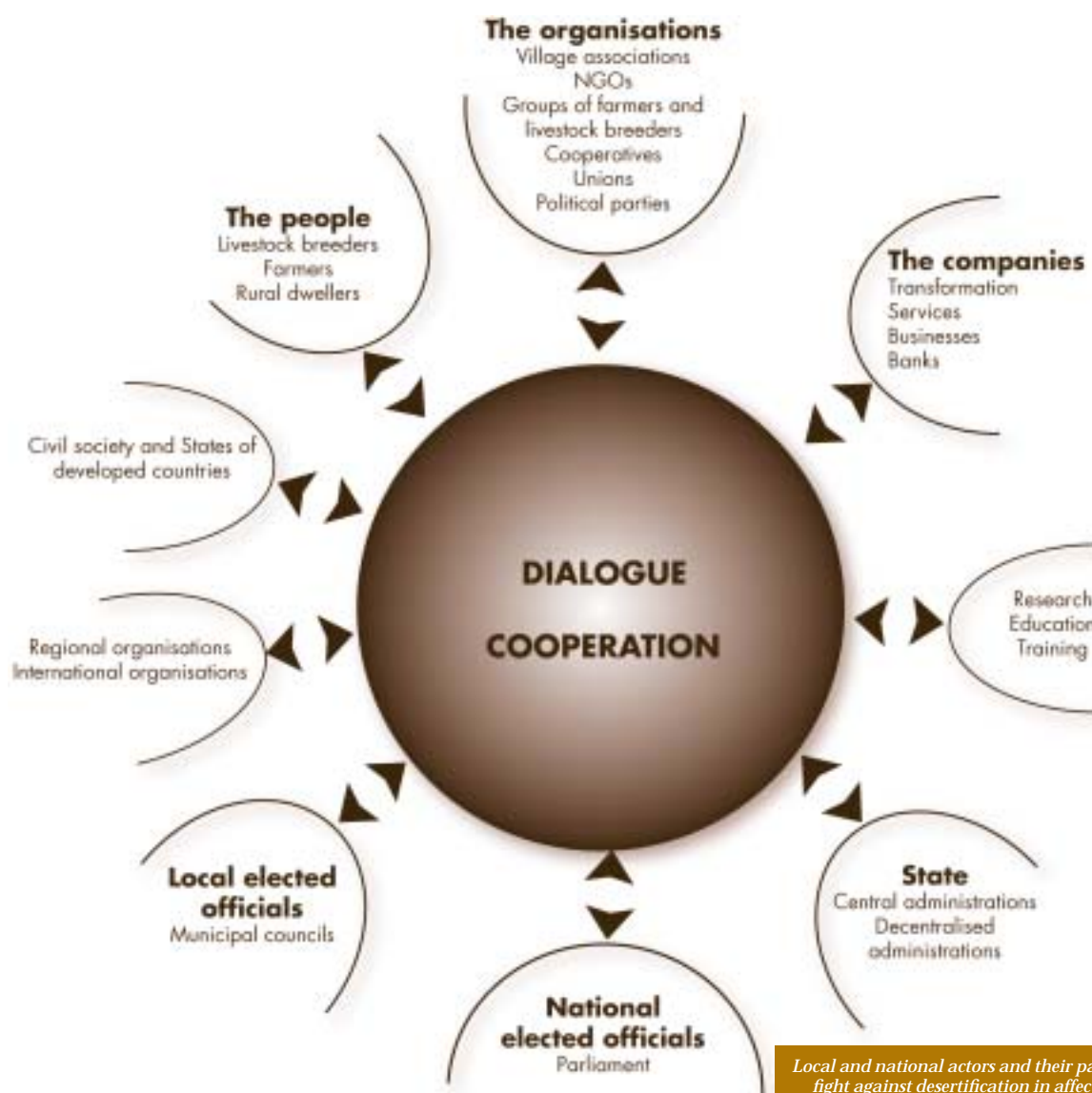
In the fight against desertification, the last category of actors and decision-makers is that of administrative departments, which are responsible for questions concerning agriculture, livestock breeding, forest, environment, development and water resources. Let us also note the administrative departments responsible for finances and the master plan as well as those responsible for liaison with bilateral and multilateral financial backers. The first ones referred to, the most technical ones, are generally divided into central administrations and deconcentrated and decentralised departments in regions. The latter group are centralised and closer to the political power.

The technical administrative departments generally have some know-how, which is made available to populations and their organisations. Unfortunately, dialogue is sometimes lacking and local practices and know-how are often ignored. There is frequently a gap

between these different categories of actors: i.e. there is a lack of attention, lack of understanding on either side, reciprocal distrust. This makes projects relatively inefficient from the initial preparation phase to the implementation itself.

In developed countries, Foreign affairs and Cooperation departments are sometimes complex, centralised in the capital or fairly decentralised, leaving a lot of decision-making power to embassies in developing countries. The dialogue between diplomats, financial backers and technicians is not always easy and political priorities usually win out. There is also a lack of dialogue between these administrators and the politicians who actually take the decisions.

How can those who take decisions be convinced that an action is just? This remains a key issue both for developed and developing countries.





The specific case of scientists, teachers and trainers

In countries affected by desertification, but also in developed countries, some scientists, professor-researchers in universities, researchers and their institutions are directly involved in the fight against desertification through the UNCCD (United Nations Convention to Combat Desertification) and have taken into account objectives in the fight against desertification in their work.

They deal first of all with fundamental scientific questions to which they have made significant contributions, such as knowledge of:

- ecosystem dynamics, their resilience and their capacity to resist extreme drought situations and increasingly serious aridity;
- biodiversity and the genetics of plants grown in drylands and the development of suitable varieties;
- pedogenesis, soil salinization;
- wind and water erosion;
- the climate, its irregularities and their consequences;
- surface hydrology, the dynamics of watersheds, modelling of surface flows, the replenishment of water tables, deep aquifer mechanisms;
- social and economic anthropology;
- the economics of the environment and natural resources, convention economics;
- the sociology of organisations and socio-anthropology;
- the modelling of exchanges related to the evolution of resources, demography, relations between the population and the environment;
- etc.

They also investigate more applied issues leading to techniques for the fight against desertification or farming production and livestock breeding systems which are most suited to arid conditions such as:

- short and medium-term climate forecasting, early warning for food security and environment;
- the fight against soil salinity, improving the efficiency of irrigation, the fight against wind and water erosion;
- livestock breeding practices, cropping systems, the role of prices, in particular for agricultural products and markets, the impact of public policy;
- decentralisation and its consequences;
- participatory management and governance issues;
- etc.

This research is undertaken by universities and/or specialised scientific institutes, using State budgets and/or research contracts, on the national level or from other countries, from the European Union or international organisations. There is also a network of international agronomic research centres—CGIAR (Consultative Group on International Agricultural Research) with institutes such as ICRISAT (International Crops Research Institute for the Semi-Arid tropics), the CIAT (International Centre for tropical Agriculture) and ICARDA (International Center for Agricultural Research in the Dry Areas).

One of the most important problems for countries in arid areas is the weakness of their national research institutes, often too small and with limited budgets. Most of the States cannot finance research themes which need to be developed.



French cultural centre in Dakar. Description of mushroom found in the nests of mushroom termites. This photograph was taken during a 3 hour science session organised at the CCF in Dakar on the theme 'What if termites were useful?' and was attended by more than 150 people.
A. Brauman © IRD

Example

Science and civil society: an example from Algeria

A socio-economic transition began in Algeria in the 1990s. Instruments were set up to bridge the gap between science and development and this should continue. The interaction between the national level and the local level is one of the objectives and implies an ambitious policy to raise awareness and educate the public. There is still a big gap between scientists and decision-makers or actors in the field:

- *Research* is too often cut off from reality. Research programmes are decided upon by academics and not in response to needs of the civil society. The necessary multi-disciplinary dimension assumes cross-pollination, whereas social sciences have practically been excluded from university programmes. Scientists find it difficult to enter into the political system and are too isolated. There is a great need for recognition of the social usefulness of researchers.
- *Engineering firms* have practical but unformalised knowledge.
- *Decision-makers* are above all preoccupied by short-term issues on the local, national and geopolitical levels and find it difficult to perceive how their decisions affect the long-term. This would require some simulation of the future of which climate change is only one component.

The ivory towers in which academics are isolated will have to be broken down to enable them to communicate more easily. There is thus a need for intermediary professions.

One of these would consist in selecting useful scientific information, which is suitable and relevant, in order to send messages to design and engineering firms and decision-makers. All information has a specific meaning for a given decision-maker or politician. The translation depends on the question asked. The risk involved should thus be emphasised as it will lead to risk management systems and crisis management systems. Some of these systems already exist but are handicapped by a lack of coordination and anticipation. This intermediary profession would find it much easier if scientists were integrated from the very beginning, but they have not been trained for this.

The second intermediary profession would involve learning the users' language in order to translate their needs into scientifically relevant questions. The way in which subjects are defined for scientific investigation would have to be rethought. Academics work in a very precise intellectual matrix. Development institutes run research programmes that are more thematic and sectoral. Forecasting the future for the next twenty years would require undertaking multi-disciplinary scientific research which is both consistent and managed so as to achieve the policy objectives.

On the international level, the status of scientists from the South is not well recognised, which means they are fairly vulnerable and lack confidence when dealing with international cooperation. North/South relations are still negatively affected by 'imperialist' traditions. Systems based on scientific supremacy are still active and a neutral solidarity movement between North and South has not yet emerged.

From Bégni and Senouci, 2006.

Another group plays a fundamental role in society: it includes teachers in secondary and primary schools. High-schools, secondary and primary schools take part not only in education and training people but also in offering them the possibility of better managing their own organisation after receiving high-level training. These are the necessary conditions for a fruitful dialogue between the State and its representatives and civil society. Otherwise, dialogue is imbalanced and it is the State which dominates. It is easy to see that much bigger budgets will be necessary to maintain the educational system and ensure that there are enough capable teachers.

A last group is likely to play an increasingly significant role: it includes trainers, teachers and extension officers. This group does not fall under the national education authority but under other administrations (agriculture, vocational training, etc.) and sometimes can or could be financed by the professions themselves. One of the ways of transmitting scientific knowledge would be to have teams of technical mediators who are capable:

- of extracting useful knowledge from scientific research for expertise to be provided by these intermediaries;
- and to then share this knowledge with farmers and livestock breeders, who are facing short term issues.



Scientific training in Dakar, Senegal. Eleventh congress of the African association for biological fixation of nitrogen, 22-27 November 2004, at the Cheikh Anta Diop University in Dakar. A special session was devoted to a meeting between scientists and high-school students in the region.
P. Tendeng © IRD



Focus

UNCCD, science and scientists

Many articles in the Convention refer to the role of science and scientists in the fight against desertification. Worthy of note are the articles 6, 10, 12, 16, 17, 18, 19 and 24.

These stipulate that developed countries which are Parties to the Convention are obliged to cooperate actively with affected countries and in particular to facilitate their access to technology, to relevant knowledge and know-how. The setting up of national facilities for observation and evaluation are recommended as well as the reinforcement of all systems for collecting and analysing data and information. Research activities to further understanding of processes and the role of human and natural factors should be reinforced. Local know-how should be better used. International scientific cooperation should be reinforced. The parties agreed to reinforce training and research activities on the national level and also the participation of populations when implementing research programmes as well as to create extension and support services for the dissemination of technology and know-how using participatory methodologies. The Convention thus created a 'Committee for science and technology' responsible for providing advice and information to signatory countries. This committee has unfortunately encountered some difficulties in playing its role.

Moreover, in many countries, there are networks of scientists who correspond on anti-desertification issues and development in drylands. A European network was set up in 2006 and thematic networks are active in the sub-regions affected.

For more information: www.unccd.int

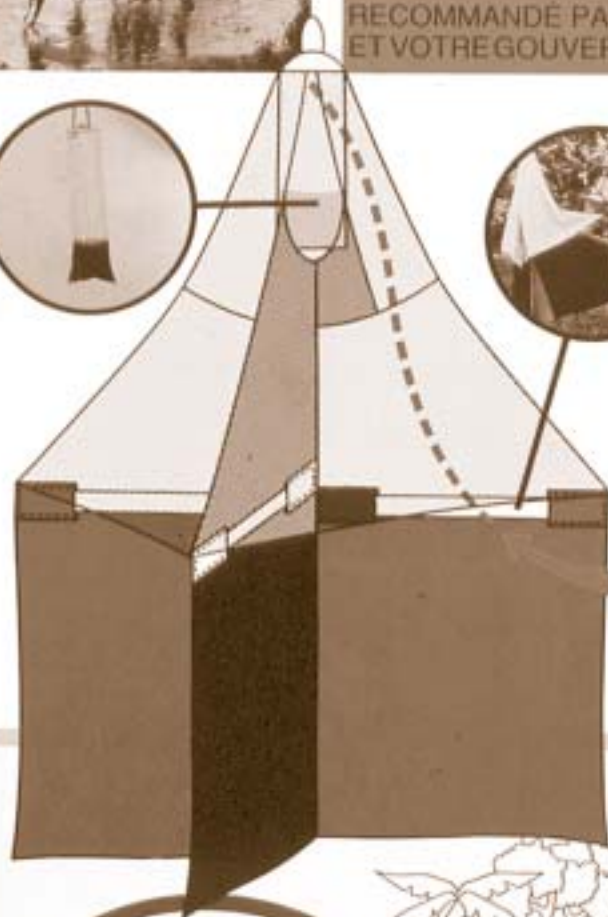


POUR LUTTER DANS VOTRE VILLAGE
CONTRE LA
MALADIE DU SOMMEIL
INSTALLEZ DES
PIEGES A MOUCHES
TSE-TSE

RECOMMANDÉ PAR L'OMS
ET VOTRE GOUVERNEMENT



SA PIQÛRE PEUT TRANSMETTRE
LA MALADIE DU SOMMEIL.
CETTE MALADIE EST MORTELLE
SI ELLE N'EST PAS SOIGNÉE



**TOUT LE VILLAGE
DOIT
PARTICIPER**

EN NETTOYANT AUTOUR
DU PIÈGE ET
EN COMPTANT LES MOUCHES
CAPTURÉES CHAQUE MOIS DANS
LE SAC PLASTIQUE



ORSTOM

ORGANISME NATIONAL DE RECHERCHE SUR LES MALADIES
DONT LE GOUVERNEMENT SE PRÉOCCUPE

© 1994

PLACER LE PIÈGE

PARTOUT OÙ SONT
LES MOUCHES TSE-TSE



History of research at IRD
from 1944 to 1994. Campaign against
sleeping sickness at ORSTOM
(which became IRD in 1999).
D.R. © IRD

The contribution of science to decision-making

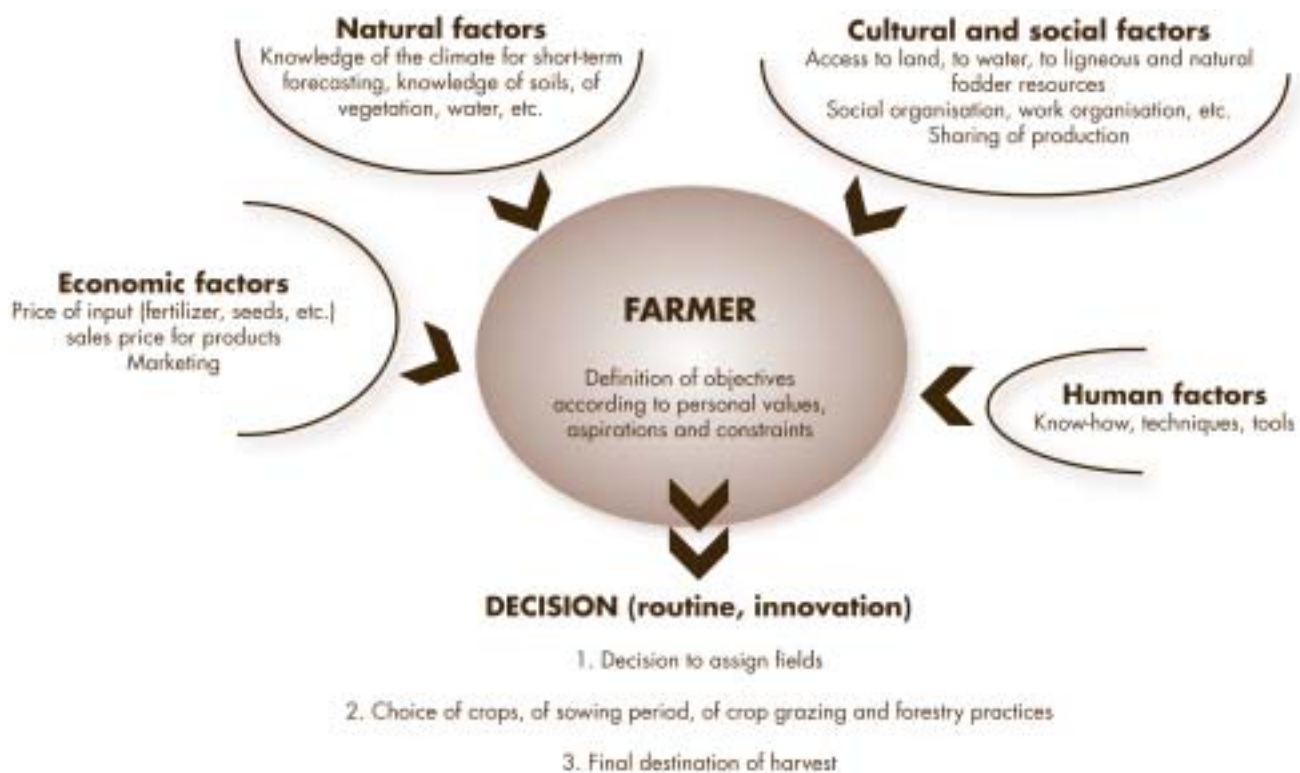
How are research programmes defined and who benefits from them? How do scientists communicate? How do research results reach the final users? Finally, how does science intervene in the decision-making mechanisms used by the actors referred to previously? In order to answer these questions, the different stages of decision-making of a farmer and those of a Minister of Agriculture for a developing country affected by desertification are successively examined in this section.

Stages in a farmer's decision-making process

Decision-making mechanisms follow certain stages, unconsciously or consciously, either successively or simultaneously. For a farmer in a developing country, the decision-making environment consists on the one hand of parameters which characterise the natural

environment in which he farms and which he knows empirically and on the other hand parameters included in what we have called a sphere of cultural references and social practices which determine his 'degree of freedom'. The farmer may not cultivate where he wants to and cannot sell what he produces as he wishes. He is in fact subject to social organisation. Finally, we should add to the previous description, his technical know-how and his economic environment. Economic information is generally fairly rare apart from immediate prices which can be observed in markets. Finally, some decisions are taken slowly, such as the choice of fields to farm or crops to sow, while others are taken immediately such as sowing dates, agricultural maintenance work and harvesting.

All of the factors which make up the decision may be broken down into 'natural', 'cultural and social', 'economic' and 'human' factors, as described in the diagram below.



What factors make up a farmer's decision?

Information which the farmer requires to optimize implementation of his choices

Information required	Parameters	Frequency	Decision
Meteorological conditions	Rain, temperature Early warning of risks	Daily	All agricultural work
Water conditions	Actual and potential evapotranspiration Soil humidity Cumulated rainfall, trends	Ten days	Choice of irrigation Treatments
Climate forecasting	Medium and long-term data	Month, season	Choice of varieties Choice of sowing date
Soil conditions	Fertility, texture, structure	Season, year	Type of work Manure
Vegetation conditions	Monitoring of vegetation growth stages	Agricultural season	Manure, maintenance work, complementary irrigation
Social conditions	Land use rights Family labour/ employees Training Political stability, conflicts	Agricultural season	Choice of land Choice of crops Choice of work
Economic conditions	Price of input Price of products	Agricultural season	Choice of crops Choice of work

Information which the livestock breeder requires to optimise implementation of his choices

Information required	Parameters	Frequency	Decision
Environment conditions	Composition of flora	Ten days	Choice of grazing land and movements Storage/ removal from storage
	State of grazing land	Ten days	
	Biomass	Ten days	
	Water	Daily	Choice of grazing land Storage/ destocking
	Rainfall	Ten days	
Socio-economic conditions	Trends	Season	Choice of grazing land Storage/ destocking
	Land tenure, grazing rights Sales price	Season	



The responsibilities of a Minister of Agriculture and the Environment and his collaborators in a country with drylands

There are four main responsibilities of a Minister of agriculture and the environment and his administration in developing countries affected by desertification:

1. He must plan to meet the food requirements of his country, obtained either by adequate production or excess production (in which case he should plan to stock food) or by relying on imports or on international food aid. In order for this aid not to destroy the conditions necessary for local production (by lowering prices or coming too late, concurrently with the following harvest), it is necessary to anticipate situations by estimating cultivated areas and yields for a production forecast, if possible before harvesting. This will enable him to manage imports, stocks and exports.

2. Countries affected by desertification (African countries in particular) are frequently the prey of pests such as locusts; it is thus necessary to have all the necessary means for preventing and fighting pests.



The necessary information to meet the objectives of a Ministry of agriculture

Information required	Parameters	Frequency	Objectives
Food security	Estimate cultivated land areas	Season	Estimate needs
	Forecast yields		Estimate rate of needs' satisfaction
	Estimate production		
	Population	Year	
	Local prices	Daily	Decision to import
	Availability of world stocks	Season	Decision to stock Transport
Risk of pests	Presence of larvae	Daily	Daily prevention Emergency intervention
	Presence of insects		
	Stage of development		
	Presence of water, of vegetation		
State of desertification	Various biophysical and socio-economic indicators: • Grass land biomass, rate of vegetation cover, surface states, erosion, fallow land, yields • State of schooling, nutrition, dwelling types, existence of businesses, associations, organisations, etc.	Season	Fight against desertification
Planning, programming	State of resources, mapping Diagnosis of situation Land use, potential State of civil society Taking of needs into account National policy orientations	Year	Choice of public policies

3. The countries affected must regularly estimate the state of desertification and progress made, or failures in the fight against desertification; they should normally submit a national report to the Convention once every two years.

4. All countries must integrate the fight against desertification in their development strategy, in particular agricultural, and in their policy for reducing poverty. They thus need the means to define public agricultural policy and policy for supporting actors in civil society.

The Minister and his colleagues must thus have control panels and indicators to enable them to monitor situations, or even to anticipate them, in order to make recommendations to the Council of ministers which is to take the decisions.



The contribution of science and scientists in providing useful information

The above tables and diagrams show that biophysical and socio-economic information is necessary for decision-making. This information is in fact provided by the parameters listed in these tables. Some of them are immediate and temporary, such as rainfall; while others remain valid for the month or season and still others are revised each year.

Which are those that depend on the routine activities of operational departments and those which depend on more technical and scientific activities? In both cases, the same question is raised: how will a farmer, a livestock breeder, a ministerial official understand the technical message sent either by the relevant department or by the scientific community?

Let us take the well-known case of meteorological data: the weather forecasting department records rainfall each time it rains, totals it each day and makes a ten day synthesis and then a monthly synthesis. How would someone who has no frame of reference, know whether rainfall of 1 mm, 10 mm or 100 mm is significant or useful and what conclusions he might draw from this information? To whom should the meteorological department send the information and

with which comments to enable the raw data to be used, in other words how to make the transition from immediate weather forecasting to climatology or to agro-meteorology?

Let us take another example based on ecological surveillance observatories: each month, an observatory assesses the species diversity on control plots as well as the surface covered by vegetation. It draws up a list of plant species and a coverage rate trend. If these observations are not sent with comments, how will the farmer and the extension agent working for the local agricultural department deduce from them whether there is a serious threat of desertification or on the contrary whether vegetation is gaining ground and consequently that desertification is losing ground?

Furthermore, who should make the comment? The answer is the scientist, whose mission is to produce knowledge, to develop methods, to understand how systems work and to model them. He will thus need time to interpret all of the data and transform it into information. Moreover, his career depends on his high-level scientific production and on his peers. But this production is incomprehensible for non-scientists and hence for final users. On the other hand, if he produces 'non-scientific' comments, this will not be taken into account for his career. Furthermore, do scientists know



*History of research, Nigeria.
Ibadan Research Centre.
R. Fauck © IRD*

Focus

GRET, Groupe de recherche et d'échanges technologiques (France)

The GRET, created in 1976, is a professional association for international solidarity and cooperation, whose aim is to contribute to sustainable and cooperative development, to fight against poverty and to increase the income of rural and urban populations, to reduce their vulnerability and develop their capacities. Its resources come from projects financed through development agency contracts (with France, the European Union, etc.) and from sales of services ordered by public or private stakeholders in the cooperation field. A tenth of the budget is provided by the French Ministry of Foreign and European Affairs and the CIRAD (Agricultural Research Centre for International Development, France) to capitalise on practical know-how of development and publish it. It helps shape public policy and works in the field to mobilise scientific and technical skills in very varied contexts, working as closely as possible with local actors. It is an essential coordinator for technology transfer between those who develop the technologies and those who use them.

For more information: www.gret.org

how to write for people other than scientists? Do they know how to write for scientists working in another field? How should multi-disciplinary publications be organised? All of these questions indicate that there is a need for an internal debate among scientists.

Another question arises due to the fact that the time steps are totally different from one activity to another: the scientist observes, records, interprets, tries to understand and thus needs time, whereas the farmer and the minister need information which can be used immediately.

Having raised these questions, we can see how difficult technical and scientific communication is. Whether the information comes from an operational technical department such as the meteorology department or from a research organisation, it has to be understandable for everyone. How can this be achieved? Several conditions are necessary:

- The final beneficiary must himself be relatively well trained, whence the importance of schooling and basic training for villagers, farmers and livestock breeders, so that they know how to write, read and count. It is also important that agents of NGOs, groups, village associations and unions, be trained so that they know how to keep accounts, read contracts and manage projects.

- The message must be understandable and arrive in time. Whence the necessity for mediators, capable of interpreting, transcribing and transmitting technical and scientific information. These mediators may belong to intermediary bodies acting as relays between science and techniques and final users. It has been observed today that in some scientific and teaching establishments, researchers and teacher-researchers take part in training sessions for peasant farmers and therefore sometimes claim the role of mediator. Consequently, new research issues arise from this privileged situation. The researcher becomes, at least momentarily, an 'expert' working for the civil society.

- One might also recommend technology-transfer organisations, whether public or private, for instance the GRET (*Groupe de recherche et d'échanges technologiques*) in France or the technical institutes managed by professional agricultural groups. The life of these organisations depends on the capacity of professional agricultural organisations to finance them and/or the decision of public authorities to compensate for their lack of financing due to the low income level of peasant farmers.

How can exchanges between science and civil society be developed for the fight against desertification?



In order to illustrate problems arising in partnerships between scientists and development agents, seven research-development projects were undertaken in Africa between 1999 and 2004, in North-South partnerships, partly financed by the French Ministry of Foreign and European Affairs and partly by national research institutes. The CSFD supervised the scientific aspects and wrote the final report*.

Integrated and multi-disciplinary projects...

Most of these projects take into account both the dynamic of natural ecosystems and that of the use of resources by populations. The fight against desertification is thus placed in a wider context of territorial development and sustainable development, thus dealing simultaneously with technical, cultural, socio-economic and political aspects. Consequently, the projects are based on multi-disciplinary approaches and use participatory methodologies, from their conception up to the final achievement.

Some are defined as 'extension research'. The idea is to support private and public actors in local development using original working methods which often rely on advanced technology. In so doing, they implicitly raise the question of the immediate social usefulness or real-time usefulness of the research. The responses provided range from the classic one of reinforcing local research capacities (through training and technology transfer) to co-construction of local development, which is more innovative.

* For a detailed, in-depth description of all projects, the complete summary report (CSFD, 2004) is available on the CSFD site: www.csf-desertification.org

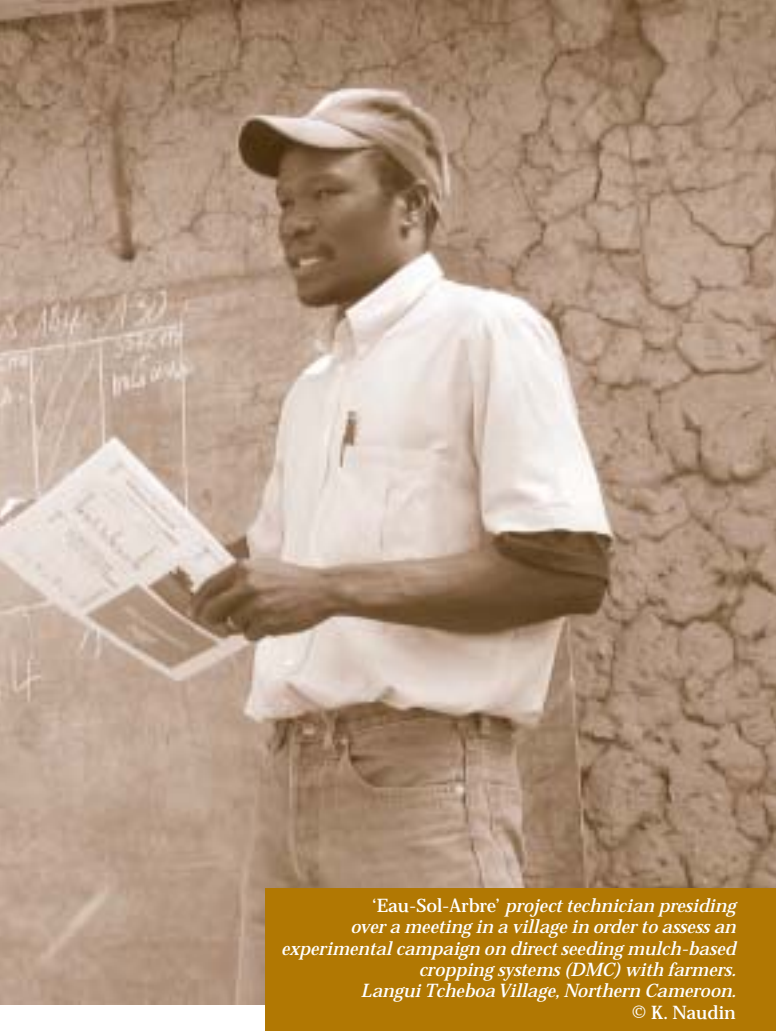
Example

Selective breeding of sorghum and dialogue between researchers and farmers

The popularisation of varieties created by research has not been very successful in the Sahel as they were unsuitable for farmers' growing conditions. This failure of research is due in part to the fact that neither the climatic constraints of the area nor the methods used by farmers were properly taken into account: i.e. choice of sowing dates, ploughing and preparing ground, choice of varieties. A joint research project to develop a new breeding approach was set up in Mali between the IER (*Institut d'Économie Rurale*), at Bamako, Mali, the CIRAD (Agricultural Research Centre for International Development, France) and groups of farmers. It was based on research into varieties, participatory diagnoses and joint selection.

Varietal zoning was thus defined, based on the characteristics of local varieties and the constraints of local cropping systems. The coupling of two models (water budget and development of photoperiodic sorghum) made it possible to identify the optimum adaptation zone for each variety. The maps obtained are computer-generated tools for defining dissemination zones for varieties and **ideotypes** for breeders.

From Soumaré *et al.*, 2006.



'Eau-Sol-Arbre' project technician presiding over a meeting in a village in order to assess an experimental campaign on direct seeding mulch-based cropping systems (DMC) with farmers. Langui Tcheboa Village, Northern Cameroon. © K. Naudin

Point of view

Concerning the transfer of methods to development actors...

"The idea is no longer to transfer methods for diagnosis and planning but to give actors the means to cover by themselves, in an endogenous way, the whole intellectual and practical process which results in this need for analysis and planning. The approach is thus focused on a bottom-up process from the local towards the global and on the learning of dynamics rather than on achieving technical products. This is done by reinforcing local management capacities. The idea is not to only undertake a participatory approach but to stimulate local dynamics capable of initiating actions, now and later."

From D'Aquino and Seck, 2003.

Focus

Seven participatory, multi-institutional and multi-disciplinary projects

The seven research-development projects selected by the CSFD in 1998, following a call for proposals, were co-financed by the French Ministry of Foreign and European Affairs and French and African research institutes. They were undertaken from 1999 to 2004.

■ **Project: 'Reinforcing of extension research in a pilot operation for decentralised management of renewable resources on the left bank of the Senegal River'** (CIRAD/PSI, ISRA/UGB/SAED/ Rural community Council of Ross Bethio, Senegal) Disciplines dealt with: geography, sociology, legal and political science, economics and management, applied mathematics and computing, anthropology

■ **Project: 'For viable management of peri-urban ligneous resources. Analysis and modelling of traditional rules and practices in various natural and Sahel-Sudan environments in Niger and in Mali'** (CIRAD/IRD/University of Niamey/ESP/IER/CRES/SED/ DNE) Disciplines dealt with: biology, forestry, agro-economics, sociology, geography, computing, modelling

■ **Project: 'Desertification in the Jeffara region. Anti-desertification programme in the Jeffara region of Tunisia: resource practices and uses, techniques of the fight against desertification and the future of rural populations'** (IRA/IRD/CRDA Médenine and Gabès)

Disciplines dealt with: hydrology, demography, pastoralism, economics, anthropology, agronomics, economics, etc.

■ **Project: 'The mobility of herds in oriental Chad and South-West Morocco, a contribution to the fight against desertification'** (IAV/LRZV)

Disciplines dealt with: pastoralism, geography

■ **Project: 'Impact of human practices on conservation and in situ management of forest genetic resources: the case of *Acacia tortilis raddiana* and of *Balanites aegyptiaca*'** (CIRAD/INERA/URZA)

Disciplines dealt with: ethnobotany, genetics, socio-economics

■ **Project: 'A study of the consequences of land use practices in drylands, on degradation of physical and biological environments in Mali (Bamba zone)'** (IRD/IER/ISFRA/Agronomics research Centre /DNAER/DNCN/DNAMR)

Disciplines dealt with: botany, climatology, sand encroachment, socio-economics, computing

■ **Project: 'Research on technologies used for the fight against desertification in the Sahel, development of techniques for fighting desertification and studies of their socio-economic effects'** (INERA/IRD/Special programme CES/AGF/Project GCP/RAF/303/ ITA/ Project CESII/Project Jachère)

Disciplines dealt with: agronomy, socio-economics, agro-ecology



Management of the W reserve in Niger. The European Union supports park management through the ECOPAS association. J. Derrider © IRD

... which are useful socially

This issue describes four of the seven projects. They meet the criterion, if only partially, that research should be socially useful immediately.

■ *'Reinforcing extension research in a pilot operation for decentralised management of renewable resources on the left bank of the Senegal river'*. This project is located in a fragile wetland zone with high population density near the Senegal River. It aims to support rural communities in their official role of manager of natural resources undertaken since the 1990s through a decentralisation process. One of the aims is to reinforce the research capacity of the South in order to support local communities in the fight against desertification.

■ *'Towards viable management of peri-urban, ligneous resources. Analysis and modelling of traditional rules and practices in various natural, Sahel-Sudan environments in Niger and in Mali'*. This project aims to encourage good management of peri-urban, ligneous resources in Mali and Niger by defining a decision-making tool but also through consultation and negotiation with the different stakeholders involved in managing natural resources and the fight against desertification: modelling by a multi-agent system.

■ *'Desertification in the Jeffara region. Anti-desertification programme in the Jeffara region of Tunisia: resource practices and uses, techniques of the fight against desertification and the future of rural populations'*

This project studies the complex and varied types of 'socio-environmental' relationships in the Jeffara region in Tunisia, more specifically in a catch basin divided from upstream to downstream into segmented farming landscapes. It also evaluates the efficiency of current water and soil conservation techniques (WSC) and the fight against desertification.

■ *'Research on technologies used for the fight against desertification in the Sahel, development of techniques for fighting desertification and studies of their socio-economic effects'*. A lot of technology has been developed to fight against desertification. This project makes an inventory of local knowledge and technologies in the Northern half of Burkina Faso as well as providing a technical, socio-economic and agro-ecological assessment.

For each project, a result (or a set of results) is described below — either methodological or final — and whatever appears to be useful socially, even if it is somewhat embryonic or limited. We should note that each project may include several socially useful results:

1. Reinforcing local research capacity
2. Reinforcing the capacity of other development actors
3. Support for negotiation and decision-making
4. Supporting local development actors in managing natural resources

Reinforcing local research capacity

By training in research

The four projects are evidence of significant efforts which have been made to train people for research: the main indicator is that of certified training offered by these projects: doctorates, DEAs (advanced higher diplomas) masters, theses, engineering courses, DUTs (university technology degrees), etc., which have been supervised and financed by projects. This characteristic is not in itself innovative, it is in fact the rule in North-South cooperative projects but it has not always been respected.

By developing tools for joint scientific work

The project *'For viable management of peri-urban, ligneous resources. Analysis and modelling of traditional rules and practices in various natural Sahel-Sudan environments in Niger and in Mali'* uses a specific modelling technique, the multi-agent system. This computer programme is used to simulate the impact of various practices and rules for managing resources according to their evolution and to thus elaborate various possible scenarios on the basis of these tests. The models are part of the advanced technology currently used for research-development.

The project managers acknowledge that it is not so much the results of the models they have developed that are interesting, but the fact that they have forced researchers in different fields to discuss the issues, thus establishing a basis for dialogue and transferring knowledge in the world of research.

The project also enabled the training of African researchers in modelling techniques, thus transferring advanced technology, whose usefulness for promoting discussion between actors, not only between researchers but also with users of resources and those who take the political decisions, has now been acknowledged. The potential social usefulness of such a transfer for defining sustainable development policies, such as the fight against desertification, is thus high.

* The techniques studied were: anti-erosive ditches, *zai*, half-moons, small dikes, subsoil tillage, scarification, ploughing, ridging, deferred grazing area, re-afforestation, vegetation cover, grass strips, wind-breaks and live hedges.

Reinforcing the capacity of other development actors

Several projects have made it possible to reinforce the capacity of other development actors: either directly by organising workshops with all of the actors involved in managing resources or indirectly by setting up meetings with users of resources or with public authorities as well as by *in situ* experiments.

The case of the project *'Research on technologies used for the fight against desertification in the Sahel, development of techniques for fighting desertification and studies of their socio-economic effects'* is interesting. It is original in that it proposes, in addition to a bibliographic review of anti-desertification techniques since the 1960s and an analysis of their agronomic efficiency, a socio-economic evaluation of their impacts and the conditions under which they were disseminated. This specific objective implies a participatory approach and experiments in a peasant farmer environment. It led to technical transfers towards private actors in the villages investigated, even though this was not the explicit aim of the project. These transfers moreover remained limited to a small number of actors. Nevertheless, the results of the project can also be transferred to all initiatives for implementing anti-desertification techniques, whether they concern groups of producers or villager associations, organisations belonging to civil society or national projects. We may note in passing:

- *The technical aspects**: the recording of costs and benefits of the developments proposed, the suitability of these developments according to available data on soils, their slope and rainfall.
- *The socio-economic and cultural aspects*: one may note the improvement in food security in villages applying these techniques but also the exclusion of the poorest farmers from the benefits of these developments and the fact that cultural resistance to change has to be taken into account.
- *Development aspects*: details of the conditions for more spontaneous dissemination including in particular the land ownership question and that of agricultural loans, the imperative need to move from actions undertaken on the scale of a micro-field to that of a *terroir* and collectively owned land.

These results are among the many likely to aid rural development and anti-desertification organisations in their daily work. Here again the immediate social usefulness of the project is real but limited; nevertheless it is potentially significant.

Points of view

■ The ecologist and the peasant farmer

"It would be a good idea to consider as well, concepts of protecting and restoring the environment, as recommended by most research projects and organisations. The peasant farmer in Mossi, for instance, does not act for the purpose of saving his environment. He is first of all concerned with crop yields."

When one tries to develop a technique —such as zai— to rehabilitate degraded soils, this cropping technique is used for a completely different purpose to that of a peasant farmer, in other words to increase his yields. The two concepts, the agricultural one and the ecological one, cannot easily nor obviously reconciled. This implies a certain perception of the environment and a common vision of land-use at the village scale or at the regional scale. This vision is even more difficult to get across, given the very scattered housing on the Mossi plateau in the centre and north of Burkina."

From Hien et al., 2004.

■ Tradition and innovations

"Even if the zai technique has a long history, mainly in the provinces of Passoré and Yatenga, where it was readopted by peasant farmers about twenty years ago, based on traditional, occasional use for rehabilitating degraded land, the technique is still considered to be 'exogenous'. This is even truer in that it is recommended, improved and developed with outside help, even on a participatory basis (projects, NGOs)."

The adoption of an innovative technique must take tradition into account, even more so in the Mossi society which is dominant in the areas in question, where the hierarchy is dominated by the elders when decisions have to be taken. Moreover, the improved zai is not only a technique: it also is a change in practice which is closely related to an agricultural identity. In comparison, the use of a plough (for peasant farmers who can afford them) was more easily adopted as it was only a tool which reduced labour."

From Hien et al., 2004.



Decision-making and negotiation support for politicians

The research-development projects meet objectives for decision-making aids, which are often declared from the very beginning as an expected result or as a practical spin-off for development. However, supporting decision-making by providing new knowledge to enable the formulation of suitable public policy remains dependent on the good will of the authorities. It is not systematically accepted and is not always immediate.

The project entitled *'Desertification in the Jeffara region. Anti-desertification programme in the Jeffara region of Tunisia: resource practices and uses, techniques of the fight against desertification and the future of rural populations'* is a monograph which provides new knowledge on traditional and modern rules for access to natural resources. In these analyses, water is given a central position. Agricultural and livestock breeding activities, anti-desertification practices and their evolutions are described and analysed. The results lead to a series of recommendations to public authorities for improving management of local development and the fight against desertification in the region.

The project first formulates general recommendations which are then qualified by sectoral recommendations. The general recommendations insist on the necessity to encourage:



Presentation of the draft text for the local environment convention in the community room of the rural community of Salemata, Senegal.
O. Barrière © IRD

- the diversification of agricultural activities and extra-agricultural activities;
- integrated development approaches which go beyond the physical framework of watersheds by relating the physical, socio-economic and political environments;
- the promotion of local knowledge and practices.

Among the sectoral recommendations, water management is seen as vital for production and the fight against desertification. They recommend:

- reinforcing complementarity between the traditional commercial system for water supply to avoid increasing inequality and support traditional techniques;
- also supporting traditional activities for adding value and for collecting water while developing new techniques and their transfer;
- developing sanitation systems by considering possible development of irrigated crops by reusing waste water;
- taking into account the salinity of water tables for the development of irrigated agriculture.

It makes several recommendations for the fight against desertification, all related to the water issue: globally, the idea is to reinforce control of flood waters and run-off, to maintain WSC structures (for water and soil conservation) and to regenerate very vulnerable areas by means of suitable cropping practices.

The project defines a policy framework for using and cultivating land by emphasising:

- the constant attempt to match cropping practices to soil characteristics: the necessity for zoning which corresponds to the ability of the land in order to identify areas for arboriculture (oleiculture) and to avoid their extension onto unsuitable land;
- stabilising privately farmed areas on soils which are suitable for the crops grown on them;
- preserving traditional collective grazing land and adapting the size of herds to grazing land capacities.

Finally, the project argues in favour of developing the main production systems (farming combined with livestock breeding, irrigated agriculture, oleiculture, etc.), based on diversification and flexibility to enable adaptation to risks and to new opportunities.

Supporting local development actors in managing natural resources

The support of local actors and development actors managing natural resources is a fairly recent and original approach which is perfectly illustrated by the project entitled *'Reinforcing of extension research in a pilot operation for decentralised management of renewable resources on the left bank of the Senegal river'*.

Its scientific objectives are already development objectives since they involve:

- experimenting and analysing the institutional framework for collaboration and consultation, in particular when this is a result of land use plans, a pilot operation in the region;
- developing operational procedures for diagnosis and planning for sustainable development which are adapted to the local context;
- developing an institutional, legal and land tenure framework which validates and reinforces endogenous management techniques used by local communities.

In Senegal, since decentralisation, the rural councils and communities have been in charge of local development and are responsible for managing space. However, they do not always have the means to apply the development plan to their spatial and land realities. This project supervises the development of a consensus-driven, territorial development policy for the community of Ross Béthio, located in the valley of the Senegal River. It is the local development actors—users, politicians, sometimes companies—who define the research priorities and topics according to their immediate needs. The researchers thus see themselves as mediators between all development actors. Their work is based on the use of advanced tools and technologies.

The creation of the GIRARDEL group (*Groupe interdisciplinaire de recherche pour l'appui à la planification régionale et au développement local*) brings together researchers from different fields but also agents from the SAED (*Société d'Aménagement et d'Exploitation des terres du Delta du fleuve Sénégal*), local elected officials and local development agents; it has established the framework for permanent dialogue between researchers, communities and development. The constant emphasis on dialogue is expressed by GIRARDEL. This dialogue, which is renewed through meetings, workshops or seminars throughout the project, is one of the keys to its success. This dialogue framework became possible thanks to the development of tools for cartography, diagnosis, dialogue and negotiation, based on geographic information systems (GIS) and on multi-agent system models (for role playing). Special attention was paid to transferring the methods developed towards local researchers, in particular the control of the tools used and the way in which they are used (for dialogue). This was the first condition for viability and the dissemination of results obtained. Among the results, one might note a review of land assignment and the introduction of a land use and development plan in four rural *communes* in the valley.





Farmers, researchers and agricultural extension workers visiting an experimental cotton field on direct seeding mulch-based cropping systems (DMCs), Northern Cameroon.
© K. Naudin

Are research-development projects socially useful?

Taken as a whole, the aim of the four research-development projects is clearly to be socially useful, in which they succeed at several levels, although the extent of their success differs. However, this objective could both be better presented in the final reports and better developed during the projects. It may be noted as well that the usefulness which is ultimately observed, may exceed the expected results. Finally in the last project, which defined itself as extension research, this immediate social usefulness was the very condition for its existence. This particularity raises a specific issue, in that fundamental science is also useful to society even though its usefulness is generally perceived over much longer periods of time.

This claim of researchers to be development mediators is an innovative experimental position which offers much potential, both for the fight against desertification and for the development of partnerships with the civil society. It has the merit of showing that the role of researcher is not to carry out development policies but to relay ideas and the projects of various actors so that they can achieve the development together. Naturally, this position requires an ethical stand on the part of those who implement these methods, in that most of the other actors who are partners in development are not able to use the mediation tools; the researcher should also allow the clearest possible expression of the stakes underlying discussion. Finally, in spite of the neutrality of his position, he is never entirely neutral with respect to political commitment or opinion. Without making too much of his opinions, which might be counter-productive, he should nevertheless not hide them.

What future is there for interactions between civil society and science?

For a long time, research, and specifically agronomic research, concentrated on very fundamental and technical themes with the idea of a linear transfer towards the agricultural world. The model was based on field results, which had to be communicated to farmers by extension agents. This model failed for various reasons, due both to researchers and to State administrative departments, which were responsible for extension services.

At the same time, social and anthropological research was limited, cut-off from other fields and often mistrusted by public authorities. It was only when the major successive droughts occurred in the Sahel that research took traditional know-how into account as well as the adaptation modes developed by the societies which had suffered such crises. Agronomic researchers began to go out of their research stations; social science researchers highlighted complex situations; civil society began to get organised. The conditions for dialogue between actors became more favourable. The practical knowledge now has to merge with scientific knowledge, but how can this be done given the very different positions and social status of the various participants?

How and under what conditions can scientists become 'experts'?

Research professions initially require particular conditions: the researchers need to be sure that they will be able to work over the long term and not be influenced by pressure or lobby groups, they also have to do quality work and present validated results. The preoccupation of involving final beneficiaries in the actual definition of research topics is new as is the desire to possibly involve them in the research itself. The same is true for the desire to communicate results. This requires a specific effort that the researcher may not be able to make. The researcher may then become an 'expert', in other words a person capable of giving an opinion and analysing a situation and capable of suggesting solutions and decision-making tools.

The researcher will then find himself in a new position: instead of asking 'research questions', he will have to

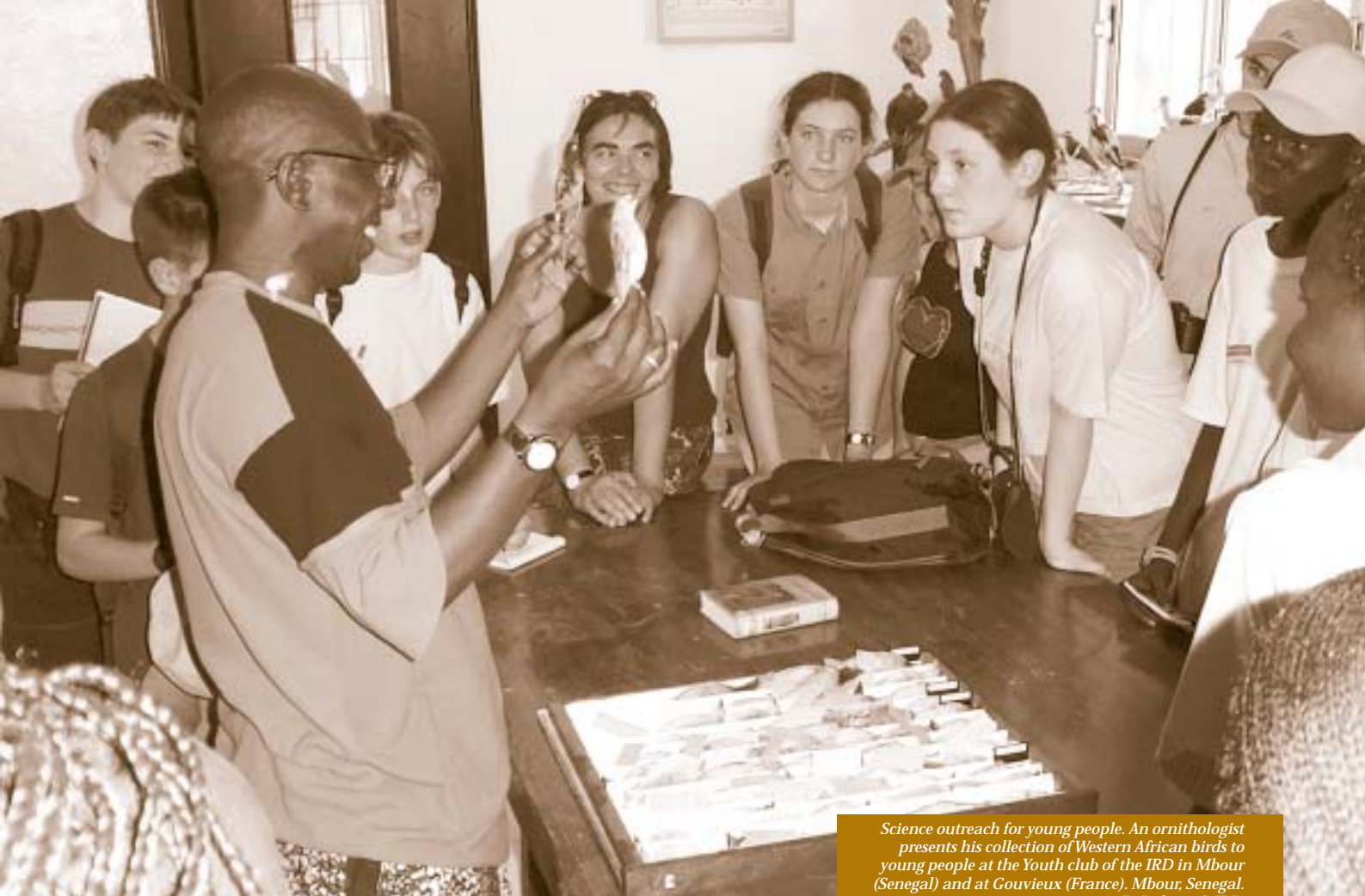
answer practical questions from public authorities, farmers and livestock breeders. Will he be able to do this alone? Certainly not, because the expected answers will have to be as objective as possible and the most interdisciplinary as possible.

Should this position of expert occur for a certain 'time' in a researcher's career? For short or medium periods (for a few weeks or a few years) and on behalf of civil society? If so, with what kind of contractual relationships? Should it be in the service of the general public in particular and through the media? The contradictions between managing a scientific career in the true sense of the word and time devoted to communications on the radio and television, to taking part in round table discussions, to participating in exhibitions, films, etc, have to be resolved. Should these activities only be personal activities or may they be undertaken collectively within a scientific institute?

Let us now look at the situation of civil society in its current state of organisation in countries affected by desertification: groups of villagers, farmers and livestock breeders have emerged but they are not yet sufficiently strong. There is probably a 'missing link' between researchers and farmers but how can we conceive of this link?

Which would be the best 'intermediary organisations' or 'mediation bodies between scientists and their institutions and organisations belonging to civil society'?

Would the best 'intermediary organisation' be, for example, between scientists and one or more NGOs grouped in a coordination group, or between scientists and agricultural technical organisations and professional unions (for instance farmers unions)? What sort of contracts should be envisaged to change over from individual contacts to more structured relationships? How can the needs of civil society be expressed and through which channels? Can these intermediary bodies also be used to transmit new research issues to researchers? Finally, what should the status of these intermediary bodies be: their make-up, their financing, their contractual relationships, between, on the one hand, researchers and on the



Science outreach for young people. An ornithologist presents his collection of Western African birds to young people at the Youth club of the IRD in Mbour (Senegal) and at Gouvieux (France). Mbour, Senegal. D. Lefèvre © IRD

other farmers? It is clear that in countries affected by desertification, farmers, livestock breeders and rural dwellers are not yet well enough organised to establish sufficiently well-organised professional bodies and thus have enough influence with scientists when it comes to decisions. Consequently, there is still a lot to be done in the field of cooperation and training.

Science has already contributed a lot in terms of knowledge; researchers have learnt how to evolve and are beginning to dialogue with final users of their research. But science can still contribute more today in new fields and in a way that is easily and quickly assimilated.

Here are a few examples from very different fields:

- Ground surveying techniques using satellite imagery and the Global Positioning System (GPS) are used to give villagers a map of their farming area in a short time; this is an efficient tool for dialogue and for aid in decision-making for development and which can be immediately understood and adopted, no matter what level of education the villagers have.
- Satellite imagery, which enables livestock breeders to better manage their grazing itineraries.
- Environmental monitoring, coupled with field work, is used to anticipate the movements of swarms of locusts and to act more efficiently upstream, which in

turn would limit environmental damage due to the use of pesticides.

- The improvement of short and medium-term climate forecasting, involving farmers, would enable the adaptation of seeds and cropping techniques.
- The intensified use of SMSs through mobile telephones will enable rural producers to be better informed on the going rates for products in agricultural markets.
- The quality, certification and better transformation of products in the area will enable more economic value to be added to local products.
- Etc.

Can scientists play a major role in shaping public opinion and influencing public authorities?

Scientists can make very efficient lobby groups. For instance, look at the way they started debate on climate change and biodiversity, which led to the United Nations conventions on these themes and the Kyoto protocol. At the current time, they manage to launch debates on the regulation of economic exchanges, private goods, common and public goods, public/private partnerships, financing of investments, etc. Scientists are today fully-fledged members of civil society with particular social and political responsibility, as they have the fundamental knowledge and can play a leading role through dialogue with those who have practical knowledge.

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Websites

Non-governmental organisations

- **Caritas Internationalis**
www.caritas.org
- **Coordination SUD**
www.coordinationsud.org
- **Eau Vive**
www.eau-vive.org/en
- **Friends of the earth international**
www.foei.org
- **Greenpeace International**
www.greenpeace.org/international
- **GRET, Groupe de recherche et d'échanges technologiques, France**
www.gret.org/default_uk.asp
- **GTD, Groupe de Travail Désertification (Working Group on Desertification)**
www.cariassociation.org/gtd
- **IUCN, The World Conservation Union**
www.iucn.org
- **Médecins sans frontières**
www.msf.fr
- **Oxfam International**
www.oxfam.org
- **Transparency International**
www.transparency.org
- **WWF, Global environmental conservation organization**
www.panda.org

Coalitions of national and professional federations

- **CONCORD, European NGO Confederation for Relief and Development**
www.concordeurope.org
- **IFAP, International Federation of Agricultural Producers**
www.ifap.org
- **ROPFA, Network of Farmers' and Agricultural Producers' Organisations of West Africa**
www.roppa.info/?lang=en

Scientific institutes

- **Cemagref, Institut de recherche pour l'ingénierie de l'agriculture et de l'environnement, France**
www.cemagref.fr/English
- **CIRAD, Agricultural Research Centre for International Development, France**
www.cirad.fr/en/index.php
- **CNRS, Centre national de la recherche scientifique, France**
www.cnrs.fr
- **CTA, Technical Centre for Agricultural and Rural Cooperation, Netherlands**
www.cta.int
- **French universities: see the Ministry of Research website**
www.recherche.gouv.fr
- **INRA, French National Institute for Agricultural Research**
www.international.inra.fr
- **IRD, Institut de recherche pour le développement, France**
www.ird.fr/us/index.htm
- **Programme for Research - Development (PCRD): see the European Commission website**
<http://ec.europa.eu>
- **'Science and Society' Committee of the Academy of Sciences, France**
www.academie-sciences.fr/comites/groupe_sciences_societe.htm

Development agencies and international organisations

- **AFD, French Development Agency**
www.afd.fr/jahia/Jahia/lang/en/home
- **Food and Agriculture Organization of the United Nations, Italy**
www.fao.org
- **IFAD, International Fund for Agricultural Development**
www.ifad.org
- **UNCCD, United Nations Convention to Combat Desertification**
www.unccd.int
- **World Bank, USA**
www.worldbank.org

Farmers visiting an experimental field of direct seeding mulch-based cropping systems (DMCs). Explanations are given by a technician from the Eau-Sol-Arbre project in a cotton field, Zouana, Northern Cameroon
© K. Naudin

Glossary

Colbertism: An economic doctrine expressed in 1615, which consisted in encouraging the transformation of raw material in the country, the creation of State factories and national industries and their protection by customs tariffs and quota restrictions.

Ideotype: A new plant model which under growing conditions uses the resources of a given environment better than currently farmed types and which withstands hazards better.

Subsidiarity: Subsidiarity is a fairly vague concept dating from Aristotle and Saint Thomas Aquinas which has been adopted by European construction for the twofold purpose of encouraging member States to abandon some of their sovereignty in certain fields (European currency, common agricultural policy, etc.) in favour of a higher body, Europe, and a lightening of the role of the State in favour of territorial authorities, which are assumed to be closer to citizens (regions, departments, *communes*). It may be defined as a hierarchy of powers within the society according to the specific sphere of competence of each of the component elements of the society. One might thus postulate that the widest powers may be attributed to civil society itself and then public procedures to the local bodies (schools, etc.) and then to higher bodies up to the State (regulations, fiscal regulations, policy, justice, etc.) and beyond (European Union, United Nations, etc.). More pragmatically speaking, the subsidiarity principle consists in only reserving for the higher level, aspects that the lower levels are not able to assume more efficiently.

‘Top-down’ approach: Literally ‘from the summit to the base’. Refers to policies and decisions developed at State level and moving down to the administrations responsible for applying them and the populations who are supposed to benefit from them; the opposite of a ‘bottom-up’ approach which assumes that the base populations express their needs, which are then taken into account when developing policy.

List of acronyms and abbreviations

- ACP: Africa, Caribbean, Pacific
- AFD: French Development Agency / *Agence Française de Développement*
- AOF: French West Africa / *Afrique Occidentale Française*
- BONGO: Business Oriented NGO
- C3ED: Centre of Economics and Ethics for Environment and Development, France / *Centre d'économie et d'éthique pour l'environnement et le développement*
- CARL: *Centre d'Action et de Réalisations Internationales*, France
- CCD / UNCCD: United Nations Convention to Combat Desertification
- CEPE: *Centre d'Études Phytosociologiques et Écologiques* [Phytosociological and ecological study centre] (which has become the CEFE, *Centre d'Écologie Fonctionnelle et Évolutive* [Center for Evolutionary and Functional Ecology]), France
- CGIAR: Consultative Group on International Agricultural Research, USA
- CIAT: International Center for tropical Agriculture, Colombia
- CIRAD: Agricultural Research Centre for International Development, France *Centre de coopération internationale en recherche agronomique pour le développement*
- CLONG Volontariat: Committee for liaising between Volunteer NGOs / *Comité de Liaison des ONG de Volontariat*
- CNAJEP: Committee for National and International Relations of Youth and Non formal Education Organisations / *Comité pour les relations Nationales et internationales des Associations de Jeunesse et d'Éducation populaire*
- CNRS: *Centre National de la Recherche Scientifique*, France
- CRID: Centre for research and information on development / *Centre de Recherche et d'Information pour le développement*
- CSFD: French Scientific Committee on Desertification / *Comité Scientifique Français de la Désertification*
- DEA: Advanced Higher Diploma
- DGRST: General delegation for scientific and technical research, France / *Délégation générale à la recherche scientifique et technique*
- DMC: Direct seeding mulch-based cropping systems
- DUT: University Technology Degree
- ECOWAS: Economic Community Of West African States
- EHES: *École des Hautes Études en Sciences Sociales*, France
- ENID: European Networking Initiative on Desertification
- FORIM: Forum for international solidarity organisations supporting migrant populations / *Forum des organisations de solidarité internationales issues de migration*
- GIRARDEL: *Groupe interdisciplinaire de recherche pour l'appui à la planification régionale et au développement local*, Senegal
- GIS: Geographic information system
- GMO: Genetically modified organism
- GONGO: Governmental organized NGO
- GPS: Global positioning system
- GRET: *Groupe de recherche et d'échanges technologiques*, France
- GTD: Working group on desertification, France / *Groupe de Travail sur la Désertification*
- ICARDA: International Center for Agricultural Research in the Dry Areas, Syria
- ICRISAT: International Crops Research Institute for the Semi-Arid tropics
- IER: *Institut d'Économie Rurale*, Mali
- IFAN: *Institut Français d'Afrique Noire* (which has become *Institut Fondamental d'Afrique Noire*)
- IFAP: International Federation of Agricultural Producers
- IRD: *Institut de recherche pour le développement*, France
- IUCN: The World Conservation Union, Switzerland
- JRU: Joint Research Unit
- NGO: Non-governmental organisation
- ORSTOM: *Office de la Recherche Scientifique et Technique Outre-Mer* (which has become IRD), France
- OSS: Sahara and Sahel Observatory, Tunisia
- ROPPA: Network of Farmers' and Agricultural Producers' Organizations of West Africa
- SAED: Society for development and exploitation of land in the Delta of the Senegal river / *Société d'Aménagement et d'Exploitation des terres du Delta du fleuve Sénégal*
- SOA: *Réseau syndical des organisations agricoles de Madagascar*
- USD: US Dollar
- UVSQ: University of Versailles Saint-Quentin-en-Yvelines, France / *Université de Versailles Saint-Quentin-en-Yvelines*
- WSC: Water and soil conservation
- WWF: Global environmental conservation organization

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Abstract

Scientific research in and on drylands truly began at the beginning of the 20th century. It was first developed in a colonial context with the ultimate aim of adding value to the land. It expanded again during the independence years for States, particularly in Africa. The major droughts of the 1970s gave a new impulse to this research. The efforts were devoted to making inventories of ecosystems as well as their functioning. Human and social sciences emphasised land tenure issues, demography, migrations and economic anthropology. However, we should not forget that since the invention of agriculture and livestock breeding, farmers and herders were the first to observe their own environment.

Faced with the major problems which have emerged since the end of the 20th century, the basic question is to know how to combine traditional knowledge with progress due to scientific research. The increase in population, the climate change and the global market require that solutions be found to overcome land degradation.

This CSFD file attempts to describe the civil society of countries affected by desertification and the way in which farmers, livestock breeders and politicians take decisions, which parameters and information they need and how scientists can meet these needs. It also describes the contribution of some research-development projects that the CSFD selected and monitored at the beginning of the 21st century. These projects, financed by the French Ministry for Foreign Affairs and French and African scientific institutes, were undertaken through North-South scientific partnerships and partnerships between researchers and users of research for some themes which are particular to the fight against desertification. To conclude, the file raises the issue of the transfer of knowledge from researchers towards the final users and suggests that attention be paid to media or intermediary bodies between researchers and civil society.

Keywords : Scientific research, civil society, combating desertification, transfer of knowledge

Résumé

La recherche scientifique dans et sur les zones arides a véritablement commencé au début du 20^{ème} siècle. Développée tout d'abord dans un contexte colonial avec une finalité de mise en valeur, elle a connu une nouvelle vigueur au moment des indépendances des États, particulièrement en Afrique. Les grandes sécheresses des années 70 ont donné une nouvelle impulsion à cette recherche. Les efforts ont été consacrés aux inventaires des écosystèmes ainsi qu'à leur fonctionnement. Les sciences humaines et sociales ont mis l'accent sur les questions foncières, la démographie, les migrations et l'anthropologie économique. Mais il ne faut pas oublier que depuis l'invention de l'agriculture et de l'élevage, les agriculteurs et les pasteurs ont été les premiers observateurs de leur propre milieu.

Devant les grands problèmes majeurs qui se posent depuis la fin du 20^{ème} siècle, la question primordiale est de savoir comment marier les connaissances traditionnelles avec les progrès issus de la recherche scientifique. L'accroissement de la population, les changements climatiques, le marché mondial, commandent de trouver des solutions pour parer à l'augmentation de la dégradation des terres.

Ce dossier du CSFD tente de décrire la société civile des pays affectés par la désertification et comment les agriculteurs, les éleveurs et les responsables politiques sont amenés à prendre des décisions, de quels paramètres et informations ont-ils besoin, et comment les scientifiques peuvent-ils leur donner satisfaction. Il décrit également l'apport de certains projets de recherche-développement que le CSFD a sélectionné et suivi dans le début des années 2000. Ces projets, financés par le ministère français des Affaires étrangères et des institutions scientifiques françaises et africaines ont été réalisés en partenariat scientifique Nord-Sud et en partenariat chercheurs - utilisateurs de la recherche sur un certain nombre de thèmes propres à la lutte contre la désertification. En conclusion, le dossier pose le problème du transfert des connaissances des chercheurs vers les utilisateurs finaux et il propose le développement de médias, ou de corps intermédiaires, entre les chercheurs et la société civile.

Mots clés : Recherche scientifique, société civile, lutte contre la désertification, transfert de connaissances

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