



**CLIMATE CHANGE
ADAPTATION**

&

**THE FIGHT AGAINST
DESERTIFICATION**



CLIMATE CHANGE ADAPTATION & THE FIGHT AGAINST DESERTIFICATION

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INTRODUCTION

The entwined issues of climate change and the fight against desertification are ever more crucial for Africa. It is here that the combination of these two phenomena is obstructing the development efforts of nations and impacting the resources on which their peoples depend for life.

The three conventions resulting from the Rio process (UNFCCC, UNCCD and UNCBD) provide very useful frameworks for considering and acting upon environmental and sustainable development issues. They have differing objectives and work on different scales, yet they share common adaptation activities for attenuating the effects of climate variability and/or climate changes in exacerbating drought and desertification. They all help to implement adaptation strategies. Whereas UNFCCC openly deals with the challenges of the vulnerability of communities and ecosystems and their adaptation to climate change, UNCCD focuses on the need to develop strategies for preventing or minimising the negative impacts of drought. UNCBD, for its part, emphasises the negative impacts of climate change on biodiversity. There is a great need for synergy between them to enlarge the impact of their work.

It is in response to a request of member countries and organisations that OSS and GTZ signed an agreement in December 2005 to undertake a study on 'adaptation to climate change and the fight against desertification'. Starting with current knowledge of the issue, this study aims to define adaptation strategies, to determine the way they relate to the fight against desertification and to recommend action for increasing synergy between them.

This study is a sound reflection of the vision of the OSS. The organisation was created in 1992 in an international context marked by the Rio Summit and the adoption of Agenda 21. Since then it has continued to strive for the implementation of Multilateral Environment Agreements (MEAs) and in particular UNCCD in Africa. Finally, the member countries of the OSS are among the most vulnerable to climate variability and changes and the most affected by drought and desertification.

In adopting its Strategy for 2010, OSS has committed itself to natural resource management in Africa. In particular it has set up a cooperative management mechanism for transnational water resources. It has devoted its efforts to collecting, analysing and disseminating useful information, to monitoring drought and desertification as well as defining adaptation strategies for its member countries which take into account their needs and potential.

The first section of this document deals with the relationships between desertification and climate change in Africa, based on actual consequences of these phenomena and recent

trends as described in the scientific literature reviewed. In considering the texts and tools of two conventions (UNCCD and UNFCCC), the second section emphasises how they converge and the definitions, concepts, methodologies and difficulties encountered in their implementation.

The first section of this document deals with the relationships between desertification and climate change in Africa, based on actual consequences of these phenomena and recent evolutions as described in the scientific literature referred to. The second section considers the texts of the two conventions and their tools while emphasising the ways in which they converge and the definitions, concepts, methodologies and difficulties encountered in implementing them.

1

The general context

1.1- Conceptual overview and analysis

Climate variability, a common factor of desertification and climate change

Climate change refers to significant long-term modification (or variation) of the climate, due mainly to human activities. The most widely used indicator for characterising climate change at present is the increase in concentrations of greenhouse gases (GHG) related to human activity¹. These emissions are the main cause of the increase in mean global temperature, from 0.3° to 0.6 °C over the last 100 years (IPCC , 2001). The most recent report of the IPCC (2007) is even more alarming as it states that the mean increase in temperature over the last 100 years has grown from 0.6 °C in 2001 to 0.74 °C in 2007.

Uncontrolled GHG emissions accentuates such extreme phenomena as drought in arid zones

Climate change is mainly caused by the concentration of GHG and African countries only contribute to this in a very slight way. It has the effect of amplifying extreme phenomena, such as, and in particular, droughts in dry areas, including Africa, and this leads to a global increase of climate variability. This trend will intensify as long as GHG emissions are not brought under control.

The phenomenon of desertification degrades land and soil in dry areas, according to various factors including a combination of climate variations and human activity. This

¹ The use of fossil fuels, industrial production and changes in land use have caused an increase of about 30% of CO2 concentrations since the 18th century, a doubling of methane (CH4) concentration since the pre-industrial era as well as an increase in concentrations of nitric oxide (NO), sulphur dioxide (SO2) and ozone (O3).

definition indicates that if all other factors remain constant, climate change will increase and continue to increase the risks of desertification in dry areas.

The impact of climate change in dry areas in Africa

Those dry areas² which are vulnerable to desertification risks are characterised by strong 'natural' climate variability. In these regions, the term 'climate variability' refers more specifically to fluctuating rainfall.

Climate change reduces rainfall and this accelerates the degradation of vegetation cover and hence erosion, thus accelerating desertification mechanisms. In turn, changes in vegetation cover and the degradation of soils affect the climate to the extent that an exposed soil increases evapo-transpiration and reduces rainfall³ further.

Reductions in rainfall induced by climate change accelerate the degradation of vegetation cover and encourage erosion

An observation of rainfall minima and maxima over several decades indicates some remarkable trends that may indeed be the manifestations of climate change.

This certainly appears to be the case with the Sahel belt south of the Sahara where there have been notable consequences for rain-fed agriculture and livestock, the two main types of subsistence farming in this region.

In this area, rainfall patterns have been observed on different time scales:

Lean periods before the next harvest, a synonym of food insecurity, are getting longer

- **in interannual variations, since the 1970s:**

- observations on rain water volume recorded each year show peaks of abundance and troughs of scarcity which are more marked than during earlier periods; during these extreme events, whether drought⁴ or floods, crops either burn or rot on their stems;
- the overall rainy season tends to be shorter; several studies have indeed emphasised the shortening of the wet period over the last two generations. These trends mean there can only be one harvest of any given crop per season. Moreover, the lean period between harvests – the most critical from the point of view of food security – is consequently longer.

² In this text, the term 'dry areas' covers arid, semi-arid and dry sub-humid areas affected by desertification.

³ The degradation of vegetable cover leads to an increase in albedo (the reflection of solar radiation) which stops rainfall from falling (Charney's hypothesis). 2 - Other analyses have shown that vegetation (in particular that of dense forests) captures water vapour better than bare soil and plays a role in monsoon circulation. Thus, re-evaporation from tropical vegetation allows for the reconstitution of humid air masses which lead to rainfall further to the North. These mechanisms are still poorly understood and debated by scientists.

⁴ Drought is an irregular phenomenon which refers to rainfall volumes below the normal mean, causing a water deficit in the soil, water courses and groundwater. This endangers crops and leads to scarcity of water for household use, and to famine.

- **For measurements within a single season,** the growing irregularity of rainfall is reducing the prospect of good harvests. Further, meteorological stations have observed an increased frequency of dry 'pockets' during the winter season. These dry pockets limit crop growth and sometimes lead to young plants shrivelling on the stem.

In arid regions of Africa, extreme events such as droughts and floods thus appear to have become both more intense and more irregular over the last three decades. The reduction in the overall length of the rainy season and the increase of dry pockets are explicit indicators of climate change and increased risks for local communities.

For those regions to the north of the Sahara desert, the issue of the impact of climate change is posed in different terms. In climatic terms, as in the Sahel, the area is characterised by low rainfall, with variations between countries and years. Over the last few years, serious drought episodes have required the implementation of emergency plans, which is very costly for governments and communities.

Shorter rainy seasons, and increased 'pockets' of drought are explicit indicators of climate change. They bear with them greater risks for local communities.

In terms of rural development in these regions there is a growing disconnect of agriculture and livestock from rainfall. Irrigated 'oasis' agriculture, traditionally predominant, is making more use of aquifers. Livestock is increasingly fed on industrial food sub-products. As a result, communities are less dependent on the constraints of rainfall.

In general, the problems faced in this region north of the Sahara thus have more to do with the management of water resources and this will no doubt increase with climate change. Among the main risks are:

- an increase in demand for irrigation water with the risk of conflicts between farmers over water rights;
- a growth in demand for fertilisers with increased risks of groundwater pollution;
- lack of treatment for grey water;
- water shortages resulting from the exhaustion, or pollution, of groundwater;
- increased pressure on aquifers and the risks of transnational conflicts over water rights.



When drought prevents normal crop growth, plants wither and die

This part of Africa could also face the impact of climate change on marine and coastal environments in terms of a rise in sea level. The major North African cities and ports along the Mediterranean shoreline are particularly vulnerable.

The key points

The main difference between climate change and desertification in dry areas of Africa is that they occur on different time scales. Climate change takes place over much longer periods of time than desertification. The latter - as a concept, though not as a phenomenon - dates from 1949, with most studies having been undertaken since the 1970s.

However research undertaken on desertification also provides information on climate change even though this information is limited both geographically and in time.

In the dry areas of Africa, climate change and desertification have different time lines

At this stage, it would no doubt be overly bold and a simplification to claim that desertification is a manifestation of climate change. However, it is clear that climate change has already contributed to the intensification of desertification processes and that it will reinforce them in the future, if emissions of greenhouse gases (GHGs) are not controlled.

Whether in terms of extreme events or inadequate rainfall, the risk is not only to the environment. The economy of rural communities in Africa is mainly based on the harnessing of natural resources, in particular water and land and their products and services. Climate change will only increase their vulnerability, given that they are already suffering from desertification.

In fact, many dry areas are in least-developed countries (LDCs). These countries, already have a low level of development, are now suffering from a combination of fragile ecosystems and rural production systems with very little technological input. These are both indicators that their peoples are living in a state of major vulnerability.

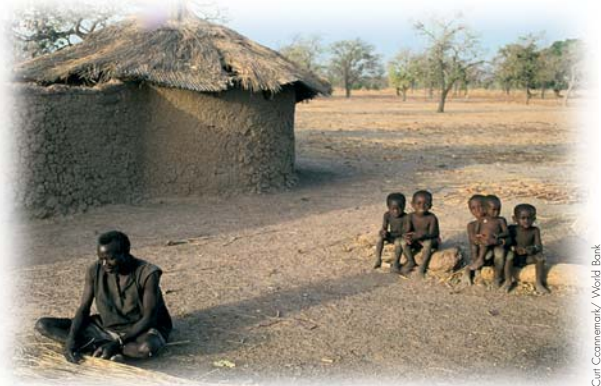
1.2- Africa's rising vulnerability - is adaptation the answer?

Vulnerability depends on three elements: the extent to which a system is exposed to risks⁵, the sensitivity of the system and its capacity to adjust.

⁵ The risk of natural disasters, for instance, can be measured by the frequency of events and their intensity, but also by their self-correlation with other types of risks such as famine or epidemics.

In applying these three elements and their combinations in the perspective of Africa, it emerges that climate change increases the risk or exposure of natural and social systems, whilst at the same time reducing the capacities of a system to adjust:

- among the social and economic indicators which express this capacity to adjust, we find the official indicators (GDP/capita, HPI and HDI⁶). In sub-Saharan Africa, these indicators are among the lowest in the world, and have regularly fallen since 1985. Such trends suggest increasing difficulties, if not the impossibility, for households to cope with increased climate risks;
- in terms of natural criteria, there is a clear trend of increasing fragility of the natural environment. This is witnessed by the observations made elsewhere in this study of reduced vegetation cover and simplification of ecosystems in arid areas; massive deforestation and loss of biodiversity in humid areas; the reduction or abandoning of regenerative practices such as leaving land fallow and transhumance; the farming of marginal land; and the concentration of livestock in smaller areas. They are all widely covered in the agro-ecological literature.



Low-income people in low-income sub-Saharan economies cannot cope properly with extremes of climate change

In Africa, the general trend towards increased climate risks and reduced capacities of natural and social environments is an indication of increasing ecological and social vulnerability.

In the field of social science, vulnerability can be quantified and expressed by the ratio between the degree of likelihood of a risk occurring and the coping capabilities⁷ developed by households.

$$V = R/C \text{ (V: vulnerability; R: risks; C: capabilities)}$$

In this approach, it is possible to counter vulnerability by introducing measures to increase capabilities or decrease risks. Identifying these measures requires defining the main tactics of adaptation which allow societies and ecosystems to withstand climate change.

The concept of adaptation refers to any adjustment in natural or human systems in order to deal with the actual or predicted effects of climate change. In practice, adaptation means all of the abilities and practices developed and implemented by

Climate change in Africa is increasing the exposure of natural and social systems to risk, and reducing their ability to adjust

⁶ GDP: Gross Domestic Product, HPI: Human Poverty Index, HDI: Human Development Indicator

⁷ Sen (1992) defines the concept of capability as being all of the capacities of individuals to meet their needs (eat enough, be in good health, be happy, have self esteem, take part in the life of the community, etc.). It covers not only their capacities, their personal characteristics and social opportunities but also their potential and their different resources (financial, physical, human, social).

societies to survive over time, in particular during times of crisis. Adaptation methods vary from one society and context to another but they also depend on a community's resources and the level of development of the country in question.

The UNEP and Intergovernmental Panel on Climate Change (IPCC) distinguish between two forms of adaptation for the purpose of reducing vulnerability to climate variability and change. 'Anticipatory adaptation' is that implemented before the initial impact occurs. It requires a risk knowledge system and information systems, in particular a set of effective environmental⁸ information systems. 'Reactive adaptation' is that which is designed and implemented in response to initial impacts. This could be, for example, a major change in cropping practices⁹.

Adaptation is any form of adjustment in natural and human systems in response to the real or expected impacts of climate change

Considered over the very short term, reactive adaptation may, furthermore, aggravate desertification when, to deal with periods of drought and famine, people start consuming immature matter in their environment prematurely, such as young wood, plants or animals, thus endangering the reproduction of species.

In regions which are naturally subject to significant climate variability, people have developed specific adaptation techniques over the centuries. In the Sahel, since the major droughts of the 1970s and in a context of the liberalisation of economies, new forms of adaptation have emerged, alongside a belated recognition of the relevance of older techniques. These include:

- diversification of economic activity, to deal with the unpredictability of harvests, such as livestock breeding, trading, fishing, temporary migration;
- changed management practices for agro-sylvo-pastoral systems: the development of a combination of farming and livestock breeding;
- the development of plant varieties which are more drought-resistant; shortening of growth cycles; use of early-maturing varieties; recession cropping for catchment basins; development of irrigated farming through water management; market- and greenhouse gardening and intensified agriculture are some of the adaptation strategies which have been adopted in the agricultural sector;
- forest management, through promoting improved cookstoves, use of butane gas and participatory management by villagers of forest edges;
- management of domestic and agricultural water: new local practices for controlling and storing rainwater such large domestic water tanks, storage reservoirs, dams, stone bunds slowing down surface runoff, traditional wells and drilled wells;

⁸ The term environment is here taken to mean all of the biophysical and climatic characteristics of society, a fairly inclusive definition put forward by UNESCO.

⁹ The switch in the Sahel to irrigation farming, through the use of fossil water resources, would be a possible form of reactive adaptation. This technological innovation would moreover require many precautionary measures to ensure the precise and fair management of this finite resource.

- management of marine and coastal ecosystems: practices for the conservation and processing of fish and use of sea water in cooking food or desalination, to overcome the lack of fresh water;
- pastoralism and mobility of herds as well as selection of sedentary species such as goats whose diet can be made more varied;
- social capital: traditional solidarity based on the use of religious and traditional ethical mechanisms for dealing with poverty;
- migration, which spreads risks by extending the spatial area used for resources and sources of income within families. Previously seasonal or temporary, these population flows are becoming permanent.



Cliff Coenenmark / World Bank

It appears that there is no detailed synthesis available of those adaptation practices which could be used differently in different contexts, nor of their relevance and potential with respect to recent economic and climatic trends such as globalisation. Furthermore, while research on vulnerability has been undertaken in the scientific disciplines of ecology and social science, little work has been done to develop the relationships between the two types of vulnerability¹⁰ while cross-matching them with traditional and new adaptation modes.

The people of the Sahel responded to the massive droughts of the 70s with many new techniques for rainwater storage

The above list also shows that adaptation is essentially a social phenomenon, involving solidarity and migration mechanisms: it continues to be implemented by communities themselves according to the means available to them and natural and economic events. In national development strategies, there seems to be a dearth of long-term agricultural and livestock policies which would allow these practices to be integrated, in a sustainable way.

¹⁰ We should note that the NEPAD has just recommended the introduction of a vulnerability index combining ecological and socio-economic dimensions.

2

The conventions: tools and effects

2.1- The texts of the Conventions

The two Multilateral Agreements on the Environment – one on climate change (UNFCCC) and the other on the fight against desertification (UNCCD) - have different meanings. The UNFCCC is considered to be the convention of countries which emit greenhouse gases, in particular urbanised, industrial and emerging countries. The UNCCD is considered to be that of rural, developing countries. Apart from this major difference, the two texts converge in obvious ways.

In November 2006, the Conference of the Parties recognised that developing countries are the most vulnerable to climate change

The two conventions share a common core objective of sustainable development, included in the UNFCCC text in articles 2 and 3.4 and in article 2.1 in the UNCCD. Both texts, furthermore, emphasise the question of food security – in article 2 of UNFCCC and in the foreword of UNCCD. Finally, both texts refer to the need for integrated approaches which take into account the ecological and socio-economic dimensions of environmental phenomena (article 4.2.a of the UNCCD and article 4.1.f of the UNFCCC).

In terms of the commitments of the signatory countries, article 4.1.e of UNFCCC explicitly mentions the case of regions affected by desertification, while affirming the need to promote adaptation to climate change.

Indeed, for UNFCCC, there are two types of response to climate change: measures which attenuate, or mitigate, emissions of greenhouse gases (GHGs) and adaptation measures. The attention to be paid to the most vulnerable countries with respect to climate change is mentioned in a general way in article 3.1 of UNFCCC. The most recent Conference of

the UNFCCC Parties, in Nairobi in November 2006, recognised that the effects of climate change will be experienced to a disproportionate extent in developing countries, which are more vulnerable and incapable of reducing these effects and which risk losing some of the gains achieved by their current development. In this framework, the SBTA (Subsidiary Body for Scientific and Technological Advice) renewed the programme to study impacts, vulnerability and adaptation to climate change for a period of two years. It should, in particular, produce information on climate risks and other socio-economic information on adaptation practices and plans as well as suggest technologies for adaptation and different types of economic diversification.



Dry stone walls are among the many practices developed to prevent soil erosion

Finally, it should be noted that the main challenge of the UNCCD is to develop measures for the fight against desertification and for attenuating the impact of drought (articles 2, 3.a and 4.2.c). Attenuation, defined as "mitigating the effects of drought", means activities which are related to the prediction of drought and intended to reduce the vulnerability of social and natural systems to drought as it relates to combating desertification (article 1.d).

There is a clear similarity between the attenuation of the effects of drought and the fight against desertification, as described in the UNCCD text, and adaptation and the reduction of vulnerability as described in the UNFCCC text.

2.2- A question of commonality: do the different national and regional implementation documents really differ?

Since 1994, the UNFCCC has encouraged countries to submit 'national communications' which include an inventory of greenhouse gases, a national analysis of mitigation measures and a national evaluation of the vulnerability of communities and their capacity to adapt.

All countries in the OSS area, with the exception of Libya¹¹, have submitted national communications since 1997. Most of them have included a list of possible adaptation strategies in their national communications: for example, the construction of stone bunds, water storage, increased drainage, restoration of canals, diversification of the economy and crop irrigation. However, only a few countries have given a complete

¹¹ Libya, which signed (1992) and ratified (1999) the UNFCCC, only ratified the Kyoto protocol on 24 August 2006.

description of these adaptation measures and none have evaluated the cost of the adaptation options proposed.

During its 7th session held in November 2001, the UNFCCC Conference of the Parties decided that it would be a good idea to help the LDCs to draft their National Adaptation Programmes of Action (NAPA) in order to respond to their preoccupations and urgent needs with respect to climate change. However, the countries concerned have not made much progress in drafting and implementing their adaptation programmes or strategies.

A NAPA has to deal with the difficult issue of integrating climate change into a country's development plan. The Ministers in charge of the NAPAs still do not have the requisite means, nor the necessary information, to respond to this challenge¹².

Similarly, the NAPAs are, by definition, focused on a national scale whereas many impacts of climate change are not limited to national frontiers. It is therefore essential to approach the question of vulnerability and adaptation to climate change on a regional basis. In 2004, a West African regional strategy for preparation and adaptation was drawn up, on the initiative of CILSS, the West African Water Partnership (GWP-WAWP) and of the Regional Office for West Africa of the World Conservation Union (IUCN-BRAO).

There is a remarkable similarity in the messages about the fight against desertification and the mitigation of the impact of drought in the UNCCD text, and about adaptation and the reduction of vulnerability in the UNFCCC text

As far as the fight against desertification is concerned, most of the achievements in terms of the Convention have been made by institutional bodies. At the national level, most of the countries affected have drafted National Action Plans for Combating Desertification (NAP/CD) using a participatory and sectoral approach. These NAP/CDs provide an inventory of priority actions to be undertaken to halt drought and desertification. However, as in the case of national communications, they are rarely accompanied with statistical forecasts of the cost and benefits of these actions.

At the sub-regional level, Sub-Regional Action Plans for Combating Desertification (SRAP/CCDs) have also been drawn up in order to ensure coherence with national actions. The SRAPs are justified as well by the transnational nature of the phenomena of desertification, in its processes and impacts.

At the international level, the UNCCD has enabled a greater mobilisation of scientific and technical organisations on all levels and progress has also been observed with respect to understanding the phenomenon, its causes and effects both on communities and on natural resources. Furthermore,

¹² In Chad, the NAPA falls under the Ministry of Water, in Mauritania, it falls under the Ministry of Rural Development and the Environment; most often, in fact, it is the Ministries of the Environment which handle this issue.

the Convention also proposed the development of a set of indicators for monitoring the implementation of the NAP/CDs, an endeavour to which the OSS contributed with support from GTZ.

*NAP/CDs and NAPAs:
two parallel processes
based on the same notion
of vulnerability*

Though they are obviously important, these achievements in no way make up for the missed opportunities and difficulties which prevent the fight against desertification from being included in development programmes. The implementation of the NAP/CDs (often undertaken by Ministries of the Environment with limited budgets) is not sufficiently effective; it is rarely considered to be a priority for national development strategies¹³ and SRAPs are not yet operational. The major challenge to be met is to consolidate

work on indicators for monitoring desertification and to encourage the standardisation of intervention methodologies, strategies and policies.

After more than ten years of implementation of the two conventions and in spite of the repeated recommendations made by the different Conferences of the Parties to UNCCD, few programmes have been developed which foster the synergism of actions undertaken by the national action programmes recommended by both conventions. However, the types of rural actions indicated in national communications for adaptation often appear to be similar to those proposed in the NAP/CDs.

The drafting and implementation of NAP/CDs and NAPAs are two parallel processes which are both based on the concept of vulnerability. Even though they fall under the same ministries, they do not feed into each other, whereas actual programmes, for example, do offer opportunities for joint implementation.

The strategic and operational frameworks of the two conventions are thus similar in design, as in the content aimed at rural African regions. Why then should efforts be dispersed in a context of scarce financial resources and limited national technical capabilities?

2.3- Funding opportunities for adaptation and the fight against desertification

The UNFCCC, unlike the UNCCD, has a compact toolbox for financing adaptation. A fund for LDCs was launched in 2001 and a special fund for climate change in 2005. A third fund, for adaptation following adoption of the Kyoto protocol, is currently being planned.

The first two depend on voluntary contributions whereas the third will mainly be financed by the Clean Development Mechanism. In addition, the Global Environment Fund (GEF) has recently initiated the Special Climate Change Fund, for adaptation.

¹³ However, Morocco has set up a High Commission for Water, Forests and the fight against desertification, the Haut Commissariat aux Eaux et Forêts et à la Lutte contre la Désertification (HCEF/LCD).

In terms of multilateral actions, a number of financial initiatives for adaptation strategy and its implementation have emerged. Less has been forthcoming on the many basic issues of adaptation mechanisms, such as the relationship between vulnerability and adaptation methods.

The UNCCD does not have any financing tool¹⁴. The fight against desertification and the implementation of NAPs thus depends mainly on the good intentions of bilateral cooperation projects. There also a number, albeit restricted, of multilateral opportunities; in particular, the land degradation project of the GEF, currently being reviewed for improvement, merits attention.

Furthermore, in several countries, the NAP/CDs have been included in Poverty Reduction Strategy Papers (PRSP) to enable an integrated approach to both fight desertification and reduce poverty and to obtain financing. This is because PRSPs are implemented by Ministries responsible for national development planning, which thus have significant budgets.

It may also be appropriate to submitting projects for the implementation of NAP/CDs, or more specifically projects for the fight against desertification, under the title of 'adaptation'.

From an institutional point of view, can the NAP/CDs be used as a basis for drafting part of the NAPAs for adaptation in dry areas? Might it not be possible to identify common actions to be undertaken when both documents have been written?



Encroaching sand is held back by barriers and tree-planting

¹⁴ The Global Mechanism is a subsidiary organ of the UNCCD and does not finance projects for the fight against desertification; on the other hand, it does undertake research on strategic subjects concerning the fight against desertification, while promoting South-South cooperation and capacity building.

CONCLUSION

This study shows that there are several possibilities for ensuring greater convergence of the efforts being undertaken for adaptation and for the fight against desertification.

Better identification of adaptation mechanisms and better assessment of vulnerability

The sectors which are the most sensitive to climate variability and change in Africa are also those which are the most sensitive to desertification:

- water resources;
- human health¹⁵;
- ecosystems in arid and semi-arid areas;
- food security;
- coastal zones

Open access to research findings ... a regional knowledge base ...

The risks are not only climatic and ecological; conflicts over water rights, poverty and migrations could well grow, with increasingly noticeable consequences on a world scale.

The importance of knowledge management and environmental information

Information is vital for adaptation and climate, and environment monitoring is essential for forecasting risks. However, the results of leading edge research must be made accessible and understandable both to national bodies for crisis management and prevention. Equally this information must be made available to final users (communities, civil society, NGOs). This work of translating and disseminating information and scientific knowledge demands special communication skills. Within this framework, the exchange of experience between, for instance, the north and the south of the Sahara should also be promoted.

In order to ensure better management of available information, it is essential to develop a regional knowledge base of the crucial stakes involved in degradation of natural resources

¹⁵ In its 7th FRDP (Framework Research and Development Programme), the European Commission has just recommended submitting projects which focus on the relationship between desertification, water and health.

(water, soils, climate). Such a facility will only be viable if it is regularly fed from the national level by all the various initiatives being undertaken in the field of the environment and socio-economic development. It would require setting up or strengthening national systems for observing and assessing natural resources by means of a user-friendly model for data collection, and database management.

There is a clear relationship between monitoring desertification and monitoring adaptation. It should be better defined.

It would also be useful to specify how the monitoring of desertification feeds into climate monitoring. Thus, setting up or reinforcing national information systems for environmental questions would make it possible to improve national communications on a regular basis and would enable efficient implementation of the NAPAs.

Needed: more regional development, more dialogue

Regional cooperation is a key dimension to progress on all fronts. Many African countries share natural resources in, for example, river basins, aquifers and protected reserves. They belong to the same institutions and are subject to the same environmental preoccupations, including land degradation, climate variability and climate change. It is important to emphasise the strengthening of regional networks, through African organisations at the sub-regional, regional and even international levels. Such a regional platform should also involve sub-regional authorities (AMU, CENSAD, CILSS and IGAD) and specialised sub-regional technical organisations (ACMAD, AOCRS, Centre Régional Agrhymet, CRTEAN, INSAH, OSS and others). They should work together with bilateral cooperation organisations (including CIDA, DFID, GTZ, SDC and USAID), multilateral organisations with databases on Africa (FAO, GEF, Global Mechanism, UNEP and World Bank), as well as environmental NGOs (such as IUCN, WWF and WRI).

Respect existing principles, strengthen their implementation ... this is the opportunity of adaptation

At the international level, a high priority should be given to redefining the framework for strengthening relations between UNCCD and UNFCCC, in particular around the decisions which are taken on adaptation.

Adaptation should thus offer an opportunity for strengthening existing instruments. In the same vein, it is an opportunity to encourage the introduction of efficient procedures for the correct and transparent collection and processing of data.

All this need not lead to a new programme or plan being added to those which have already been developed by the countries concerned and whose implementation would run into similar obstacles to those already encountered. The process of defining strategies for adapting to climate variability and climate change should rather be one which respects the principles of environmental governance already defined by the countries involved. It should strengthen, support, stimulate and place emphasis upon these existing

principles, along with the efforts already envisaged in the fight against desertification or for the conservation of biodiversity - efforts which, to this day, have not yet been effectively implemented.

ABBREVIATIONS AND ACRONYMS

| | |
|-----------|--|
| ACMAD | African Centre of Meteorological Application for Development |
| AMU | Arab Maghreb Union |
| CD | Combating desertification |
| CEN-SAD | Community of Sahel-Saharan States |
| CIDA | Canadian International Development Agency |
| CILSS | <i>Comité Inter-Etats permanent de Lutte contre la Sécheresse au Sahel</i> |
| CRTEAN | <i>Centre Régional de Télédétection des Etats de l'Afrique du Nord</i> |
| DFID | Department for International Development (UK) |
| FAO | Food and Agriculture Organisation |
| FRDP | Framework Research and Development Programme |
| GDP | Gross Domestic Product |
| GEF | Global Environment Facility |
| GHG | Greenhouse gases |
| GTZ | Gesellschaft für Technische Zusammenarbeit (Germany) |
| GWP-WAWP | Global Water Partnership - West African Water Partnership |
| HDI | Human Development Indicator |
| HPI | Human Poverty Index |
| IGAD | Inter-Governmental Authority on Development |
| INSAH | Institut du Sahel |
| IPCC | Intergovernmental panel on climate change |
| IRD | Institut de Recherche pour le Développement |
| IUCN-BRAO | IUCN - the World Conservation - Regional Office for West Africa |
| LDC | Least-developed countries |
| MEA | Multilateral Environment Agreements |
| NAP | National Action Programme |
| NAPA | National Adaptation Programme of Action |
| NEPAD | New Partnership for Africa's Development |
| NGO | Non-governmental organisation |
| OACT | Organisation Africaine de la Cartographie et de la Télédétection |
| OSS | Sahara and Sahel Observatory (Observatoire du Sahara et du Sahel) |
| PRSP | Poverty Reduction Strategy Papers |

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|--------|---|
| SBTA | Subsidiary Body for Scientific and Technological Advice |
| SDC | Swiss Development Cooperation |
| SRAP | Sub-Regional Action Programme |
| UNCBD | United Nation Convention on Biodiversity |
| UNCCD | United Nation Convention to Combat Desertification |
| UNEP | United Nations Environment Programme |
| UNFCCC | United Nations Framework Convention on Climate Change |
| USAID | United States Agency for International Development |
| WRI | World Resources Institute |
| WWF | World Wildlife Fund |

Where variable means vulnerable

It is in the drylands of Africa, more than elsewhere, that climate change and climate variability are leaving their permanent, pernicious mark. In a cruel cascade of events, variability turns out to mean vulnerability.

The regions are succumbing to a series of extreme climate events. Rainy seasons are becoming shorter, periods of drought longer. Land is degrading, eroding. Soils are impoverished, and no longer fertile. Shorn of their cover, their rate of evapotranspiration is rising and rainfall, whilst often more intense, is falling in volume. The relationship between climate change and desertification is stark: one provokes the other.

The risk is more than 'just' environmental. Rural livelihoods are under pressure. Shrinking harvests and water shortages are making paupers of rural communities, exposing them to conflicts on water access, to migration, to hunger, to epidemics ...

For centuries, the communities of the region have made traditions of their innovations in adaptation. Can those techniques be relevant today? What could be their long-term impact?

Is adaptation indeed one way to mitigate Africa's state of growing vulnerability? And what shared solutions can we realistically expect from the world's two environmental conventions – UNCCD and UNFCCC – together?

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SAHARA AND SAHEL OBSERVATORY

Bvd du Leader Y. Arafat, BP 31, 1080 Tunis, Tunisia
Tel.: (+216) 71 206 633, Fax: (+216) 71 206 636
E-mail: boc@oss.org.tn - URL: www.oss-online.org



DEUTSCHE GESELLSCHAFT FUER TECHNISCHE ZUSAMMENARBEIT

Tulpenfeld 2- 53113 Bonn, Germany
Tel.: 49 228 98371 11, Fax.: 49 228 98371 25