

Separate streams?

Adapting water resources management to climate change

Climate change is a major threat to all aspects of human development and to the achievement of the Millennium Development Goals. Compounding this threat, the world is in the midst of a global water crisis, with around 700 million people facing water scarcity and 900 million people lacking access to safe drinking water. The poorest members of society, who often live in more fragile, less productive environments, are highly vulnerable to climatic impacts on water resources, and are hit first and hardest.

Although the world's leaders are increasingly engaging with the question of how to tackle the risks and uncertainties associated with climate change, they are far from reaching a conclusion. Critically, there has been little progress to date in terms of integrating climate risk considerations within sectoral policy frameworks, and water is no exception.

Steps now need to be taken to determine where the emerging financial opportunities for adaptation should be directed. Tearfund believes that as water is a key sector, underpinning all other development sectors, it should be prioritised for adaptation funding.

Tearfund research

This paper summarises the main findings of research conducted by Tearfund in 2008. The work is based on empirical evidence from case studies undertaken in Niger and north-east Brazil, and aims to identify how climate change adaptation can be integrated within the water sector to benefit the most poor and vulnerable people. It draws on primary research at the community level, and policy and institutional reviews at the national level, to look at:

- how the changing climate is impacting the way poor people manage their water resources in the semi-arid environment, their adaptive responses to climate variability, and associated needs to help support these responses.
- the policy and institutional context in each country in relation to tackling water and climate change, the current status of synergy and integration between the two policy areas, and the interface between national policy and practice on the ground.

The case-study regions

The primary research was conducted among:

- pastoralists and agro-pastoralists (Tuareg and Wodaabe Fulani) in the Abalak department, Tahoua region of Niger, and;
- communities residing in the lower Jaguaribe sub-region of Ceará state in north-east Brazil.

Niger and north-east Brazil are characterised by a high degree of climate variability which existed prior to the onset of climate change. Both areas have records of long periods of drought which, since the 1970s, have been increasing in their frequency and severity.

The two regions experience not only inter-annual but also intra-annual variability, and with population growth the need for anticipatory strategies has become ever more urgent. There already exists what has been described as an 'adaptation deficit'

Parts of Niger are amongst the most vulnerable regions in Africa to food and water scarcity¹.

Methods used

The research was implemented in several phases. For each country this entailed:

- **a fieldwork-based study:** Including consultation with communities.
- **a policy and institutional review:** Looking at the national policy context in relation to water resources management and climate change.
- **a supplementary review of climate change scenarios:** Investigating existing data and published information on recent trends of precipitation climatology in the study areas.

management requires good land

management in the pastoral zone. Currently pastoralists do not have land tenure rights to their land; ownership of rural land is only accorded to farmers, and pasture land is considered a common resource.

Climate related issues have limited the mobility of the traditionally nomadic pastoralists, and increased their likelihood to 'fix'.

Key findings from Niger

Issues

Communities identified a range of livelihood issues that they attribute to climate variability.

- **Increasing vulnerabilities:** Diminishing water availability is a central problem, which has a number of knock-on effects, such as an increase in the time required for water collection and the distance travelled to water points.

The biodiversity make-up of the area is also perceived to be changing. There are less water-rich herbaceous species available for animal fodder resulting in decreased milk production. Vital fluids for human consumption must therefore be found elsewhere.

Other issues include climate-related sickness associated with poor water quality and soaring cereal prices during the dry seasons.

Increasing tensions: Social conflict is becoming more prevalent due to the rising population, movement of people into the area and increased resource use. There is increased conflict between transitory herders and the local population over surface water and pasture. Many sites indicated that people are afraid to move in the wet season, because others will come in behind them and consume available pasture. Then in the dry season there is no pasture available.

Land tenure issues also further exacerbate tensions. Water

Community responses

The following adaptive methods are being used with increasing regularity, as water crises are now unfolding more frequently.

- **Redistribution of household responsibility** – Women (and children) are increasingly involved in both drawing and hauling water. This is hard work, especially at deep wells, where water is drawn by donkeys from depths often in excess of 100m.
- **Increase in the number of deeper wells** – This has a tendency to 'fix' the populations who are dependent on the wells for water. This has led to an intensification of livestock rearing and water use, and resulting negative impacts on surrounding land resources.
- **Water harvesting** – New methods have been used at a few sites, with loose stone dikes being built in valley bottoms.
- **Change in stock size and herd composition** – There is an increasing reliance on small stock (fewer animals), and also herd composition has changed. Cows, sheep and goats are now more important than camels because they are easier to manage in a smaller space and have shorter gestation periods.
- **Changing roles of Tuareg women** – Women are becoming involved in small stock rearing using supplementary animal fodder, as well as water-related work, thereby creating new opportunities for them and triggering a significant cultural switch in Tuareg groups.
- **Alternative food security measures** – Most sites reported that the changes in climate and rainfall have caused a decrease in food security, so there has been a shift away from traditional

Below: Water is becoming an increasingly scarce commodity in the Sahel, and communities are depending more on deep wells, than traditional sources of surface water.

Photo: Edgar van Hoek

Bottom: Communities wish to see the establishment of protected enclosures and to be able to manage water resources in their "terrain d'attache" through local land management committees.

Photo: Jeff Woodke



¹ Thornton, P.K., Jones, P.G., Owiyo, T.M., et al. 2006. *Mapping climate vulnerability and poverty in Africa*, Report to the UK Department for International Development.

pastoralist activity. E.g. there is now increasingly regular recourse to animal selling, and grain bank use.

- **Income diversification** – Women engage in a wider range of income-generating activities than previously (handicrafts, wood selling, working for others) and often run small shops selling basic goods. Men have become involved in commerce, such as buying and selling animals or commodities, and transporting goods, people or livestock to market.
- **Increase in farming** – Farming is now carried out to generate fodder as well as grain production.
- **Rise in levels of migration** – Tuareg men are migrating to Libya (and Wodaabe Fulani women to Nigeria or Niamey) to find work.

National level perspectives

Climate change is currently being addressed in Niger via a series of stand-alone donor funded projects, and does not appear to be considered systematically within water resources planning.

Policy on water is long-established and complex, cutting across the interests of several ministries. Critical areas for water policy in central government are those within the Niger Basin and its important agricultural areas, as opposed to the more remote pastoralist regions in the Sahel.

Current legislation regarding resource management (Water and Rural Code) is currently contradictory with regards to pastoralist water and land rights. Revisions of this legislation are underway and it is critical the pastoralists' views and needs are taken into account.

Decentralisation of the water sector has begun on paper, but in practice there is still a long way to go for the process to be operational. However, the government is now making a concerted effort to engage donors and grapple with Niger's long-running problems of institutional capacity and effective delivery.

Key findings from Brazil

Issues

- **Increasing vulnerabilities:**

Water shortages i.e. notable diminishing rainfall and recharge patterns, are sited as an overarching problem. The water resources of most communities studied

depend directly on rainfall and groundwater recharge via boreholes with desalinators, rain-water harvesting, shallow water holes and communal wells.

Smallholder rain-fed agriculture, a significant activity for the most vulnerable small-scale landowners in the area, has also been affected by the reduced rainfall. During extreme drought years there is often no harvest. This has initiated a shift towards irrigated agriculture which is neither economically viable for poor communities, nor at present a sustainable long-term solution in the face of changing climatic conditions.

- **Increasing tensions:**

State investment in infrastructure for water supply has focussed on irrigation in recent times. A complex irrigation system has been installed based on the Jaguaribe and Banabuiú Rivers. This has been superimposed on traditional settlement patterns and already widely differentiated land tenure, in some cases causing the need for major resettlement.

The success of the export sector in north-east Brazil has allowed large companies to consolidate ownership of land by buying it from the small, poor owners who do not have the resources to develop it.

Some smallholders have real concerns that in future large landowners cultivating genetically engineered crops will dominate the area. This ongoing tension is likely to increase with the impacts of climate change, as small rain-fed agriculture will become even less sustainable without additional support. There is concern that indigenous knowledge, values and the traditional forms of managing water and land in the *sertão* are being lost.

Community responses

- **Water harvesting** – Large cisterns are used to collect water from roofs during the rainy season and are replenished later in the year by a tanker provided by the local municipality. A programme to construct household cisterns is now being supported through the One Million Cisterns programme.
- **Collective action** – One community reported progress on water-related issues after uniting in an 'association' to tackle shared problems. E.g. the use of 560 plaque cisterns and the construction of subterranean dams, which is supporting the sustainability of

Intensive irrigation technology and infrastructure along the Jaguaribe river is largely inaccessible to small scale farmers.

Below: Household cisterns for rainwater harvesting are being used more and more widely in Ceará.

Photo: Diaconia

Bottom: A Brazilian smallholder explains how his community is coping with increasing water shortages in the Jaguaribe river valley.

Photo Edaar van Hoek



smallholder rain-fed agriculture.

- **Restoring biodiversity** – A Seed Bank is being used within one community to re-establish seed varieties that have been disappearing. These new *casa da farinha* (lit. 'house of flour') facilitate agro-forestry as well as the breeding of goats and chickens by improving the forage available.
- **Income diversification** - One community is developing organic agricultural practices based on wind-pumped water. These include beekeeping, industrialisation of the caju fruit and producing 'cottage industry'-type products, as well as establishing an organic restaurant.
- **Social protection payments and conditional cash transfers** – A number of rural families receive assistance from federal government schemes in the form of pensions and the *Bolsa Familia* (family allowance). These conditional cash payments provide the means for rural families to buy water and food, offsetting local shortages or seasonal lack of production. Although they cushion the effects of drought, these sources may not, however, be politically or economically sustainable in the long-term.

National level perspectives

Although issues relating to climate change are clearly firmly on the political agenda in Brazil, efforts to date have concentrated mainly on responding to short-term climate variability (principally in terms of drought responses). Long-term climate change has yet to be tackled seriously.

Institutionally, the water resources management structure in Ceará state is an innovative model of decentralised water management and supply from which several lessons can be learnt. Adaptive water management features include: effective devolution of authority from national to state level; use of a technical expert group (social scientists and water engineers) to help implement reforms, and; the participation of informal water user commissions.

Despite this, large segments of Ceará's rural poor remain vulnerable to the impacts of climate change, most notably drought and water scarcity. Reforming the governance of water institutions is a necessary but insufficient step to build resilience to climate change. Vulnerability in Ceará has been linked to many factors, such as poverty and productive capacity, therefore issues such as land and assets rights will also need to be tackled.

Tearfund's recommendations

Although two different pictures emerge, there are consistent messages that can be drawn out and applied for policy and intervention. Tearfund believes that donors and national governments should:

- **Integrate climate risk-based approaches, which address climate variability and climate change, within water policy frameworks.** Adaptation should not be viewed as a separate 'sector' to water with separate frameworks, tools and approaches.
- **Focus on 'linked-up' cross-sectoral approaches to water resources planning systematically considering climate risk within these approaches.** Synergy and integration e.g. with land, agricultural and mining sectors should be the ultimate aim in water policy planning and implementation.
- **Support the decentralisation process for managing water resources.** This should include supporting efforts to strengthen related institutional, legal and regulatory components, and technical and financial capacity at the local level.
- **Target differentiated solutions to water resources management according to the needs of different groups.** Communities that are particularly vulnerable to climate change should be targeted, and appropriate sustainable solutions that reflect their needs and interests should be prioritised over stand-alone infrastructure investments.
- **Ensure that climate risk information, where available, is made widely accessible and is used to inform water planning strategies.** The establishment of regional research centres that collate relevant information from all relevant sources could be a potential way forward.
- **Strengthen local adaptive capacity by supporting localised water resources approaches, and looking at options for how to replicate them at scale.** Technical and financial support is needed to help develop long-term sustainable adaptation solutions by building on current local approaches.
- **Empower communities to participate in water resources planning and management.** This must encompass a two-way flow of information between government and communities.
- **Plan for change as livelihoods and cultures alter as a result of climate change and water scarcity.** E.g. ensure availability of information and learning opportunities on income diversification in the semi-arid environment.

The logo for Tearfund, featuring the word "tearfund" in a white, lowercase, sans-serif font inside a teal rectangular box.

For more information or a copy of the full report, please contact Jane.Cacouris@tearfund.org
www.tearfund.org

100 Church Road, Teddington, Middlesex TW11 8QE
enquiry@tearfund.org Registered Charity No. 265464