



## Climate change and climatic variability in West Africa

Since the mid-1980s, The African Studies Centre (ASC) in Leiden, The Netherlands, has been studying climate change in West Africa in a multidisciplinary research programme. With its partners, Wageningen University and Research Centre and the University of Amsterdam, it launched the multi-scale and multi-disciplinary research programme, Impact of Climate Change on Drylands (ICCD) in 1999, financed by the Dutch national research programme on Global Climate Change and Air Pollution.



The objectives were:

- To analyse the effects of climate change and rainfall variability on drought risk and yield potential;
- To develop a comprehensive framework to analyse regional scale impacts; and,
- To identify different risk-coping strategies at farm household level.

Specific methodologies were developed to link climate change models with a social science approach to investigate mitigation strategies towards climate change and rainfall variability. The ASC team was primarily responsible for the social science contribution.

### Findings

Several findings stand out. On the local, regional and national levels, climate variability, not climate change, is the most significant problem people have. The variability of rainfall, defined as the average deviation from the mean, is enormous, sometimes up to 40-80% and increases with decreasing annual rainfall totals.

Especially in marginal areas, such as the Sahara desert, the Sahel and the sub-humid Sudan zone, rainfall unpredictability poses enormous threats to food security and deficits lead to localised and general food crises every year. Intra-season drought may lead to harvest losses and crop failure even in years where rainfall totals would allow a normal harvest. Spatial variation and end of season showers can mean the difference between a bad and a good harvest across a distance of just several kilometres and the vulnerability of rural populations to food shortages is extreme.

Another major point drawn from this study is the tremendous variety in responses to climate variability at the regional, local and individual level. At the regional level, there are specific complexes and combinations of cropping and animal husbandry systems often operated by different ethnic and occupational groups in response to climate conditions. Depending on access to resources, ethnicity, social networks and labour and commodity markets, an amazing number of solutions and organisational arrangements to secure food and other life necessities are found by people within these regions.



### Rural-rural migration

Of old, these specific regions have been migration zones. Unsurprisingly, the impact of climate variability translates in increasing mobility of the people in these zones. This does not only concern rural-urban migration – where these migrants join the poor masses of African cities – but also, and more remarkably, rural-rural mi-

## ASC Info sheet 2

gration. People continue to be on the move (peripatetics and dwellers) creating mobile lifestyles. The rural proletariat seems to be increasing in arid zones in the Sahel. Apart from the increasing numbers of 'drought' migrants to African cities as a consequence of climate change, there are other effects on the urban areas, related to the provision of towns with rural products, such as fuel wood, food and animal products.

### *Socio-cultural differences*

New methodological devices were developed to tackle the relation between climate change and societal changes. Attention was given to climate conditions and human strategies at regional and local levels, while linking these to higher order structural and contextual conditions.



One methodology is called 'Pathways' because it means unravelling historically rooted trajectories of people's decision-making with regard to changes in their environment. Across families and over generations there are changes in patterns of decision-making that may be connected to climate change. The focus on contextual decision-making processes has been an important tool in an interdisciplinary research where the social sciences often have difficulty in getting their message through. Ten of such case studies have produced enough material to discover trends that also lead to new social and economic configurations. If these trends continue, the social and economic landscape of West Africa may change profoundly.

Scenario studies with the help of global change models executed within this programme produced contradictory results. One model (MPI-GCM) predicted a progressive desiccation

of large parts of the region whereas another model (GFDL-GCM) predicted precisely the opposite. In the first, measures will have to be oriented at increasing the buffering capacity for the region for larger fluctuations and a progressive decline in food production. In the other, increasing rainfall will pose enormous challenges in the form of floods, erosion and possibly adaptations in cropping regimes and land use strategies.



Given the general lack of social and economic infrastructure and widespread extreme and chronic poverty, with 80% of the population living on less than US\$1 per capita per day, these areas belong to the poorest in the world. They are hardly connected with world markets and human resources are very little developed. Life expectancy is low, child mortality and malnutrition rates are among the highest in the world and will continue to be so for decades. These areas should receive prime attention for measures to mitigate the consequences of climate change and climate variability.

For a full list of references, please see

[www.rtcc.org/leiden](http://www.rtcc.org/leiden)

See also

[www.ascleiden.nl/publications/climatechange](http://www.ascleiden.nl/publications/climatechange)

Mirjam de Bruijn & Han van Dijk  
African Studies Centre  
P.O. Box 9555  
2300 RB Leiden  
The Netherlands  
Tel.: +31 71 5273360/72  
Email: [bruijnm@ascleiden.nl](mailto:bruijnm@ascleiden.nl) / [dijkh@ascleiden.nl](mailto:dijkh@ascleiden.nl)  
Website: [www.ascleiden.nl](http://www.ascleiden.nl)