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Title

The Economic, Developmental and Livelihood Implications of Climate Induced Depletion of Ecosystems and Biodiversity in Africa

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[nb: Both authors are subject to IPCC interim report deadlines on 10th December; this has prevented lengthy consideration of the details of the paper prior to the 3rd December deadline for submission of this abstract, in particular material of specific relevance to the conference theme. This abstract is therefore a highly preliminary draft. The contents of the final submitted paper will expand considerably on the material indicated in the abstract, and will focus in more detail on the conference themes. A more detailed abstract could be made available by mid-December if required.]

ABSTRACT - NOT FOR CITATION

The Economic, Developmental and Livelihood Implications of Climate Induced Depletion of Ecosystems and Biodiversity in Africa

Introduction

Climate variability and change combined with a number of other factors – e.g. HIV/AIDS, access to resources (e.g. land and water), effective governance and political will – are shaping development pathways in Africa. While much still remains to be done to better understand these factors and their mix of influence, much has already been done to understand the possible impacts of ‘deadly duos’ – climate change and HIV/AIDS, (e.g. Gomme *et al.*, 2004) or climate variability and biome loss; the impacts of climate variability and erosion of livelihoods; and winners and losers under climate change. In this paper, some of these narratives and their development implications will be explored.

Previous indications of climate impacts and changes that may occur in Africa by the IPCC (2001) included the identification of some key impacts such as the potential impacts of the North Atlantic Oscillation on fisheries in north-western Africa; sea-level rise and possible impacts in parts of Egypt and the river Nile; rainfall variability implications for parts of the Sahel and possible associated impacts on species composition; population and livelihood impacts of associated changes with sea-level rise in coastal areas such as Banjul in Gambia and Lagos in Nigeria; possible changes in East African Great Lakes and associated impacts for livelihoods dependent on resources derived from these lakes; potential loss of the succulent Karoo biome projected under climate change and associated biophysical and socio-economic impacts; in addition, several other changes may include possible positive impacts, e.g. biome shifts in southern Africa may favour certain industries over others e.g. horticulture over plantation forestry (IPCC, 2001, p. 522).

In much of Africa, the interplay between poverty, climate, political governance, conflict and HIV/AIDS is combining to produce a rather depressing potential future scenario. Indeed the IPCC in some of its *key findings* in the previous assessment (2001) indicated that “Most countries in Africa are particularly vulnerable to climate change because of limited adaptive capacity as a result of widespread poverty, recurrent droughts, inequitable land distribution, and dependence on rain fed agriculture” (IPCC, 2001:66). In the recently produced Millennium Ecosystem Assessment for Southern Africa (2004) the conclusion reached is similar “At least four of the eight Millennium Development Goals (reducing hunger and child mortality, combating diseases, and ensuring environmental sustainability) will not be met in the region unless attention is given to stabilising ecosystems’ (SAMEA, 2004:iii).

Improved understanding of the relative contributions of the mix of biophysical and socio-economic and human factors to changes and how people and ‘environment’ are connected and influence response options in Africa, are thus critical. Some of the potential links between climate change and development are illustrated here for southern Africa, and will be further explored in other parts of Africa in the more detailed paper.

Linkages between climate variability and water resources in southern and eastern Africa

The linkages between climate variability and resources can be illustrated using water as a critical livelihood resource. When one examines some of the global circulation models (GCMs) outputs in relation to future rainfall scenarios in southern Africa, a number of 'outlooks' or situations are depicted. Notwithstanding the uncertainty and lack of agreement in the models, it would seem overall that that rainfall may increase in the northern and eastern parts of the region and decrease in the southern and western parts by about 15% in some cases (SAMAE, 2004).

Coupled to possible variations in rainfall are a number of possible changes that may be induced in the hydrological regime. Decreases in annual runoff, for example, over much of South Africa, and over parts of eastern Zimbabwe and most of Mozambique are indicated when using some models. Enhanced runoff may, for example, be anticipated over northern Zambia and Mozambique as well as over eastern Tanzania, with the most significant increases predicted for Kenya (Schulze, Meigh and Horan, 2001; Vogel, 2004). Overlaid onto these scenarios of climate and related hydrological change is the possibility that these changes may also be exacerbated by 'shock' events e.g. drought and floods.

Residents in the region, particularly the poor, are usually those most exposed and negatively impacted by 'weather' and climate shocks. At a macro level such periods of stress also unleash a variety of 'knock-on' impacts. The droughts of the early 1980s and 1990s, for example, seriously impacted the southern African region reducing cereal production, water supplies with resultant impacts on GDP. The loss of farm workers' jobs and the reduction of overall livelihoods for many have also been noted (see for example, Benson and Clay, 1998) and several case studies for areas in southern and other cases in Africa will be profiled in the more extensive paper.

The links, however, between water availability, 'governance of water', 'ability to pay for water' and other issues related to consumption are also key fundamental contributing factors that require further detailed research in the southern African context. These factors are often usually exacerbated or 'revealed' during periods of scarcity triggered by droughts and floods. The implications for changes in water availability (ignoring issues of water access, although these are critical as will be shown later) for the region are therefore critical considerations particularly when viewed against the backdrop of possibly climate variability in the region that has been described above (SCF Report, 2002 - Vogel; Vogel, 2004).

Some socio-economic impacts and vulnerabilities exacerbating climate variability in southern and eastern Africa

Notwithstanding the current concerns about climate change and its impacts there are also a variety of socioeconomic factors that are combining to shape vulnerability and adaptation to stress (e.g. climate variability) in the region. These include macro-economic changes that are contributing to change (e.g. globalisation and structural adjustment, HIV/AIDS, civil conflict and weak governance). Several of these are rooted in complex socio-historical and economic policies in the past. These have usually resulted in differential allocations of ecological services, political rights, and access to and ownership of resources in the region raising complex issues of social justice that still have impact on the region today and are ongoing (Vogel, 2004).

All too often the focus in climate change is narrowly tied to various sectors or impacts. Health and climate is a good example. The issue of health and climate change is usually treated and examined with reference to those health related aspects directly linked to climate e.g. malaria. In Africa, however, another health issue is already making people more vulnerable to the possible impacts linked to climate change. The impact of HIV in the region, although limited by accuracy of data, is well documented. The impact of such health stress on people's livelihoods is also becoming better researched (Republic of South Africa, 2003).

Although difficult to project accurately a number of impacts coupled to HIV/AIDS for Africa and climate change have been offered. A recent study on the Rwandan case (where one has the combinations of civil conflict, governance, HIV/AIDS and environmental change), for example, shows that despite crops being planted in 1994, for example, and crops being in good condition there was *no one there to harvest them* (Gommes *et al.*, 2004, 18). As this brief excerpt from the study shows and the authors conclude:

“Climate, weather and environmental conditions are relevant for HIV/AIDS Early Warning Systems: they interact with the dynamics of HIV/AIDS because they condition the density of populations, affect their nutrition and health status and often trigger the seasonal or exceptional movements of people. For each of these aspects, it is necessary to distinguish chronic and acute situations, which in turn are often associated with chronic and acute weather anomalies (Gommes, et al., 2004, 19).

Conclusion

This brief abstract has attempted to show the complex interplay between climate variability, climate change, and development. The potential losses and gains under various climate scenarios need further examination. What is key, however, is the need for further research that is required on the nexus between climate change and development so that potential interventions can be made sustainable. It is generally agreed that the best option to reduce Africa's vulnerability to climate change is adaptation. Pervasive poverty and underdevelopment, particularly in the rural areas has forced a sizeable proportion of the population to make their livelihoods from mining ecosystem resources. With a climate-induced depletion of ecosystem resources and biodiversity in Africa, there is a growing tendency for a collapse of the livelihood systems of these populations.

As this brief abstract has attempted to show, one of the key issues will be enabling the '*call on the trade-offs between adaptation measures*' For example, do we require more Early Warning systems in Africa or should we be trying to better twin such efforts with development activities that could be linked to Early Warning e.g. better clinics and HIV interventions? Do we need to construct more dams or do we need to better understand local water harvesting and seed varieties to become 'drought proofed'? Arguably more critically, do we need to increase our understanding of the issues shaping who gets access to water including water pricing etc in parts of Africa? How successful has Africa been in mainstreaming climate change into development? How can the adaptive capacities of the local populations be increased to sustain developmental activities in the face of climate change? These are not easy questions to answer but they raise some of the issues that may be required if one is to really begin to address climate change and development in Africa.

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