

Coping with drought – do science and policy agree?

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Arid regions—which occupy about half the surface area of South Africa—experience highly variable rainfall and frequent droughts.¹ Natural ecosystems have adapted to this climatic variability, as have the human societies which inhabit arid zones, demonstrating intricate and diverse adaptation strategies to drought. Primarily, these communities respond to drought by evasion (seasonal migration) or endurance (e.g. through forage management, changing livestock types and numbers, water and soil conservation and finding alternative sources of income).² Our need to understand both natural and social responses to drought is made all the more important by the fact that the frequency and severity of droughts is expected to increase in response to anthropogenic climate change.³

Drought has been researched in South Africa since early last century, and drought losses have long been attributed to poor vegetation, soil and water management.⁴ It has been argued that the impacts of drought have been exacerbated by the absence of a sufficiently complete management strategy.⁴ But are our policy-makers making informed and sensible decisions, in light of the severity of water stress in South Africa? And how will climate change impact on our adaptation strategies?

Six papers in this issue, emanating from the Arid Zone Ecology Forum of 2007, discuss drought in arid areas, and particularly how its social and ecological effects are interlinked. Finding ways to reduce the impacts of drought on both ecosystems and society should be a major

research focus. The ability of land users to deal with drought is becoming progressively dictated by the resilience of their agro-ecosystems; the diversity of livelihood options; and whether or not they have access to resources and good institutional support.⁵ For the rural impoverished in South Africa, alternative sources of income, such as formal employment, pensions and state grants, have become increasingly important, with farming now primarily serving as a safety-net against unemployment. Yet there seems to be a mismatch between government policy and socio-economic realities on the ground: the South African Department of Agriculture is promoting full-time reliance on commercial livestock production, against a background of economic, climatic and political uncertainty.⁵

It also appears as if it is not just the Department of Agriculture for which drought management is not a policy priority. Despite South Africa's water-stressed status, half of the 12 proposed projects for the Accelerated and Shared Growth Initiative for South Africa are water-intensive and unlikely to be sustainable (J. Blignaut pers. comm.). These include a biofuels initiative that will include cultivation of crops in the Northern Cape and Free State, both provinces that have suffered severe droughts in recent years. By 2000, we had allocated almost 99% of that year's surface water yield and 41% of the annual usable potential groundwater to human use, primarily for irrigation.⁶ Only 1.4% of South Africa's water yield is available to meet the needs of the poor, most of whom have no access to piped potable water.⁶ Increased aridity will demand the adoption of water-saving technologies, with increased input costs, which will pose further challenges, particularly to emerging farmers.⁶

A search of the literature reveals that relatively few studies have been conducted on the ecological effects of drought. Hoffman *et al.*,⁷ in reviewing the four published studies conducted on vegetation in the Succulent Karoo, found that they failed to reach consensus on how drought impacts plants in that biome, mainly because they employed various methods and measured different variables and responses. A review of the literature by Dean *et al.*⁸ found that faunal responses to drought differ strongly both within and between vertebrate and invertebrate phyla. Again, investigations into the resilience of resident bird populations to droughts in southern Africa have revealed different responses, most likely because intensive long-term studies have not

covered a full cycle of dry and wet years, and perhaps also because the subtler drivers of avian responses remain unexplored.⁸

Ecosystem responses are usually revealed only over time, and nowhere is this truer than in arid areas. Long-term research is therefore essential, and it is imperative that the South African research community and government agree to a suite of coordinated long-term field observations, experiments and models to inform agricultural policy and conservation planning. This may be an opportunity for the recently-established arid zone node of the South African Environmental Observation Network to develop and drive research and monitoring programmes that integrate ecological, social and economic impacts, ensuring that research contributes to our understanding of long-term variability and habitat change.

But research will have no impact on livelihoods unless there are mechanisms in place for translating findings into policies which address the needs of society in response to drought. The challenge here for institutions such as the South African National Biodiversity Institute and the Agricultural Research Council, is to convey information from researchers to government, as well as convince government that continued support for research will yield long-term dividends. The challenge to government—translating research recommendations into policy—is even more difficult, but no less crucial.

The 2007 special drought session of the Arid Zone Ecology Forum, and the papers emerging from it,



Sheep in an arid Karoo landscape near Namies in the Northern Cape province of South Africa.

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