

Counting the cost of climate change in Namibia

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When most of a country's wealth is in the wild, shifts in natural systems can wreak havoc with its economy. Namibia is a case in point. Its natural legacy underpins much of the national bank balance — and also leaves it highly vulnerable to the impacts of climate change. In fact, research suggests the impacts on natural resources alone could reduce the country's GDP by 1 to 6 per cent. The need to mainstream climate change into national policies and planning is clear, not least because the poor will be most affected. Employment opportunities could shrink and wages fall, with incomes for unskilled labour dropping by 24 per cent in a worst-case scenario. So along with 'climate-proofed' policies and activities, Namibia needs a strategy to deal with displaced farmers and farmworkers. But it is up to industrialised nations — the most responsible for climate change — to help Namibia and other vulnerable countries cope with the impacts and plan for a climate-constrained future.

Vulnerability to climate change

The realisation is growing that poor nations will suffer most from the effects of climate change. This vulnerability stems partly from their location in areas such as drought-prone sub-Saharan Africa or flood-prone Bangladesh. Their capacity to cope with climate change is also low because of limited financial resources, skills and technologies and high levels of poverty. And they rely heavily on climate-sensitive sectors such as agriculture and fishing. Namibia is very dependent on natural resources: some estimate that up to 30 per cent of its GDP is reliant on the environment.

Ironically, it is also these poor nations that have contributed least to climate change. Data covering 1950 to 2000 from the Climate Analysis Indicators Tool, developed by the World Resources Institute, indicates that African countries contributed 4.6 per cent of cumulative global carbon emissions during that period. Today their share of emissions is just 3.5 per cent of the total. Namibia was in fact estimated

to be a net sink for carbon dioxide in 1994 due to the large uptake of CO₂ by trees. The country contributed less than 0.05 per cent to global CO₂ equivalent emissions in 1994, even when this carbon sink is excluded from calculations.

Increasingly, countries are recognising the need to assess the likely impact of climate change on their desired development pathways, and to ensure all policies and activities are 'climate-proof'. While climate change clearly must be mainstreamed into policies and planning, the way this will happen is less clear.

The forecast for Namibia

Temperatures in Namibia have been rising at three times the global mean increases reported for the 20th century. The rise in temperature predicted for 2100 ranges from 2 to 6°C. Particularly in the central regions, lower rainfall is expected, while overall rainfall is projected to become even more variable than it is now. Even if rainfall changes little from today's levels, hotter temperatures will boost evaporation rates, leading to severe water shortages. Poor rural pastoralist and dryland populations will be affected most. Extreme events such as drought are likely to become more frequent and more intense.

There may be less plant cover and productivity on grassland and savannah in response to relatively scant rainfall and more evaporation. Grassy savannah may also become less dominant as desertification occurs in some areas, and shrubs and trees benefit from higher levels of CO₂ in others. Impacts on the marine environment are uncertain, but scenarios range from dramatic ecosystem responses that reduce their overall productivity to more intense coastal upwellings — the wind-driven movements of cooler, nutrient-rich water to the ocean surface — which would increase productivity.

Quantifying the impacts

Namibia's advanced Natural Resource Accounts (NRA) help to evaluate the contribution of the environment to national wealth by developing

KEY MESSAGES:

- Over 20 years, annual losses to the Namibian economy could be roughly 1 to 6 per cent of GDP because of the impact climate change will have on the nation's natural resources.
- The impacts will fall hardest on the poor. Work opportunities will decrease and wages decline. Even under a best-case climate change scenario, a quarter of the population will need to find new livelihoods.
- Climate change is clearly a key influence on economic growth in Namibia. Nations such as Namibia can no longer ignore the contribution of the environment to, and the importance of environmental sustainability for, national wealth in the face of the climatic shifts.

so-called 'satellite' accounts for natural assets such as fish, forests, wildlife, water and minerals. Data from the NRA can be fed into the conventional national economic accounts. This capability potentially allows for sound sustainable development planning that includes natural resources as well as man-made or owned assets — a clear advantage for policy makers in economies such as Namibia's, which is so dependent on natural resources.

In NRA, natural assets are valued in two ways. First, the values of the total natural resource stocks are measured using the appropriate metric unit for area or volume. These are treated as capital assets in the stock or asset account. Secondly, their annual contribution to national income in terms of direct use values is measured in the production or flow account. Changes in the capital stock from year to year are also reflected in the national income.

| Values | Current GDP contribution (%) | Changes expected due to climate change (%) | Effect on GDP (millions N\$) | Confidence in range of change |
|--------------------------------|------------------------------|--|------------------------------|-------------------------------|
| Use values: | | | | |
| Cereal production | 0.5 | Decrease (10-20) | -16 to -32 | Low to medium |
| Crop production | 1 | Decrease (10-20) | -32 to -65 | Low to medium |
| Livestock production | 4 | Decrease (20-50) | -264 to -660 | Medium |
| Traditional agriculture | 1.5 | Decrease (40-80) | -197 to -395 | Medium to high |
| Fishing | 6 | Increase(30)/decrease(50) | 0 to -990 | Low |
| Tourism | 2.3 | Increase/decrease | - | Low |
| Forests | + * | Unchanged | 0 | Low |
| Non-use value | + * | Decrease | - | Low |
| Total value | | | -509 to -2142 | |

* Not included in the traditional national accounts

Data from the NRA was fed into a Computable General Equilibrium (CGE) model, which uses actual economic data to determine how economies respond to policy or other changes. This revealed that under a best-case scenario, agricultural impacts would be partly offset by improved water distribution, there would be no impact on fisheries and the overall GDP would fall by only about 1 per cent. Under a worst-case scenario, large-scale shifts in climate zones would reduce agricultural and fishing outputs, and the overall GDP would fall by almost 6 per cent over 20 years. However, this estimate constitutes only a fraction of possible climate change impacts because it considers only two economic sectors – agriculture and fisheries – and ignores impacts such as those on health, infrastructure and energy that relate less to natural resources and that other country studies have shown to be significant. The estimate also ignores non-use values such as 'option values' for future use or 'existence values' of just knowing that an area or species exists.

Namibian natural resource experts have further worked to quantify, as much as possible, the economic impacts of climate change on Namibia's natural resource base. Estimates of how climate change will affect various sectors, and subsequent translation into economic impacts, can only be best guesses. Expert estimates suggest, however, that over 20 years, annual losses to the Namibian economy could be between 1 and 6 per cent of GDP — that is, between US\$70 million and \$200 million — if no action is taken to adapt to climate change.

Who will be hit hardest?

Combining data from the NRA with Namibia's Social Accounting Matrix (SAM) provides the chance to see who will be hit hardest by the impacts of climate change on the environment. The SAM is a database that provides information on activities in different economic sectors and helps identify the poverty status of different groups. Evidence from low-income countries around the world suggests that the people likely to be most affected by climate change are the poorest and most vulnerable. And in Namibia, results show that climate change impacts will hit the poor hardest, with employment opportunities constrained and a substantial decline in wages, especially for unskilled labour.

Even under the best-case scenarios generated by the CGE model, subsistence farming will be sharply reduced. In the worst-case scenario for agriculture, labour intensive livestock farming is

hit hard, and while high-value irrigated crop production could thrive, job creation in this area would be minimal. Thus, even under the best-case scenario, a quarter of the population will need to find new livelihoods. Displaced rural populations are likely to move to cities, which could cause incomes for unskilled labour to fall by 12 to 24 per cent in order to absorb the new workers. Income distribution in Namibia is

already one of the most uneven in the world and this inequality is likely to increase. What this will do to social cohesion, if no counteracting policies are put in place, can only be imagined.

IIED is conducting a second study in this project series 'Estimating the economic costs of climate change' in Tanzania. This work is ongoing and publication is expected in April 2008. If you are interested in participating in this project in Tanzania, please contact James MacGregor at james.macgregor@iied.org.

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