



Water Security for Development in an Uncertain Climate

Key messages:

- Integrating water security and climate resilience into development planning, rather than pursuing it as a separate agenda, is a good long-term strategy.
- The economic cost of inaction could be very high, and governments should protect their investment against derailment by future climate change.
- Building climate resilience requires coordination across water and non-water institutions at many levels.
- Investing in no/low regret adaptation options is a good starting point for action.
- Achieving water security for growth and development in a harsher climate calls for increased investment in all aspects of water management.

Improving water security is a prerequisite for growth, development and poverty reduction. It is the link between food, energy and economic growth. Yet, most African countries are far from achieving water security, and without it their development prospects are compromised. As climate risks increase, water security becomes even more difficult and costly to achieve.

Strategies, plans and investments that promote sound water resources management are a cost-effective way of delivering immediate development benefits while building resilience to longer term climate change.

Climate variability has been shown to reduce growth; in the case of Ethiopia by as much as 38% per year¹. Floods and droughts have a big impact on the economy as well as causing loss of livelihoods and life. In Kenya, the 1997–98 floods caused GDP to drop by 11% and the drought of 1999–2000 a further drop of 16% of GDP². In Rwanda, the direct economic costs of the 2007 flood were estimated to be US\$4–20 million in two regions. In 2002, 13 million people in southern Africa needed food relief due to drought. In September 2011, 13.3 million people in the Horn of Africa required drought relief in the form of food assistance. Resilience, through investment in better water management and infrastructure, can reduce such negative impacts on GDP and human welfare.

The challenge of climate change uncertainty

Climatic fluctuations are nothing new in Africa. Most countries experience cycles of drought, flooding and other extreme climatic events that cause damage, suffering and disruptions to their populations. These climatic events have serious economic consequences that can derail a government's best intentions and set back progress in development by years. Such experiences provide a sober warning of what could be in store in future with the climatic changes that increasingly seem likely. For many countries, climate change implies the worsening of already familiar climatic fluctuations, with the addition of new threats and risks.

1 Grey, D. and Sadoff, C.W. 2007. Sink or Swim? Water security for growth and development. *Water Policy*, 9(6): 545–571.

2 Lenton, R. and Muller, M. (ed). 2009. *IWRM in Practice*. GWP, Earthscan, UK.

Projecting climate change trends into the future is a complex science. It seems very likely that temperatures will increase throughout Africa, and at a higher rate than global average increases. Rainfall projections are much less certain, with some climate models predicting increases in rainfall in some areas and others predicting decreases, although they do all predict that storm rainfall will become more intense. This uncertainty is also evident for predicted streamflow runoff across Africa, as illustrated in Figure 1, which shows the results from the projections of six different global climate models (GCMs).

This uncertainty is unhelpful to planners and policy makers. It will take time for climatic trends to become apparent but in the meantime action cannot wait, and decisions that will have long-term

consequences have to be made, based on imperfect judgements about the future. This leads to two main climate challenges:

- How to proceed with development ambitions in the face of this uncertainty?
- How to make decisions which will not lead to regrets if the climatic futures unfold differently from what is expected?

It is worth noting that the impact of climate change will not be negative in all situations for all parties. There will be gains as well as losses between countries, and between different sectors and individuals, depending on their situations and the form which climate change takes. To make the most of the positive opportunities, however, societies need to be adequately informed about climate scenarios.

- **No/low regret investments** are characterised by acceptable returns whichever climate change scenario materialises.
- **Climate change risky investments** give acceptable returns without taking climate change into account, but give low returns if climate change materialises. If feasible, it is important to reduce the climate risk of these investments
- **Climate change justified investments** yield acceptable returns under a climate change scenario, but would not necessarily be considered in the absence of climate change.

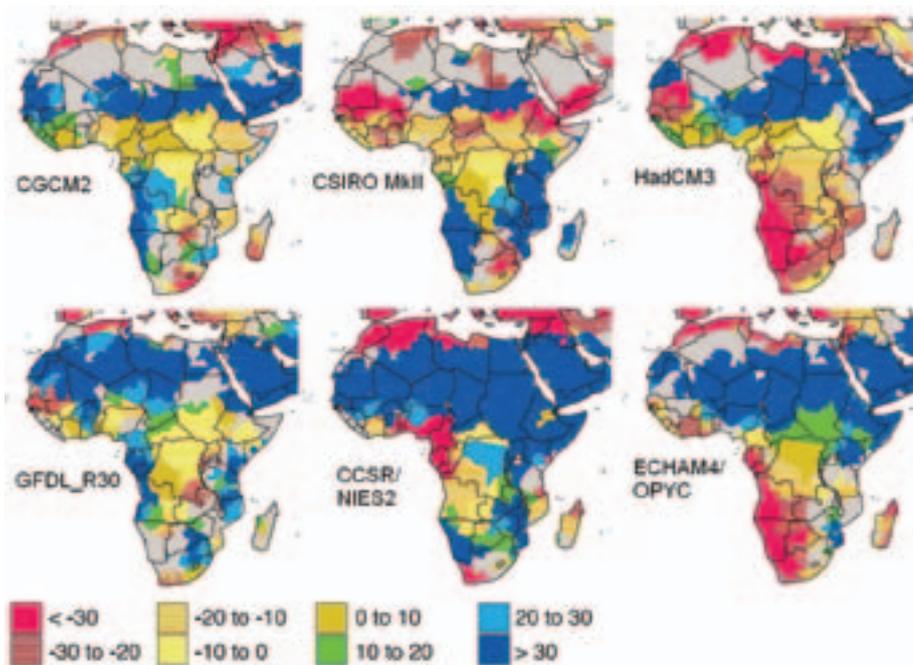


Figure 1. Projected climate change impacts on runoff in Africa by the 2050s under six different climate models (% change in average annual runoff by 2050 compared to 1961–1990 for the SRES–A2 emissions scenario) a change of less than one standard deviation is shown in grey³.

Promoting no/low regret investments as a priority

A starting point for the integration of water security and climate resilience in development planning is the formulation and prioritisation of no/low regret investments, i.e. those which have a high chance of success against the full range of uncertainty in climate change and other future drivers.

Some no/low regret investment decisions will be those dealing with the existing level of climatic fluctuations, which many African countries are still not well protected against. The backlog of such investment has been termed the adaptation deficit, and will be a sizeable part of many countries' investment portfolio.

Although no/low regret investment programmes are desirable for their independent benefits (Figure 2a), climate risks cannot be altogether avoided when managing a highly variable natural resource such as water. In such situations identifying and minimising climate risks

³ Kundzewicz, Z.W., Mata, L.J., Arnell, N.W., Döll, P., Kabat, P., Jiménez, B., Miller, K.A., Oki, T., Sen, Z. and Shiklomanov, I.A. 2007. *Freshwater Resources and Their Management. Climate Change 2007: Impacts, Adaptation and Vulnerability.* Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Parry, M.L., Canziani, O.F., Palutikof, J.P., van der Linden, P.J. and Hanson, C.E. (eds)]. Cambridge University Press, Cambridge, UK. pp. 173–210.

will offer benefits to long-term programme performance (see Figure 2b) by decreasing their sensitivity to uncertain climate futures.

The broad choices for minimising risk follow the principles below:

Do things differently

- Can the design be altered to reduce risks?
- Can the investment be implemented in stages to allow for climate change to unfold before making further decisions?

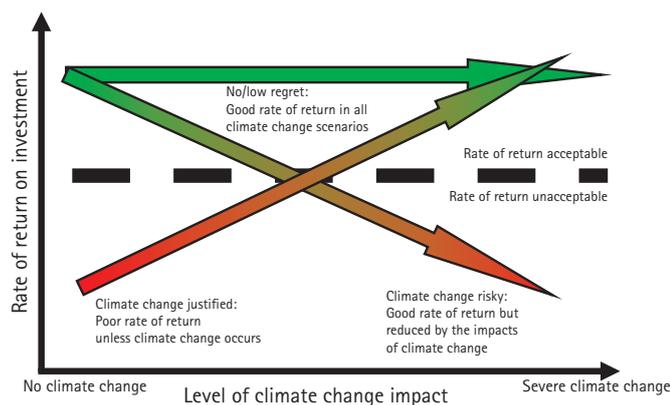
Do different things

- Are there alternative ways of achieving the investment returns with lower climate risks?
- What innovative technologies, management systems and insurance can be used to reduce risks?

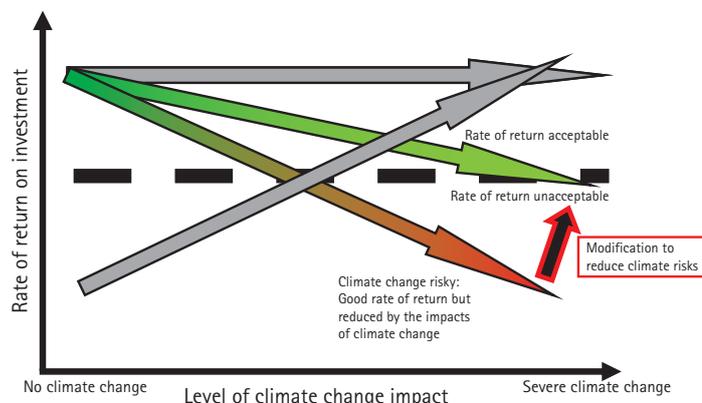
Enhancing the robustness of decisions could, for example, also include: (i) starting pilot projects and using the evidence generated to make more informed decisions, (ii) staging of investments into progressive phases, (iii) improving policies and strategies for sound water management, and other 'soft' options that do not irrevocably commit large amounts of money and resources, or (iv) ensuring large investment commitments are informed by further research/study.

When risk minimisation is not possible, economic development planners must make the decision as to whether the climate risks can simply be borne by the government as acceptable given the urgent needs which the investment addresses.

While it makes sense for countries to give priority to no/low regret investments, it is also important to consider other investments that would be vital if and when climate change comes about. These are 'climate change justified' projects which can be regarded as insurance against future climate change.



(a) Characteristics of investment types



(b) Minimising climate risks to increase performance under climate change

Figure 2. Illustration of no/low regret, climate change risky and climate change justified investments in terms of returns under different levels of climate change.

Financing strategies for climate resilient development

To finance these investments there is no one-size-fits-all solution. Water investment is a tangle of cases including both the water resource and the many services it provides (for example, household water supply, irrigation, industrial use, flood defence, pollution management, ecosystem support, navigation, hydropower). Each of these has to be handled differently from a funding point of view, and a mixture of public and private funding, with cost recovery from users, is likely to be appropriate, depending on the case. Once investment needs have been

prioritised, appropriate funding sources can be mapped to them.

Specialised climate funding is another option. Most existing specialised funding is earmarked for mitigation, whereas most water projects relate to adaptation – finance for which is presently only available from a few sources and on a modest scale. The prospect of a Green Climate Fund could transform the financing situation for adaptation measures. Meanwhile existing climate funds should be fully exploited by African countries in conjunction where possible with mainstream sources of project finance.

Integrating climate resilience in development planning

Integrating water security and climate resilience into development planning, rather than pursuing it as a separate agenda, is the better long-term strategy. It requires action across a range of governance levels and sectors. Key actions include:

- increasing the priority of water security and climate resilient development in plans and programmes at all levels;
- allocating resources to priorities of water security and climate resilience;
- addressing water security and climate resilience as a cross-sectoral policy;
- monitoring the performance of existing institutional, financial and coordination systems in relation to water and climate;
- investing in relevant information that would reduce the uncertainty over the impacts of climate change;
- promoting donor coordination and alignment to national development objectives.

The selection and financing of investments to boost the climate resilience of development efforts will also call for new and enhanced skills in a range of areas including:

- hydrological monitoring, data collection and analysis;
- downscaling and interpretation of global and regional climate models;
- climate vulnerability and impact assessment;
- climate sensitive programme and project design;
- financial and economic appraisal techniques;
- stakeholder engagement and consultation; and
- public awareness and education.

Summary of recommendations

- Uncertainty over the impact of climate change should not stand in the way of taking immediate steps to improve climate resilience.
- Sector strategies, plans and investments should promote sound water resources management as a cost-effective way of both delivering immediate development benefits and building resilience to longer term climate change.
- Central government should take a leadership and coordinating role in national climate resilient development, and act as a driver for change through line ministries and local government.
- Priority should be given to no/low regret investments (i.e. those that have a high chance of success under a full range of climate futures) as a start-point for the integration of water security and climate resilience in development planning.
- New funds offering finance for climate adaptation should be fully exploited, in combination with funding from conventional sources.



Recommended further reading:
 GWP/AMCOW. 2012. *Water Security and Climate Resilient Development: Strategic Framework*. GWP, Stockholm, Sweden.

GWP/AMCOW. 2012. *Water Security and Climate Resilient Development: Technical Background Document*. GWP, Stockholm, Sweden.