Investing in water security
for climate resilient growth and development

Policy Brief | No. 4

Managing Risks and Making Robust Decisions for Development

Key messages:

- Despite growing scientific consensus about the likelihood of future climate change there is a wide margin of uncertainty about its impact on particular countries and how specific economic sectors, public health and social conditions will be affected.
- Uncertainty over the impact of climate change should not stand in the way of immediate steps to improve climate resilience.
- Robust Decision Making (RDM) is an approach that aims to produce decisions that governments will not regret, no matter how the future turns out.
- No/low regret investment decisions will deliver benefits whichever climate change scenario materialises.

There are wide margins of uncertainty in future climate change. Leaders of today and tomorrow will need to embrace this uncertainty in their decision-making processes if timely progress is to be made toward achieving water security to underpin economic growth and climate resilient development.

Water, climate and development

Productive sectors such as energy, industry and agriculture depend on water, with major macro-economic benefits across the whole economy. The social returns are also high, with employment opportunities in rural areas through agriculture and in urban areas through water-dependent industries. The IMF[1] has warned that deteriorating climatic conditions could lower GDP growth due to reductions in output and productivity, particularly in the least developed countries and in sectors such as agriculture, fisheries and tourism. The risk of disasters, such as severe flooding, can undermine economic growth as well as social development.

Climatic fluctuations are nothing new in Africa. Cycles of drought, flooding and other extreme climatic events cause damage, suffering and disruption with serious economic consequences. These can de-rail 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 with future climatic change. For many countries, climate change implies the worsening of historically familiar climatic fluctuations, with the likelihood of new threats and risks such as rising sea level, new diseases and more frequent storms.

Uncertain climate futures

Although there is growing consensus in the scientific community about the likelihood of future climate change, there is a wide margin of uncertainty about its impact on particular countries, regions and districts, and its further impact on specific economic sectors, public health and social conditions.

Such uncertainty complicates the task of policy-makers faced with decisions with long-term consequences, based on imperfect judgements about the future. However, even where climatic projections cannot be made with a satisfactory degree

1 http://www.imf.org/external/np/exr/facts/enviro.htm February 2009 and http://www.imf.org/external/pubs/ft/weo/2008/01/pdf/c4.pdf

of confidence, often the risks can be conveyed in terms useful to policy-makers – e.g. using qualitative descriptions of climate variability, narratives of likely changes, and information about the likely direction of change.

Making robust decisions

Uncertainty over the impact of climate change should not stand in the way of taking immediate steps to improve climate resilience. Robust Decision Making (RDM) is an approach that aims to produce decisions that governments will not regret, no matter how the future turns out. These decisions give priority to no regret or low regret investments since these would be the right choice whether or not the predicted climate change takes place.

Some of the benefits of the approach include:

- It can be applied to plans, policies and projects already in place, or being developed, to meet national economic growth and anti-poverty aims.
- It accepts the future uncertainty as a fact, but instead of attempting predictions and the estimation of probabilities, uses a different logic. It asks what future conditions would render the investment vulnerable, and seeks to bolster the investment against those eventualities.
- It reaches decisions that perform well over a range of plausible futures, even though they may not be the best for any specific future state.
- It can be applied to both 'hard' investments in infrastructure and equipment, as well as 'soft' investments entailing, for example, changes in policies and procedures, research, and capacity building.

Robust decisions might, for example, include:

- deciding to carry out further data collection and research to understand climate risks prior to undertaking substantial investment;
- starting pilot projects to produce evidence and experience that can later be scaled up; and staging of investments into phases or increments, to be progressively added as the climatic situation evolves;
- investing in disaster risk reduction measures, such as early warning systems;
- introducing water demand management measures and other 'soft' options that bring immediate benefits and do not irrevocably commit large amounts of money and resources;
- investing in building the adaptive capacity of water and land management institutions;
- investing in, or providing incentives for, water efficiency measures including new technologies and operation practices.

Some no/low regret decisions deal 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 may be a sizeable part of many countries' investment portfolio. Such climate resilient investments are virtually inseparable from the national development agenda.

Climate change is a gradual process, compared to the life cycle of most investments and programmes. In reality, many existing assets (buildings, infrastructure, equipment) will be little affected by prospective climate change, and may not need much modification before coming to the end of their productive lives.

For new investments still at the planning stage a different calculation is required. If it is possible to build in design features which anticipate climate change, at little or no extra cost, it is sensible to do so, since a small outlay now could save a much larger expense later. However, this calculation should take into account the discounted value of costs arising in the future, which could make it more rational to delay spending until the distant future, when it may or may not be necessary.

No/low regret investments can consist of: (i) modifications to existing water assets, systems and infrastructure, (ii) pursuing current development investments, again, modified as necessary if this can be

done cost-effectively, and (iii) building capacity to adapt through investments in information, research, education, and piloting (all of which will create greater awareness and resilience in future). No/low regrets investments should also consider alternative, and more sustainable means, of achieving a development outcome, such as the use of land management incentives and pollution control rather than costly and inadaptable infrastructure.

Governments should give priority to no/low regret options, but it is also important to consider other investments that would be vital if and when climate change comes about. These can be regarded as climate change justified, providing insurance against future climate change. The key policy issue is how much it is worth spending on climate insurance, or, in terms of investment programming, which climate change justified investments to select. This decision will depend on the risk preferences of governments and key stakeholders affected, and on the results of benefit–cost analyses showing the sensitivity of investments to different climatic futures.

Screening development portfolios

A process for screening development portfolios is shown in Figure 1 and investments to be screened would cover:

- existing water assets, systems and infrastructure (e.g. dams, flood defences, irrigation schemes, flood early warning systems, urban drainage);
- ongoing and future portfolio of water development investments (e.g. those under construction or included in national or sectoral development programmes);
- adaptation investments specifically developed under climate change adaptation programmes (e.g. National Programmes of Adaptation or Pilot Programmes for Climate Resilience).

The initial screening process would be a checklist with such factors as: vulnerability to climatic extremes; sub-sectors at particular risk; location in areas liable to flooding or storm damage; numbers of people affected; potential economic damage at stake; size of investment involved, etc. The screening would identify investments of major concern needing more thorough analysis. Box 1 identifies categories of water investments that would be susceptible to the impact of climate change.

The short list of investments identified by the above process will be further refined using benefit–cost appraisal, using sensitivity analysis based on different assumptions about future climatic states and their effect on the investment's benefit–cost ratio.

For instance, an agricultural investment programme might have an economic rate of return on the Base Case of 15%, which on sensitivity analysis might fall to 5% in the event of average rainfall being 25% less than predicted. One method of reducing this risk could be to diversify the crop mix, reducing the weight of profitable but climate-sensitive types and increasing the proportion of more drought-resistant crops. The resulting investment might have

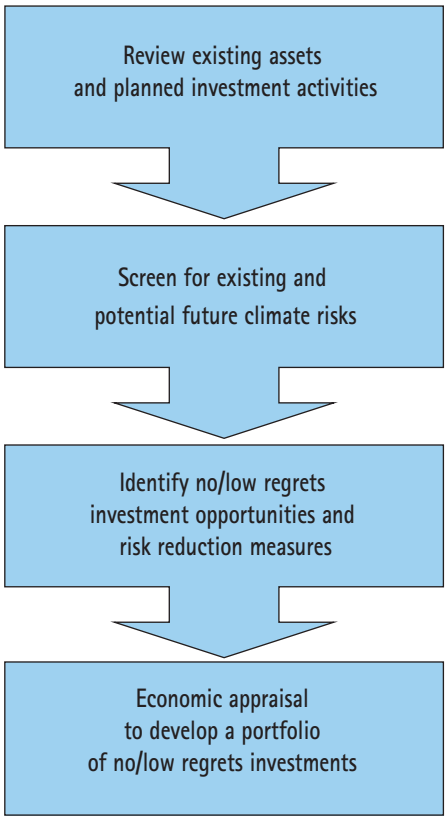

Figure 1. Schematic of the process for screening development portfolios.

Box 1

Water categories particularly sensitive to climate change[2]

- Highly capitalised or unique investments.
- Engineering structures with long lifetimes.
- Multipurpose infrastructure.
- Investments with long-lived benefits and costs.
- Systems susceptible to climatic anomalies of extreme events.
- Urban water supply systems.
- Water systems facing non-climate stress.

2 World Bank. 2009. *Water and Climate Change: Understanding the Risks and Making Climate-smart Investment Decisions.*

a rate of return of only 10%, but be resilient to climatic variability.

The final choice would involve trade-offs between rates of return and riskiness that emerge from the sensitivity analyses, and would need to take account of the risk preferences of governments and other key stakeholders.

Certain risks, though remote, might be so serious that investments with a good return on the Base Case would be rejected, while others, justified only on the assumption of climate change, would be considered to be a cost-effective form of insurance. The risk preferences of national leaders and key stakeholders will be a determining factor. In certain sectors (e.g. food security, urban flood risk, power supply, public health) it might be acceptable to pay a high 'premium' (for example in the form of an expensive climate change justified investment) to avoid a low-risk/high-damage event.

The three categories of investment that would emerge from this review and screening process would be:

- **No/low regret investments** – characterised by acceptable returns whichever climate change scenario materialises.
- **Climate change risky investments** – giving 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.

The balance between no/low regret and climate change justified investments in development programmes would differ from country to country.

Summary of recommendations

- **Government economic and investment planning, finance and spending departments carry out a review of their existing infrastructure, investments under implementation and those in the pipeline, to assess their exposure to climate risk.**
- **Investments are subjected to an initial screening process involving a checklist of factors to produce a shortlist of investments needing more thorough analysis.**
- **Shortlisted investments undergo detailed benefit–cost analysis involving sensitivity testing of their rates of return under different climate scenarios. The attitudes of national leaders and key stakeholders to risk are taken into account in investment selection.**
- **Climate change risky investments (including existing assets) are reassessed with the aim of making them more climate-resilient. If this is impossible to do cost-effectively they are dropped, or in case of overriding need the risk may be borne.**
- **No/low regret investments are given priority in a climate resilient water development programme. Some of these investments will address existing climate variability (referred to as the adaptation deficit).**
- **Selected climate change justified investments are included as insurance against future climate change.**

Key references

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Recommended further reading:

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

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