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## Policy pointers

**Climate information** will be increasingly important in the development of policy decision making over the next decades — but national climate information services (CIS) lack adequate investment in many countries.

**The ClimDev-Africa** programme is initiating support to CIS across the continent and has developed a theory of change-based evaluation approach to track these investments and measure their benefits in terms of developmental outcomes.

**Although the costs of** CIS can be specified, placing economic value on the benefits is more difficult. Out of the options available, the 'avoided losses' approach has the most potential.

**These are complex** issues, and ClimDev-Africa is starting to tackle them.

## Assessing the effectiveness of investments in climate information services

ClimDev-Africa is the first programme to support investments in climate information services (CIS) across the continent. It is managed by the African Development Bank, the Africa Union Commission and Africa Climate Policy Centre (part of the United Nations Economic Commission for Africa).

ClimDev-Africa is putting in place ways to assess the effectiveness and economic returns of CIS investments. This briefing describes how we are using the tracking adaptation and measuring development (TAMD) framework, together with other tools, to assess the costs and benefits of CIS investments.

### The ClimDev-Africa programme

The objective of ClimDev-Africa<sup>1</sup> is to facilitate the development of policies, practices, services, observation networks and stakeholder communication that enable the effective management of responses to climate change risks to development. ClimDev-Africa is managed by a consortium of three continental organisations. Their responsibilities are:

- Climate Change and Desertification Unit (CCDU) of the Africa Union Commission coordinates advocacy and provides political leadership and coordination.
- African Climate Policy Centre (ACPC) at the United Nations Economic Commission for Africa (programme secretariat) coordinates policy development and programmatic activities to build climate policy capacity through knowledge generation, advocacy and advisory services.
- ClimDev Special Fund (CDSF), managed by the Africa Development Bank, finances demand-

led investments for the generation and use of climate information.

ClimDev-Africa has three result areas: packaging and disseminating widely available climate information; quality analysis for decision support and management practice; and awareness and advocacy around informed decision making. Each of the management consortium members has responsibility for delivering parts of each result area.

The programme's immediate beneficiaries are regional economic communities, river basin organisations, national governments, parliamentarians, African climate negotiators and both regional and national climate, weather and hydrological organisations. The ultimate beneficiaries are urban and rural communities that have climate-sensitive livelihoods.

### ClimDev-Africa's evaluation approach

Table 1 (overleaf) sets out ClimDev-Africa's monitoring framework and evaluation approach

(MFEA). CIS investments made through the CDSF will be assessed through ex-ante, mid-term and ex-post case study evaluations that take place before, during and after investment. Programme evaluation will also include:

**Conventional mid-term review:** this should look at ClimDev-Africa's performance across a number of different country contexts and explore how well the initiative is being coordinated across the three core partners.

**Evaluations of result areas to outcome:** this should be scheduled once sufficient time has elapsed after the generation of the majority of outputs to allow evidence on achieving the outcomes to become available. It should take a similar approach to the mid-term review as regards to data and information assessed, the examination of assumptions and risk and performance in different country contexts.

**Impact evaluations:** this type of evaluation can only be applied in certain circumstances and needs significant planning at the inception of the initiative, with early investment in baselines and the identification of counterfactuals. As a result, CDSF capitalisation is a very appropriate moment to consider if and how an impact evaluation of ClimDev-Africa will be carried out.

### Tracking CIS investments and identifying developmental benefits

To exemplify how the evaluation approach has been developed, we will concentrate on the first result area: packaging and disseminating widely available climate information.

The objective of this result area is to ensure that policymakers across Africa, policy support organisations and the population at large have access to comprehensive and appropriate climate information. ClimDev-Africa will support the upgrading of climate observation networks and infrastructure in order to enhance the provision of essential climate services for development policy and best practice.

In the first half of 2013, ACPC initiated pilot projects to improve CIS in Ethiopia, the Gambia and Rwanda. These first investments represent the test-bed for the evaluation approach. With the operationalisation of the CDSF, more CIS investment projects will be funded. The CimDev-Africa MFEA team has initiated initial case study evaluations prior to the CIS investment projects in Ethiopia and Rwanda. Further evaluations may be implemented for CDSF-funded projects in Kenya and Mali.

To understand the value of CIS investments for adaptation decision making — a complicated subject — we need a conceptual framework that can be worked into an analytical framework for application to actual cases. Figure 1 sets out how the tracking adaptation measuring development (TAMD)<sup>2</sup> framework can be applied to CIS.

Investments in CIS should drive improvements in climate risk management by people, enterprises and public authorities. Applying a systematic theory of change-based framework such as TAMD to these investments allows us to track the institutional and developmental effects (outputs and outcomes) of CIS. Adding the estimated costs of CIS investments — drawn from

**Table 1. ClimDev-Africa's monitoring framework and evaluation approach (MFEA)**

Level of the MFEA	Monitoring and evaluation	Information required	Evidence generated
<b>Outputs</b>	Monitoring of inputs and activities	Forecasts/ plans Activities completed Costs, timing etc	Progress reports and resources used
<b>Outputs to result areas</b>	Testing hypotheses Monitoring risks and assumptions	Progress along results chains Incidence of risks Changes in contexts Case studies	Effectiveness of activities to generate outputs
<b>Result areas</b>	Monitoring of outputs realised Evaluation of quality, value and relevance of outputs	Baselines Outputs generated Third party assessments of value, quality, etc	Efficiency of output generation Benefit cost ratios of outputs Influence of contexts
<b>Result areas to outcome</b>	Monitoring stages along results chain Identifying key determining factors	Tracking processes across different contexts Case studies	Key determining factors
<b>Outcome</b>	Outcome mapping	Case studies	Value of outcomes
<b>Impact</b>	Impact evaluation	Case studies Counterfactuals	Developmental benefits of interventions

investment budgets — and using output and outcome indicators can then help identify and quantify the benefits of such investments.

In the Ethiopia pilot project, we used the TAMD framework as a conceptual basis for structuring the evaluation prior to investment. This allowed us to establish a set of indicators to be assessed in subsequent evaluations. The four steps for this initial evaluation were to identify:

1. Investments in CIS and the resulting improvements in climate risk management (CRM) for the agencies or ministries that are providing the improved climate data
2. The clients of these agencies (the users of the data) and how the CRM improvements will translate into changes for them in terms of decision making and planning
3. Indicators along the theory of change pathway
4. Assumptions and risks: what contextual factors (social, economic, environmental) are needed for the investments to lead to the expected outputs and outcome?

ClimDev-Africa carried out the above preliminary evaluation process with staff from the Ethiopia National Meteorology Agency (NMA). Figure 2 shows the resulting theory of change pathway with indicators.

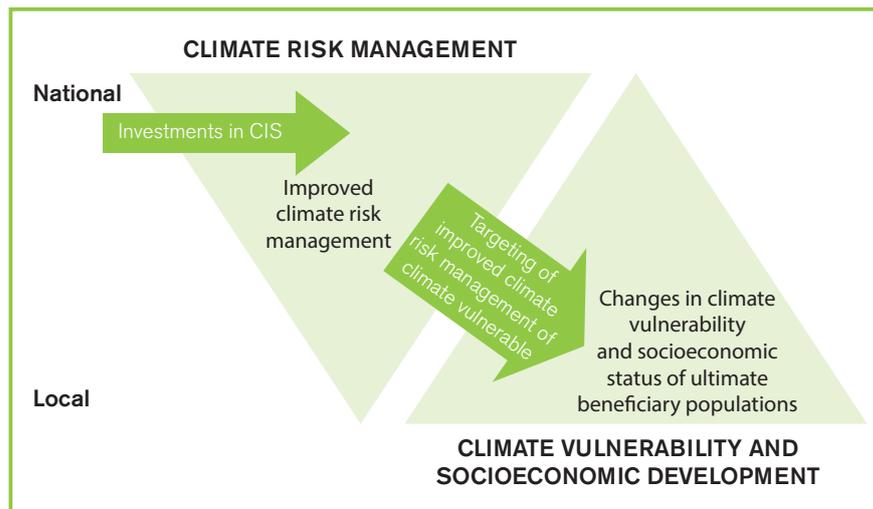
The outputs from the initial evaluation become the baseline data — agreed indicators that can be used to assess progress. They also provide the assumptions and risks that must be monitored to ensure better understanding of the performance of CIS investments. Using the outputs of the initial, mid-term and final evaluations will make it easier to assess progress as well as the significance of assumptions and risks.

### Options for assessing the economic costs and benefits of CIS investments

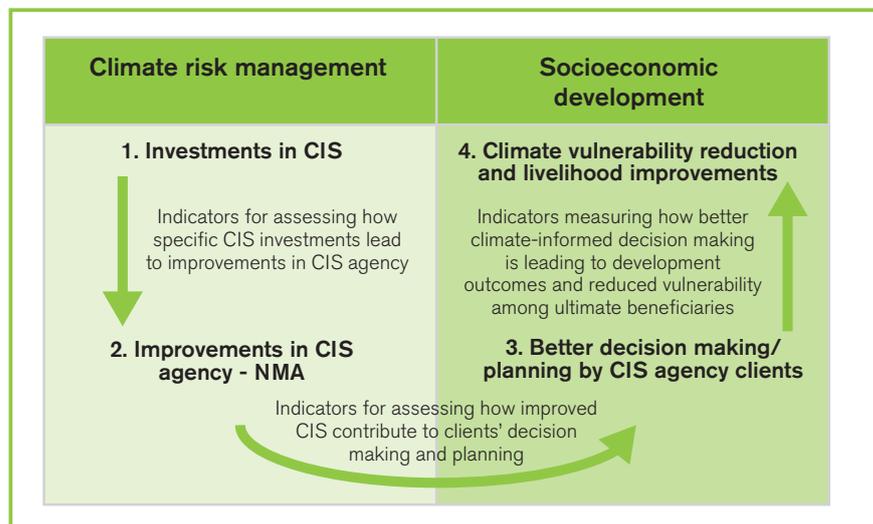
CIS can raise adaptive capacity for the climate vulnerable by reducing uncertainty about future weather and climate events. But before development policymakers choose to make investments in CIS, they need to be convinced of the likely economic returns. For that, they need access to economic cost and benefit information.

The main barrier to conducting robust CIS cost-benefit analysis is the lack of monetary values for benefits. This is particularly so where data collection is difficult. For example, where smallholder farmers and pastoralists are the ultimate targeted beneficiaries of CIS improvements, there must be careful consideration of how best to address confounding factors.

**Figure 1. Using TAMD to assess the developmental effects of changes in climate risk management**



**Figure 2. Theory of change developed during preliminary ClimDev-Africa/ NMA pilot project evaluation, Ethiopia.**



Below we discuss the different approaches that research into developing data can take to identify and isolate the benefits of CIS.

### Options for assessing benefits from CIS

**Modelling.** Climatologists and development economists work out the value of CIS benefits by modelling weather and agronomic systems used by African farmers.<sup>3</sup> For example, they may combine models to simulate the productive capacity of pre-defined crop farmers, and how different CIS products (and their absence for control purposes) structure different forms of farming strategies. The modelling process estimates a crop yield from each strategy — this is then used with market prices to calculate a monetary valuation. Monetary benefits of CIS can be isolated by subtracting the income of control strategies from those incorporating information.

### Examining losses avoided and costs

**incurred.** Public authorities have to spend money on addressing the direct and indirect effects of climate variability and change. These same impacts cause farmers and pastoralists consistent loss and damage to their assets and productive capacity. This research design systematically compares costs for users and non-users of CIS and establishes monetary benefits by comparing costs incurred by both groups. This can be done by developing and applying time-series data after implementation for those using CIS, or using socioeconomic and physical matching techniques to compare those receiving and not receiving CIS.

**Contingent valuation methods.** Willingness to pay for CIS can be revealed by observing the behaviour of proximate actors.<sup>4</sup> Researchers sometimes ask a sample of individuals to state their willingness to pay for CIS.<sup>5</sup> A carefully structured and delivered questionnaire outlines the benefits of CIS and elicits a price from the respondent contingent on them receiving the good. While no control group is necessary, the influence of other factors on the stated willingness to pay needs to be minimised. A common solution is to use statistics to control for possible income, gender-based differences or educational biases, to name but a few. After techniques are applied, multiplying a sample estimate by the number receiving CIS can establish the monetary value of benefits to the broader population of users.

**Regression analysis.** This approach offers a means to establish benefits by focusing on fluctuations in income, crop yields or other related proxy variables. In this option, whether a farmer receives CIS — and how much he or she receives — can be compared to other factors that influence income or crop yields. These may include investments in inputs, farm size, education and gender. Statistical models can provide a weight for the independent effect of CIS while simultaneously controlling for these other alternative explanations.

### Conclusions

CIS will become increasingly necessary as climate change effects impair development performance. The uncertainty around the types, timing and severity of climate risks needs to be better understood, and if possible reduced, to enable policymakers and development planners to take climate change into account. In many countries, including African ones, CIS requires investment to make it fit for purpose.

ClimDev-Africa is setting out to support CIS investments, and as part of this process, the programme is putting in place an evaluation approach that will contribute to the evidence base on how CIS can be best improved. Investments through the CDSF will be subjects of this evaluation approach.

An important area that requires attention is how to best estimate the costs and benefits of CIS investments. Although estimating costs and tracking their implementation is relatively straightforward, identifying and estimating benefits is more problematic. A theory of change-based monitoring and evaluation process — such as TAMD — can be used to develop the main elements of an evaluative assessment that can start before the investment is made, continue during implementation and be finalised after outcomes have been generated. The same process can also be used to track costs and identify benefits, and comparing data from beneficiaries and non-beneficiaries allows us to estimate economic benefits in terms of avoided losses or willingness to pay for CIS. ClimDev-Africa is making a start on these complex issues.

### Florent Gasc, Diane Guerrier, Sam Barrett and Simon Anderson

Florent Gasc is a senior researcher at ACPC, UNECA and coordinates the ClimDev-Africa MFEA team. Diane Guerrier is an IIED consultant working at ACPC. Sam Barrett is an IIED consultant. Simon Anderson is head of IIED's Climate Change Group.



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### Contact

Simon Anderson  
[simon.anderson@iied.org](mailto:simon.anderson@iied.org)

80–86 Gray's Inn Road  
London, WC1X 8NH  
United Kingdom

Tel: +44 (0)20 3463 7399  
Fax: +44 (0)20 3514 9055  
[www.iied.org](http://www.iied.org)

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### Notes

<sup>1</sup> See [www.climdev-africa.org](http://www.climdev-africa.org) / <sup>2</sup> See [www.iied.org/tracking-adaptation-measuring-development](http://www.iied.org/tracking-adaptation-measuring-development) / <sup>3</sup> For an example, see Roudier, P et al. (2012) An ex-ante evaluation of the use of seasonal climate forecasts for millet growers in SW Niger. *Journal of Climatology* 32, 759–771. / <sup>4</sup> For an example, see Considine, T et al. (2004) The value of hurricane forecasts to oil and gas producers in the Gulf of Mexico. *Journal of Applied Meteorology* 43, 1270–1290. / <sup>5</sup> Lazo, JK and Chestnut, LG (2002) Economic value of current and improved weather forecasts in the US household sector. Stratus Consulting.