

Powering up the forecasts

East Africa has distinct wet and dry seasons, and accurately predicting the onset of its rains is vital for farms and businesses. Yet hydropower is equally reliant on accurate and timely forecasts – as an important climate partnership project recently demonstrated.

The World Meteorological Organization (WMO) is driving a campaign to bring climate services into everyday decision-making. In line with this initiative, the Met Office, the UK's national meteorological service, helped to set up the project known as Strengthening Climate and Information Partnerships – East Africa (SC�PEA) as part of the DFID (Department for International Development) funded Weather and Climate Information Services for Africa (WISER) programme. The project focused on the Greater Horn of Africa and four countries in particular: Uganda, Kenya, Ethiopia and Tanzania.

SC�PEA aimed to enhance the links and exchange of information between global, regional and national climate organisations to strengthen resources for seasonal forecasts. By making climate services available to more partners and end users, the project was designed to enable people and institutions to make informed and timely decisions.

Focused on needs

To deliver relevant and meaningful climate services, SC�PEA had first to understand exactly what information end users needed. “We set up mechanisms for national meteorological services to link up with user organisations,” explains Richard Graham, Manager of the Met Office Forecast Verification and Outreach Team.

The aim was to sit down and work out what a customised weather service might deliver to end users such as these. So SC�PEA brought together climate professionals from East Africa, the UK and the US, along with end users, to discuss the possibilities in what were known as Service Development Teams – a process termed “co-production”.

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In Kenya, the Service Development Teams were led by the Kenya Meteorological Department (KMD) who organised a series of meetings with two users: the Kenyan Red Cross and KenGen, the national electricity generating company.

Working in this consultative way from the start, KMD began to build up a detailed picture of what type of information and forecasting was required. For the power generator KenGen, hydroelectric power was particularly important. “Hydropower is renewable of course,” says Willis Ochieng, Energy Planner at KenGen, “and when you consider it in terms of order of economic merit, it is also the cheapest source of energy.”

Given the seasonality of the East Africa rains, KenGen relied on forecasts to understand how much water would flow into the reservoirs to be able to plan electricity generation. “To make sure the power plant is stable, we have to be sure we have adequate water running there at any one time,” explains Willis.

SCIPEA helped them to work more closely with KMD to customise forecasts for their specific needs. KenGen explained their needs to KMD, and also expressed their requirement to have reliable forecasts of the likely amount of water flowing into the reservoir. SCIPEA then brought KMD climate personnel to the UK to work on a prototype that would deliver these forecasts to KenGen. By developing the services and then measuring the quality of predictions against actual outcomes, the project was able to test the validity of the approach and fine-tune the methods over time.

Greater precision

The Service Development Teams stressed that it would be useful to have as accurate a range of figures as possible, so, within the SCIPEA framework, KMD developed a product that delivered probabilities of rainfall amounts.

The methods developed by the team proved their worth, as Willis explains. “Comparing the forecasted figures during the trial with the real figures after the trial period showed they were very close. That was very significant for us – although further trials are needed to confirm results.”

Coincidentally, the first year the trial ran was 2016 when quite a serious drought affected the region. Any lack of rainfall can be disastrous for KenGen’s reservoirs and hydropower supply. “This has huge knock on effects to the economy,” explains Willis. “Without a consistent supply of power, factories have to close down for a period and people can lose their livelihoods.”

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Thankfully, the new procedures and information arising from SC�PEA work helped to mitigate the drought's effects. In a bad drought year, KenGen's reservoir can be closed for up to six or eight weeks. During 2016, the new customised predictions helped limit the time the reservoir was out of action to just two weeks.

Keeping costs down

The co-production route brings unexpected benefits too, beyond providing a constant and reliable source of energy, as Met Office International Development Business Manager Tracy Small points out: "KenGen has other means of generating power, including solar or fossil fuels, but they're much more expensive." As users pay for electricity as they go, when there's a power outage and KenGen has to switch from hydro to an alternative, the cost can be prohibitive. "Any outage has a major impact on the disposable income or any income at all for people and households across Kenya," adds Tracy.

KenGen is now getting the timely information it needs to plan ahead and minimise outages, and is sharing data with other partners too. So has the project been a success? "I can definitely say yes," says Willis Ochieng, "Our co-production partnership with KMD is strengthened and we can now get the forecasts one month before the onset of the season, which gives us the chance to make decisions in good time."

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