

Building a climate service for hydro-power resources: Application to Mpatamanga project in Malawi within FOCUS-Africa project

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This study is carried out within the framework of the European project FOCUS-Africa which aims to develop sustainable and tailor-made climate services in the SADC (Southern African Development Community) region for four socio-economic sectors: agriculture and food security, water, energy and infrastructure. The project aims to ensure the full value chain for the development of climate services through eight case studies in six different countries. FOCUS-Africa's climate services should become a fundamental basis for sectoral adaptation strategies at different levels (from local to regional) and contribute to the implementation of the Paris Agreement and the Sustainable Development Goals. As part of this project, EDF is leading a case study on the impact of climate change on hydropower production of the Mpatamanga hydropower project in Malawi.

Indeed, Malawi heavily relies on hydropower, which is projected to be increasingly exposed to large climate fluctuations. Overall, Malawi has a total installed generation capacity of 442 MW, with about 390 MW coming from hydropower (~88 %). The Mpatamanga project, with 350 MW of generation capacity, will increase by 80% the generation capacity of the country delivering electricity to approximately two million people and saving 520,000 tons of CO₂ emissions per year.

The main goal of this case study is to build a climate service which provides a tailored and comprehensive climate information to the different stakeholders in the energy sector as well as other related sectors. A preliminary framework was defined with the different partners which includes the modeling chain, the climate data and the downscaling and bias correction tools. This framework was then updated using all the data and the feedbacks collected during a field trip to Malawi where interviews with representatives from 8 stakeholder institutions (eg. energy, water, land) were conducted along with field visits to hydropower installations, weather and gauging stations which provided a deeper understanding of the local socio-economic context, the country's energy sector and the interlinkages among energy, water and food in Malawi. The main finding of this field trip was the strong nexus between water, energy and food security in the country. For instance:

- Water: water management between drinking, irrigation and energy production needs ;
- Energy: energy poverty leading to dramatic deforestation for charcoal which impacts hydroelectric production by increasing the sedimentation issue ;
- Food security: irrigation, fishing and water hyacinth problem worsening through the use of fertilizers in agricultural areas on the rivers banks;

All these aspects need to be represented somehow in the climate service for it to be useful and not only to the energy sector.