

The **System adaptation for OneHealth under Climate change for Vulnerable groups and Ecosystems (SOLVE)** project is a transdisciplinary initiative under the **Belmont Forum** and the **FABLE Consortium**.

SOLVE co-develops local adaptation roadmaps with societal partners to build resilient, healthy, equitable, and prosperous food and land systems. Using a suite of models, SOLVE integrates future climate extreme risks into long-term planning and promotes a OneHealth approach to better understand and address the complex interactions between people and nature.

THE CHALLENGE

The Tana-Beles basin, the primary source of the Beles River—a major tributary of the Abbay River (Blue Nile)—is a key growth hub in Ethiopia. Covering 29,200 km² and home to 4 million people, it holds significant potential for irrigation, hydropower, high-value agriculture, and ecotourism.

However, the potential of the Tana-Beles basin is hampered by complex development challenges driven by human and natural factors: deforestation, biodiversity loss, soil erosion, sedimentation, water pollution, and degradation of aquatic ecosystems. These pressures threaten livelihoods that depend on small-scale mixed farming, which is highly vulnerable to climate hazards.

The basin also faces recurring natural hazards such as drought, rainfall variability, and flooding. At the same time, it faces major food and land-use system challenges: unsustainable natural resource use, deforestation, hydro-political tensions, competition over scarce water resources, and competition, and nutrition insecurity.



FOCUS AREAS

The focus of the project is the Tana-Beles basin of Ethiopia.

Livelihoods in the basin vary between the upstream and downstream catchments. The upstream is characterized by small-scale mixed farming systems of major food grains (Teff, wheat, maize, sorghum), while in the downstream, the population is sparse and dominated by Indigenous tribes in transition, from shifting cultivation to small-scale farming systems (mainly maize and sorghum with livestock production).

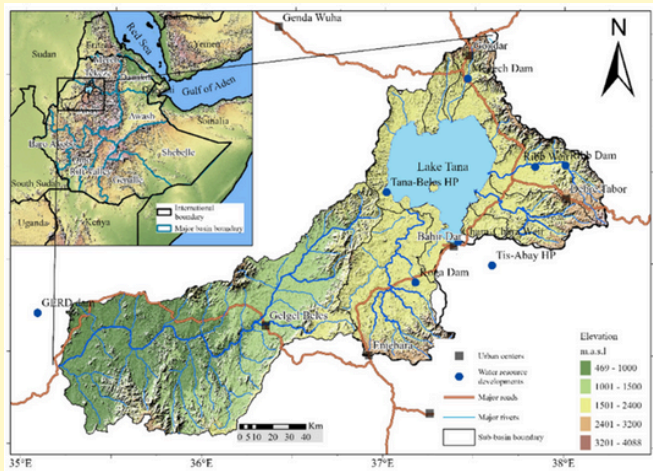


Fig. 1 Location of Tana-Beles Sub-basin

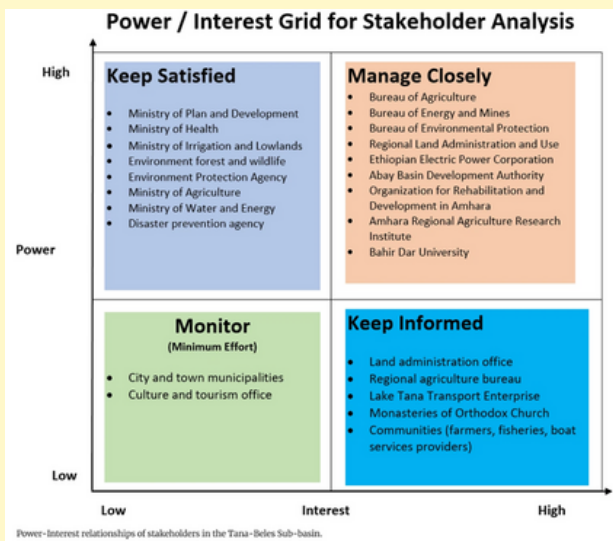
<p>LOCATION Northwestern Ethiopia (10.3–12.8°N, 35–38.2°E); covers ~29,200 km²</p>	<p>POPULATION Densely populated rural areas; major towns include Bahir Dar and Gondar</p>
<p>CLIMATE Tropical highland monsoon; 1,200–1,500 mm/year rainfall; avg. temp. ~20°C</p>	<p>LAND USE Mostly agriculture (71%); grazing, forest, wetlands, and urban areas</p>
<p>SOILS & TERRAIN Fertile Nitisols, Vertisols; includes highlands, hills, and steep valleys</p>	<p>WATER RESOURCES Lake Tana (3,111 km²), Beles River; hydropower transfer (~77 m³/s)</p>
<p>ENVIRONMENTAL ISSUES Soil erosion, deforestation, wetland loss; invasive</p>	<p>BIODIVERSITY High species richness; endemic fish, birds.</p>

STAKEHOLDERS & PROCESS

Stakeholders in the co-creation process

This project will engage stakeholders involved in the management of natural resources, land, and water resources within the basin. These include actors from multiple levels of governance, from central government ministries such as the Ministry of Agriculture and the Ministry of Water and Energy, to regional offices and local actors.

The co-creation process will be informed by the power interaction dynamics, ensuring that all relevant actors are represented and involved in decision-making.

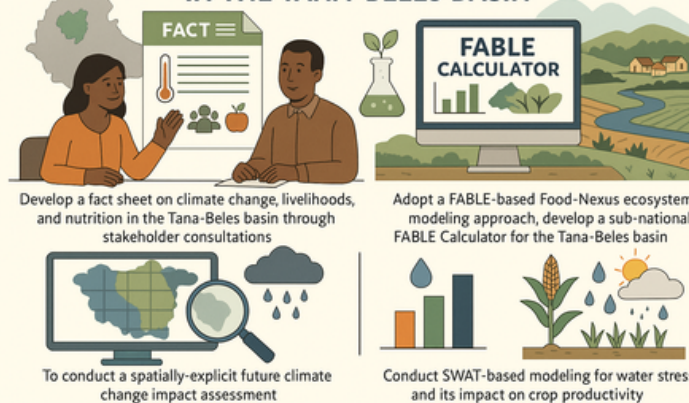


Methods in this case study:

- Co-develop a fact sheet on climate change, livelihoods, and nutrition in the Tana-Beles basin through stakeholder consultations.
- Apply a FABLE-based Food-Nexus ecosystem modeling approach, including the development of a sub-national FABLE Calculator for the Tana-Beles basin.
- Conduct a spatially explicit assessment of future climate change impacts.
- Use SWAT-based modeling to evaluate water stress and its effects on crop productivity.

Data will be drawn from the National Statistics Authority of Ethiopia, Regional government offices, satellite imagery, and geospatial data from national and international archives.

CLIMATE CHANGE, LIVELIHOODS, AND NUTRITION IN THE TANA-BELES BASIN



IMPACT

We expect that the project output will generate the following benefits:

Local communities and smallholder farmers in Tana-Beles Basin: The research will enhance local knowledge on improved livelihoods and resilience, supporting better food security and nutrition.

Informed adaptation: Results will guide regional and local agencies—such as Agriculture and Water Bureaus—in developing effective climate adaptation strategies.

Evidence-based policy: The study will provide data to support policies tailored to local needs and conditions.

Resource management: Insights will support the sustainable use of water and land resources.

Targeted intervention: Findings will inform focused interventions to strengthen community resilience and productivity.

The Ethiopia case study is led by [Alliance Bioversity International-CIAT](#) and the [Policy Studies Institute \(PSI\)](#). To get involved, please contact K.Mulatu@cgiar.org; Y.Getaneh@cgiar.org

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