B-EPICC: Hydrology and water resources – Ethiopia
Collaborative analysis of projected future hydrological conditions in Ethiopia with local researchers

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Content

• Current and future hydroclimate conditions in Ethiopia

• The impact of climate change on water resources and hydropower production

• Collaborative analysis of projected future hydrological conditions in Ethiopia as part of the B-EPICCC project
Ethiopia exhibits complex topography and hydroclimatic conditions

Source:

Climate risk analysis for identifying and weighing adaptation strategies in Ethiopia’s agricultural sector
Spatial variation of temperature and its trends in current conditions in Ethiopia

Observed climatology of mean-temperature (1991-2020)

Temperature trend over the entire country

Source: https://climateknowledgeportal.worldbank.org/
Spatial variation of precipitation and its trends in current conditions in Ethiopia

Observed climatology of precipitation (1991-2020)

Precipitation trend over the entire country

Source: https://climateknowledgeportal.worldbank.org/
Temperature projection based on CMIP6 climate models

Projected temperature changes for 2040-2059 (the 2050s) relative to 1995-2014 high warming scenario (SSP5-8.5)

Δ = +1.7°C

Low warming scenario (SSP1-2.6)

Δ = +1°C

Source: https://climateknowledgeportal.worldbank.org/
Precipitation projection based on CMIP6 climate models

Projected precipitation changes for 2040-2059 (the 2050s) relative to 1995-2014

High warming scenario (SSP5-8.5)
Δ = +100 mm

Low warming scenario (SSP1-2.6)
Δ = +90 mm

Source: https://climateknowledgeportal.worldbank.org/
The evidence and projections of climate change should be a wake-up call for:

- Scientist to research the current and future hydro-climate conditions
- and for governments, local leaders, and people to improve their preparedness for extreme weather events

To support these efforts, the Potsdam Institute for Climate Impact Research (PIK) has been contributing to the analysis of the impact of climate change on water resources in Ethiopia through various research projects.
Climate change impact on water resources of the Blue Nile basin using CMIP5 climate projections

Projected streamflow for 2041-2060 (the 2050s) relative to 1986-2005

- High warming scenario (RCP8.5)
- Low warming scenario (RCP2.6)
Climate change impact on the hydropower production in Grand Ethiopian Renaissance Dam (GERD)
As part of the B-EPICC project, we are collaborating with local researchers in Ethiopia to analyze the projected future hydrological conditions in three catchments.

**B-EPICC - Hydrology**

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Omo-Gibe catchment  
Tadesse Mosissa Ejeta

Awash river basin  
Rahel Sintayehu Tessema

Juba and Shabelle watershed (transboundary between Ethiopia and Somalia)  
Lorenzo Villani
Data delivering

Bias-adjusted and statistically downscaled CMIP6 projections over Ethiopia generated by ISIMIP project

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<th>3 scenarios</th>
<th>10 GCMs</th>
<th>7 variables</th>
<th>Period</th>
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<td>• SSP1-2.6</td>
<td>• CanESM5</td>
<td>• Precipitation</td>
<td>• Historical simulation (1850–2014)</td>
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<td>• SSP3-7.0</td>
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<td>• Minimum temperature</td>
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<td>• SSP5-8.5</td>
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- The adjusted climate data were generated using the trend-preserving Bias Adjustment and Statistical Downscaling method (Lange, 2019)
- and the observational climate dataset E5W5 (daily and 0.5°)
THANK YOU