

Climate change may help Ethiopia, increase the country's access to water

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Water gushes over falls in the Blue Nile River Basin in Ethiopia. Virginia Tech researchers recently found that the region may benefit from increased water availability due to climate change. Credit: Zach Easton

Despite the many disastrous impacts of climate change, there are some

regions of the globe that might benefit from hotter temperatures.

A team of researchers from Virginia Tech have predicted that [water availability](#) in the Blue Nile Basin of Ethiopia may increase in coming decades due to [global climate change](#). It could also lead to increased crop production, spur massive hydroelectric power projects, and foster irrigation development in the region.

"For all the catastrophic impacts of climate change, there are some silver linings," said Zach Easton, associate professor of biological systems engineering. "The sad irony is that climate change may be the catalyst Ethiopia needs to become a food-exporting country."

The research team used a suite of climate and hydrologic models to predict the impact of climate change on water availability and sediment transport in the Blue Nile. Most previous Nile Basin climate impact studies have only focused on water availability, but the study conducted by the team at Virginia Tech was a first of its kind to assess sediment transport, a big problem in the basin where some of the highest erosion rates in the world have been measured.

The findings of the study were recently published in the journal *Climatic Change*.

"Ethiopia could experience increased water accessibility making growing seasons longer and potentially allowing for two crops to be grown per year," said Moges Wagena, from Assosa, Ethiopia. Wagena is first author on the paper and also associated with the Abay Basin Authority, a [water resource management](#) entity for one of Ethiopia's 12 water basins. Wagena is one of Easton's doctoral candidates in the Department of Biological Systems Engineering, housed in both the College of Agriculture and Life Sciences and the College of Engineering. The team also included Andrew Sommerlot, another of Easton's doctoral

candidates; Daniel Fuka, a post-doctoral student working with Easton; researchers from the University of Maryland; and the International Water Management Institute, Nile Basin Office. The work was funded by the World Bank and the International Water Management Institute.

The team coupled hydrologic models with bias-corrected and downscaled Intergovernmental Panel on Climate Change, Coupled Model Intercomparison Project 5 models, known as CMIP5, for the project. Previously, studies that looked only at temperature and precipitation from the climate models found an increased rate of water availability of just 10 percent, where Easton and Wagena found potentially 20 to 30 percent more streamflow available in the region in the coming decades.

One potential problem that the analysis identified was increased [sediment transport](#) in the rivers due to increased water flow. The increased sediment has the potential to reduce the capacity of reservoirs and dams, making massive hydroelectric projects like Ethiopia's largest dam currently under construction, the Grand Renaissance Dam, less efficient in storing the 65 billion cubic meters of water that could potentially turn its turbines.

"Greater water availability is certainly a positive outcome, but this is countered by more sediment. One way to combat that is through installing conservation practices on farms, for instance using cover crops and low- and no-till planting methods to make the soil healthier, more stable, and reduce erosion," said Easton.

While [climate change](#) is and will continue to cause untold problems, nuances in climate-induced weather events could benefit the Blue Nile Basin with increased rainfall in the area.

"It's interesting, because much of the Blue Nile Basin is well above 5,000

feet in elevation, giving it pretty much an ideal climate for agriculture with low humidity, low disease and pest pressure, and potentially great water availability, which could spur development," said Easton.

More information: Moges B. Wagena et al. Climate change in the Blue Nile Basin Ethiopia: implications for water resources and sediment transport, *Climatic Change* (2016). DOI: [10.1007/s10584-016-1785-z](https://doi.org/10.1007/s10584-016-1785-z)

Provided by Virginia Tech

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