A 3-in-1 tool for climate change and resiliency assessments

Aavudai Anandhi

Anjali Sharma

Siera Sylvester

Video Abstract

Keywords: meta-analysis, decision-making, decision support tool, scenarios, scenario development, casual chain, causal loop, causal chains, eco-hydrological systems, Florida, climate change, impact assessments, adaptation, mitigation, driver, pressure, state, impact, response, Florida Agricultural and Mechanical University

Posted Date: September 20th, 2019

DOI: <https://doi.org/10.21203/rs.2.15044/v1>

License: This work is licensed under a Creative Commons Attribution 4.0 International License.

[Read Full License](#)

Abstract

Climate change is altering our world as we know it. Unfortunately, there's no one-size-fits-all solution for making our environment resilient. From planners to scientists to farmers and ranchers, the lens through which climate change is viewed is dynamic. So how can anyone plan the best course of action with the best available data? Researchers led by Aavudai Anandhi at Florida A&M University might have just the right tool for the job. Their evidence-based approach combines three climate research methods to tailor action plans to the needs of a given ecosystem—whether that's an entire country or state, or a single community, and whether for now or for the future. The approach begins with gathering evidence of climate change over a geographical region—the state of Florida for example. That's done by pulling from trusted research to understand how factors like temperature or rainfall have evolved or are projected to evolve over time. Based on that data, the next step is to create scenarios of climate change effects. These scenarios can be thought of as stories of the various futures that are possible under different conditions. They set the stage for answering questions like what would Florida look like if sweltering temperatures persisted over the next 50 years? What if they leveled off? What if cooler temperatures prevailed? And that leads to the final step. For each scenario, starting with direct climate effects like rising temperature, a cascade of causes and effects is traced for an ecosystem, resource, community or animal population. Take sea turtles, for instance. Extreme temperature changes could lead to changes in beach sand and the eggs buried underneath. These disruptions in how sea turtles grow and develop could in turn elevate their endangered status, prompting a boost in conservation efforts. The biggest advantage of this 3-in-1 approach is that it can be extended to any biological community, natural feature, or phenomenon on virtually any spatial scale, depending on the availability of climate data for that scale. Still, for countless decision makers around the world, the tool could be extremely useful. With the amount of climate data increasing exponentially, this framework could distill the most salient results for areas big and small to help utilize the benefits of climate change, reduce the harmful effects, and improve the resiliency of the environment.