

Climate Change Research Program Round 3 Awards

University of California, Santa Cruz

Local Development under Climate Change: Evaluating Trade-offs Between Carbon Emissions, Water Sustainability, and Affordable Housing for Communities

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\$722,777.24

Partners:

- U.S. Geological Survey (USGS), UC Davis, UC Berkeley
- The City of San Luis Obispo
- The Central Coast Climate Collaborative
- City of Watsonville Community Development Department
- County of Santa Barbara Planning and Development
- Salinas Valley Basin, Groundwater Sustainability Agency

Research Priority Area(s) addressed:

- Supporting and Protecting Vulnerable Communities from the Impacts of Climate Change
- Accelerating and Supporting Transitions to Climate Smart Communities

Crosscutting Thematic Lenses:

- Integrating climate vulnerability/adaptation with climate-smart approaches

Research Activities:

Land use and land cover (LULC) have impacts on carbon emissions and climate vulnerability for communities and ecosystems. Future development may exacerbate water shortages as climate change intensifies droughts, but development is needed to create affordable housing in California. The Central Coast exemplifies these issues as an understudied region with significant climate change vulnerability. This project will for the first time link the UPlan urban growth model to the Land Use And Carbon Scenario simulator (LUCAS) model to jointly estimate urban development, carbon emissions, and water demand, and link these development plans to estimates of their impacts on affordable housing, displacement, and protection of important lands. Most displacement mapping efforts focused on urban centers; this research will expand analysis to Central Coast small rural towns. The model will allow for rapid assessment of tradeoffs between State and local goals, and identify win-win planning strategies applicable to groundwater-dependent regions throughout California. The model will be widely transferable as these tools are already used by agencies throughout California.

Facilitates Greenhouse Gas Emissions Reductions:

Land use has a key impact on carbon emissions that are largely due to conversions of natural land covers to agriculture or development. This project will use the LUCAS simulator to project changes in ecosystem carbon balance and produce unprecedented high-resolution regional estimates of carbon fluxes as a baseline for evaluating future mitigation. The project will also assess tradeoffs between low-emission development and other sustainable development goals including water security, affordable housing, and land conservation.

Benefits Disadvantaged, Low-Income, and/or Underserved Communities:

This project will work with Central Coast disadvantaged rural communities that are vulnerable to water shortages under climate change and who have an interest in sustainable development of affordable housing. Stakeholders identified affordable housing and development as a key priority in a previous SGC grant. The project will integrate DAC community concerns with both water needs and affordable housing, producing maps of areas vulnerable to displacement, exclusion, and gentrification, and it will improve upon previous work by linking resident vulnerability with the housing stock and water issues. It will also empower county and municipal planners to meet affordable housing goals to minimize emissions while fostering sustainable development.