



Sindhu Nathan worked on climate change policy during Congressional Fellowship

By Elizabeth Wilson

As climate-change-induced droughts and heat waves continue to batter the United States and especially significantly affect the rural areas, the office of Senator Tina Smith (D-Minn.) has been introducing a steady stream of bills to help mitigate these crises.

Smith's reputation in the US Senate as a champion for climate issues inspired chemical engineer Sindhu Nathan, who served in Smith's office as the 2022–2023 Materials Research Society/Optica Congressional Science and Engineering Fellow.

It is important to get new renewable energy and more efficient energy systems into farms and businesses in rural areas, but they need help and money. For livestock farmers, methane—a greenhouse gas with more heat-trapping potency than CO₂—presents a particular problem. Scientists are also aware of the enormous role soil carbon storage plays in agricultural settings, but they need standardized ways to measure and study it.

During her tenure as a Congressional Fellow, Nathan worked on two bills addressing these issues. Nathan, who received her PhD degree in chemical engineering from Stanford University, has always been drawn to science policy. Her knowledge of chemistry and other sciences have allowed her work with scientists and other experts in these fields to help fashion the bills, she says.

The REAP Modernization Act aims to strengthen the US Department of Agriculture's (USDA) Rural Energy for America Program (REAP). Since 2021, REAP has provided grants to farmers and small business owners for installing renewable energy systems. For example, dairy farmers can use methane digesters that store manure, capture the methane produced, and burn the methane to generate heat and electricity.

The expanded new bill proposed in 2023 increases the cost share for grants, increases grant amounts, and streamlines educational and application processes.

In addition, the new bill calls for the study of “dual use” farmland, in which farmers combine land space for livestock or crops and solar panels.

The issue of carbon in soil is worldwide. There is more carbon in soil than in vegetation and the atmosphere combined, but scientists do not have methods for large-scale analysis—at this stage, they can only make rough estimates. Researchers are using various techniques to measure soil carbon, including spectroscopy, remote imaging, and ordinary heat, Nathan says.

Another bill, The Advancing Research on Agricultural Climate Impacts Act, aims to create a large program for standardizing the study of soil carbon.

The new bill would task the USDA with forming collaborations to develop methods for soil carbon measurements.

They would establish a Soil Carbon Inventory and Analysis Network to track and analyze how soil carbon and greenhouse gases change in agricultural settings. They will also develop models from these measurements to help predict the success of conservation projects.

There will be no one solution. “Parts of the country have different microclimates and soil types, and the ways people are using the land are different,” Nathan says.

Post her Congressional Fellowship, Nathan is now continuing as a Legislative Assistant in Smith's office. Citing Senator Smith's commitment to diversity, equity, and inclusion, Nathan says she hopes to continue addressing the interests and needs of all Minnesotans—not just agricultural producers, but also Tribal Nations and small urban communities.

“Different peoples' experiences will frame things in different ways,” Nathan says.

For example, Federally Recognized Tribes are sovereign entities that often can adopt their own regulations. In fact, they might establish different and/or stricter environmental standards than the US federal government, or their local state government, Nathan says. They are important people to work with, she says. “We can do better, and that's something I'm excited to work on.” □



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