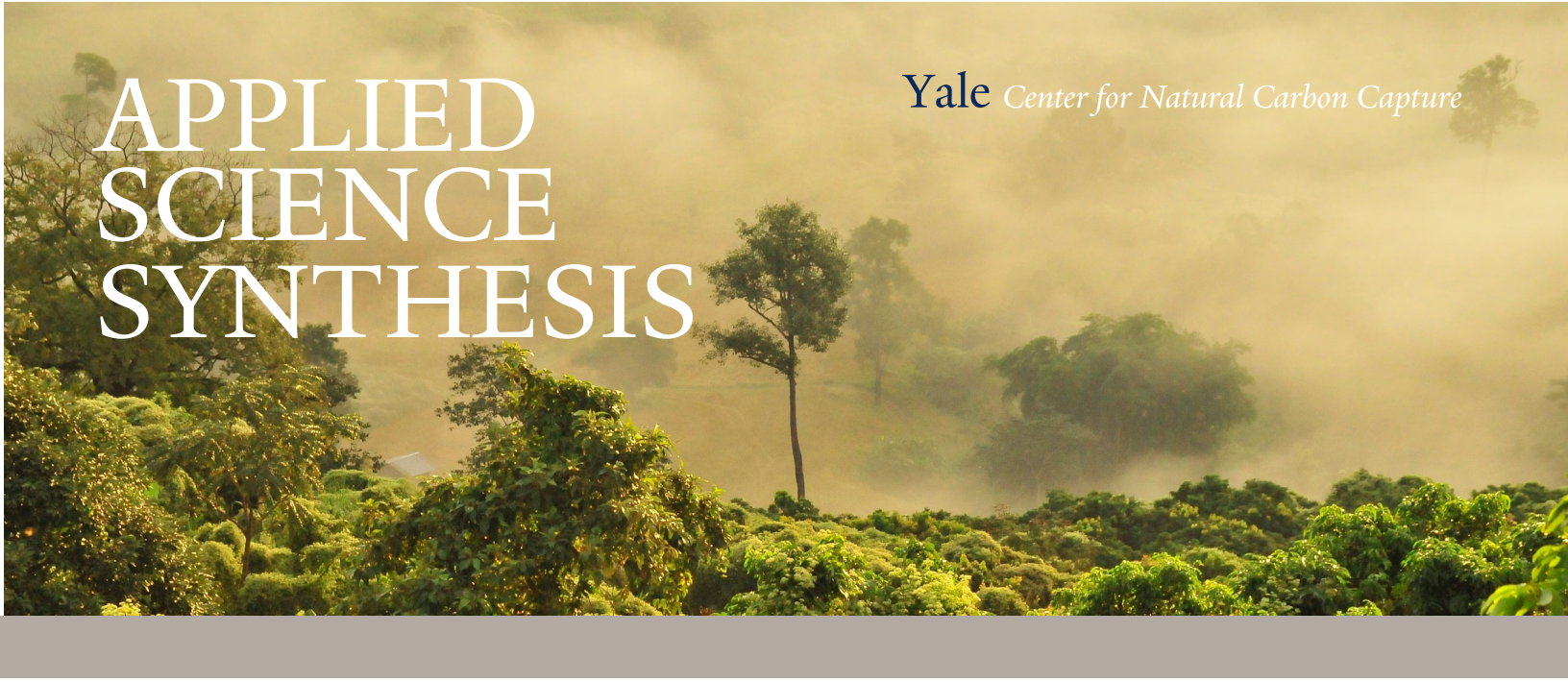

APPLIED SCIENCE SYNTHESIS

Yale *Center for Natural Carbon Capture*

WHY science synthesis?

Natural and modified ecosystems take up and store vast amounts of carbon dioxide from the air. Conservation, restoration, and better management of ecosystems are therefore at the forefront of efforts to mitigate climate change. Land managers and landowners often make decisions that affect how much carbon their forests, fields, and rangelands capture and store, and to do so they need accurate and up-to-date information. Likewise, politicians and government officials want to be confident that climate-related legislation will have impact.

However, policy-relevant scientific publications may be too technical, difficult to access, be in different languages, or be unavailable outside of the scientific professional community. Moreover, private companies have conducted research, but their data and findings are not publicly available. And the scientific community has often not reached consensus about the best way to manage or measure various factors related to carbon.

HOW are Yale scientists contributing to the implementation of solutions?

The Yale Applied Science Synthesis Program is one of the flagship projects of the Yale Center for Natural Carbon Capture. The Program helps land managers and policymakers make decisions about carbon footprints and climate impact by providing them with syntheses and summaries of the most up to date and reliable research and by building two-way lines of communication. Researchers not only provide information, but they also solicit decisionmakers' input to make sure the Program's assessments have maximum relevance. Researchers are transparent with the data they use and the assumptions that go into their models so that their conclusions and recommendations can be validated and verified.

YASSP works with federal agencies, non-profit organizations, and private industry groups, all of whom have different needs and perform varied but vital roles in carbon capture. For example, in the past year researchers have worked with the sustainability team of Ocean Spray Cranberries, Inc. to assess the carbon stocks within cranberry-growing bogs and of the forests, fields, and wetlands that surround and support those bogs. The Program is identifying knowledge and data gaps in how carbon is captured on cranberry farms to help Ocean Spray scientists and producers continue to develop climate-friendly farming practices.

YASSP is also studying where and how trees are used on farms in North and South America. Trees can improve farm productivity while both helping to store carbon and reducing the effects of farming on streams and rivers. They can be used as windbreaks between fields, directly in pastureland, or interspersed among row crops. By understanding where and how farmers are already planting trees, the Program has identified prime areas to target in the future.

WHICH tools does the program use?

The research process at the Yale Applied Science Synthesis Program integrates collaborations and connections with stakeholders throughout the research process. Through these conversations, the Program's researchers can identify questions that will advance practice and policy. Researchers collate data and synthesizes the state of knowledge to bring the best available evidence to the table to address the question. Next, they discusse the evidence with stakeholders and determine the collective confidence in the current evidence, which could lead to the identification of new questions or a gap in important knowledge and data. The Program then communicates their data, synthesis, and knowledge gaps to advance practice and policy. Where applicable, the program advocates for the collection of data in a way that elevates the standards of evidence available.

WHAT comes next?

As interest in nature-based carbon credits has increased, YASSP is working with other groups at Yale and beyond to bring together key voices in the carbon crediting world. These collaborative efforts include two public webinars on the current state of voluntary forest carbon markets and new research on best practices in ecosystem carbon measurement and verification.

Over the next year, YASSP will bring together those in charge of writing protocols for generating soil and forest carbon credits with scientists who have been critical of the current methods. Ultimately, YASSP aims to build a collaborative network of experts on carbon credit measurement, reporting and verification to increase consensus and produce a publication on the most feasible and best practices for measuring and awarding carbon credits.

PROJECTS at the Yale Applied Science Synthesis Program

- Quantifying impacts of agricultural practices on ecosystem carbon sequestration and soil health
- Comparing agricultural soil carbon measuring, reporting and verifying (MRV) protocols
- Testing the sensitivity of soil carbon sampling methods
- Understanding silvopastoral practices, carbon sequestration, and livestock production
- Assessing carbon storage in cranberry agroecosystems
- Evaluating forest management practices for sustaining human livelihoods, mitigating climate-related forest loss, and increasing carbon sequestration and storage
- Estimating the negative emissions potential of improved US forest management
- Evaluating the impacts of commercial reforestation in Latin America