

Contact: Diana Gonzalez

PROPOSED NEW CENTER AT IOWA STATE UNIVERSITY
CENTER FOR CARBON CAPTURING CROPS

Action Requested: Receive the report on the creation of a Center for Carbon Capturing Crops at Iowa State University that will report to the Vice-President for Research and Economic Development.

Executive Summary: The Center for Carbon Capturing Crops (C2C2) will conduct discovery and translational research to develop crops that are capable of sequestering atmospheric carbon. The Center was recently created by approval of President Gregory Geoffroy and Executive Vice-President and Provost Elizabeth Hoffman. Creation of the Center does not require Board of Regents approval because the Center will not require an annual institutional commitment of \$250,000 or more as stated in the Board Policy Manual §6.08. The Center will leverage the federal government's investments in crop genomics to develop crops having biomass that degrades more slowly in the soil than unmodified crops. This request addresses the Board of Regents Strategic Plan priorities (3.0) to "discover new knowledge through research, scholarship, and creative activities" and (2.0) to "provide needed service and promote economic growth."

Background:

- ◇ Need for the new Center. Global climate change due to rising levels of atmospheric carbon dioxide is one of the most important issues facing the world. By upsetting the balance between plants and the climatic conditions to which they have been adapted, these changes threaten both agricultural and natural ecosystems. Therefore, there is an urgent need to develop methods to reduce atmospheric levels of carbon dioxide.

- ◇ Center activities and objectives. Through the process of photosynthesis, crops extract carbon from the atmosphere and incorporate it into biomass. After harvest, crop residues are converted into soil organic matter. Over time, soil microorganisms digest the organic matter, returning the captured carbon to the atmosphere as carbon dioxide. Widespread planting of crops having biomass that degrades more slowly in the soil than unmodified crops will increase the amount of carbon stored in the soil which will reduce levels of atmospheric carbon dioxide and increase soil organic matter.

Farmers who grow these varieties may earn additional carbon credits. These are tradable securities that place a cost on carbon emissions and can be sold to carbon emitters, such as coal-powered electric stations. The Center will also work with soil and atmospheric scientists and economists to model the effects of widespread planting of such crops on soil organic matter, atmospheric carbon, climate, and the economy. The results of these modeling activities will help guide policy decisions that will influence carbon sequestration and climate change. Ultimately, the Center will partner with seed companies to deploy carbon capturing crops.

- ◇ Relationship of Center to other ISU Centers. The Center director will report to the Vice-President for Research and Economic Development. The Center will partner with several units on Campus to accomplish its objectives. The Center will work with the Plant Sciences Institute to access genomic data and bioinformatics expertise; the Agronomy Department for cropping systems research; the CyberInnovation Institute for assistance in modeling soil and atmospheric carbon levels; the Department of Economics for assistance in analyzing the economic impact of carbon credits; and other units as appropriate.
- ◇ Relationship of Center to other institutions. While it does not have ISU's strengths in basic plant sciences and agriculture, the Center for Global and Regional Environmental Research at the University of Iowa is a strong potential partner for the Center.
- ◇ Center uniqueness. As one of the most important centers for agricultural research in the United States, ISU has the necessary expertise in crop genomics, basic plant sciences, cropping systems, agricultural economics, climatology, and cyberinfrastructure to conduct the proposed activities in crop-based carbon sequestration. Although the potential climate benefits of carbon sequestration will accrue globally, Iowa is well-positioned, as an agricultural state, to benefit from crop-based carbon sequestration.
- ◇ Staff. The Center staff will include a director, graduate students, post-doctoral scientists, staff scientists, and a part-time administrative specialist.
- ◇ Facilities. The Center will be housed in the Roy J. Carver Co-Laboratory.
- ◇ Equipment. The new building fund includes \$4 million to equip the laboratories. Additional resources for equipment will be obtained from industrial sources, such as the \$22.5 million ConocoPhillips contract, and federal agencies, such as the U.S. Department of Energy.
- ◇ Expected need. The Center is expected to have at least a ten-year life span. The Center strategy will require discovery research (3-5 years), translational research (3-5 years), and technology transfer to industry. After carbon capturing crops have been deployed in the field, the Center will fine-tune crops to capture carbon. The Center will also study the ecological effects of adoption of carbon capturing crops. The Center will be reviewed on a five-year basis.
- ◇ Costs and funding sources. The cost of the Center is expected to be \$160,892 during the first year and \$126,998 for year 3. Funding sources include President's Office funds, and reallocations from the Plant Sciences Institute and the College of Agriculture and Life Sciences. Although the Center does not currently have extramural funding, one of its major objectives will be to compete successfully for large grants in the field of carbon sequestration.
- ◇ Link to Strategic Plan. The Center will address the University's Strategic Plan vision – "Iowa State University will be the best at advancing the land-grant ideals and putting science and technology to work" by developing crops that remove more carbon from the atmosphere, build soil organic matter, and increase farm income. By helping to mitigate climate change, the removal of carbon from the atmosphere will affect all Iowans. Increased soil organic matter will directly affect growers, and it has the potential to affect all Iowans by improving water quality. Increased farm income from carbon trading credits will also affect growers directly. It will directly help all Iowans by improving the state economy.