

Results from prior research

The principal body of SECC research has been funded by three, complementary grants:

1. Climate information system for agriculture and water resource management in the southeast USA. 1996-2010. Funding source: NOAA OGP. Participating institutions: UF, UM, FSU, UGA, UAH, AU
2. Risk reduction for specialty crops in the Southeastern USA & Open Source AgroClimate, 2003- 2011 (We are now in our third continuation of this project. Funding source: USDA Risk Management Agency. Participating institutions: UF, FSU, UGA, UM, AU, NCSU
3. Decision support system for reducing agricultural risks caused by climate variability. 2002-2011 (We are now entering our fifth phase). Funding source: USDA CSREES. Participating institutions: UF, FSU, UGA, UM, AU, UAH, NCSU

Climate Research

Climate datasets: The state climatologists participating in the SECC have collected, verified, regularly updated, and made available a range of climate data sets, including daily historic data from the co-op network. The final data set contains historical weather records from 92 stations in Florida, 64 stations in Georgia, and 58 stations in Alabama. Other data sets include: bootstrapped datasets for different ENSO phases, daily and monthly outputs from Regional Climate Models (RCMs), and daily data from automated weather stations. These datasets are regularly used by other SECC researchers and are available from the Florida Climate Office.

Weather generators: SECC researchers have produced two weather generators suited to the SE USA, one based on spectral properties of surface air temperatures that is suited for single station realizations (Shoof et al., 2005), and another that captures spatial and temporal correlations that can be used for studies conducted at watershed or larger scales (Apipattanavis et al. 2007; Baigorria et al., 2007a; Baigorria and Jones, 2009).

Regional climate model: FSU researchers have led efforts in the development a RCM that can be nested within a GCM to forecast seasonal climate (Shin et al., 2006) or hurricanes (LaRow et al., 2008). These forecasts then feed into other crop simulation models to forecast crop yields (Baigorria et al., 2006; Baigorria et al., 2008).

Statistical downscaling: Following the work of Lim et al. (2007) on surface temperature downscaling, we have statistically downscaled outputs from the NOAA CFS model from 2.5° to a 20 km × 20 km grid in order to provide information at a local level.

Agricultural Research

Agricultural datasets: Crop modelers have assembled datasets at the county level including characteristics of representative soils and management practices for the principal agronomic crops. These datasets are available from the International Consortium for Agricultural Systems Applications (www.icasa.net).

Crop simulation modeling: Crop modelers have conducted simulation runs to establish yield probability distributions for cotton, corn, peanut, potato, and tomato, for each ENSO phase and each county in which these crops are produced. These distributions served as the basis for the crop risk tool in *AgroClimate* as described below (Hoogenboom et al., 2007; Paz et al., 2006).

Crop yield forecasting: Outputs from RCM forecasts cannot be used directly as inputs to crop simulation models (Bellow et al., 2007), but using either bias correction or first RCM outputs to guide a weather generator, the results may be used as inputs to crop simulation models to

forecast crop yields for the next season (Baigorria et al., 2006; Baigorria et al., 2008; Bellow et al., 2007; Shin et al., 2006 a, b).

Drought monitoring and forecasting: Using Doppler precipitation measurements, the Alabama State Climatologist (http://nsstc.uah.edu/aosc/lawn_garden_se.html) developed a simple Lawn and Garden Moisture Index (LGMI) that is updated daily to graphically display the drought status of the region. We have developed a forecast of this index (*Agroclimate.org*) and developed a new, more robust index that is now being tested.

Water Management Research

ENSO phase and water quality: Terrestrial hydrological models have been shown effective and understanding climate impacts on water quality at various scales (Migliacio and Srivastava, 2007; Srivastava et al., 2007). Research using the Watershed Assessment Model (WAM) showed that ENSO phase affects water quality in Lake Okeechobee, through changes in phosphorous loading (Keener et al., 2007). We have also developed a database that of management practices and their impacts on water quality (Butler and Srivastava, 2007).

Water management: Since 2007, we have been conducting research to integrate climate forecast information into the operations and planning processes of Tampa Bay Water, the largest public water supplier in West-Central Florida (Martinez, personal communication).

Decision Analysis Research

Farm policy effects on climate information value: The policy environment has a strong impact on whether and how farmers use climate information. Climate phase appears to have greatest potential for helping farmers select optimal crop insurance programs (Cabrera et al., 2007, 2009; Liu et al., 2008).

Stakeholder assessments: SECC researchers have conducted numerous assessment to identify what information stakeholders want and need, how they prefer to get that information, and to evaluate products developed by the extension team (Alderman et al., 2007; Breuer, 2006a, b, 2008a, b, c; Cabrera et al., 2006; Crane et al., 2008; Roncoli et al., 2006a, b; .

Agricultural Extension

AgroClimate: Based on a prototype, *AgClimate*, the principal output of our extension program is an on line decision support and risk management system, *AgroClimate*, which is now hosted by Florida Cooperative Extension. *AgroClimate* includes a range of tools to help extension agents, farmers, foresters, and others understand their climate and how climate affects their agricultural production or risk of wild fire as well as providing outlooks on the climate and its impacts to major crops (Breuer et al., 2007; Fraisse et al., 2007; Fraisse et al., 2008, Hoogenboom et al., 2007; Pathak et al., 2007; Paz et al., 2007).

Workshops and training: In addition to dissemination of information through *AgroClimate*, SECC research and extension personnel conduct about 10 workshops and training sessions each year and participate in field days, trade shows, and workshops organized by other groups.

Publications list

A full listing of SECC publications is available at SEClimate.org.