SOUTHEASTERN CLIMATE CONSORTIUM

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Climate Information and Agricultural Decision Support in the Southeastern U.S.: A Partnership Linking User-Driven Research and Operational Services

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Who We Are

The Southeastern Climate Consortium (SECC) provides information and decision aids to help producers in three southeastern states reduce economic losses associated with climate and weather variability. Vulnerability of southeastern agriculture to climate fluctuations and weather extremes prompted formation in 1996 of a consortium of universities (Florida State, Florida, Miami, and Georgia, Auburn and Alabama-Huntsville) to capitalize on the predictability of climate impacts associated with ENSO. Our work is performed as a partnership between NOAA's Office of Global Programs, USDA, the Cooperative Extension Services and state climatology offices in each state, and the investigators. We intend our research and outreach to have a wide ranging, operational impact on productivity and profitability of selected crops and forestry. Fundamental to our approach is a symbiotic relationship between the research and operational communities.

User-Driven Research and Operational Services

If a climate information system is to be sustainable, the initial, research-intensive stages must transition toward an appropriate balance of operational and research activities. We have found agricultural applications of climate information require multi-disciplinary, multi-institutional collaboration and active involvement of decision makers from the start. Sustained interactions with growers, through operational entities such as the Cooperative Extension Service, help guide our research and amplify its impact.

Our research is of necessity demand-driven. Translating imperfect ENSO-related climate forecasts into information useful for improved decision making is a complex issue that goes well beyond simply producing better climate forecasts. Through our studies, we learned that simply documenting the effects of climate variability and providing better climate forecasts to potential users are not sufficient. Producers need feasible alternatives for adaptive actions in response to climate forecasts, and they must understand risks associated with these options to realize benefits. In many meetings with farmers and extension personnel, we found strong interest in learning more about climate variability impacts and in the use of localized climate information to improve agricultural decisions. Further, these interactions identified several decisions that could be changed in response to a climate forecast. In several instances, we identified farmers who have been using ENSO information. But, in general, farmers want more information and decision aids. We have conducted research to estimate the economic value and risks of using ENSO-based climate forecasts in several commodities and concluded that a high potential exists. However, due to the biophysical, societal and institutional

complexities of agricultural systems, decision aids and technical assistance are needed to bridge the gap that now exists between climate forecasts and their routine applications.

Climate information systems must balance research and service, which in turn requires that academicians partner with operational entities. Academia offers few rewards for operational efforts, and fortunately groups and agencies with operational mandates exist to do the job better than we could. Our efforts would be naïve and likely counter-productive if we did not recognize and take advantage of the existing agricultural and climatological technological infrastructure. The agricultural and climatological extension systems (the Cooperative Extension Services and state climatology offices in each state) have emerged as our major partners, providing a conduit for information flow from our research effort to end users, and helping prioritize our research efforts.

Our cooperation with agro-climatological extension has allowed us to evolve from a research-oriented project to a proto-operational one, and has three motivations. First, the experience of agro-climatological extension in facilitating other technological transfers helps us understand how to disseminate climate information effectively. Second, agro-climatological extension offers a readily available infrastructure for delivery of information and evaluation of its effectiveness. Third, the relationship of trust that state climatologists and agricultural extension already enjoy with farmers facilitates the iterative bridging process between forecast producers and users.

Approach

The SECC develops new information associated with climate-induced risks to agriculture and forestry and new decision aids for helping producers reduce economic risks and increase profits. Our approach has two main themes. First, we focus on climate analyses to produce forecast information for use at local scales and to produce data products necessary for analysis of uncertainty and risks to agriculture and forestry in the 3-state region. Second, we analyze climate variability effects on important yet vulnerable crops and develop decision aid products for them and for forest management. Our studies originate directly from interactions with farmers and extension agents, and build upon our assessment of how ENSO affects SE agriculture.

We use generic approaches so our results can be applied to other crops and SE states. For example, our analyses use crop simulation and economic models to translate climate and weather variability into economic and environmental risks. Our peanut, potato, livestock forage and tomato case studies use crop simulation models in the DSSAT suite of models. Since DSSAT also has models for many other crops--all of which use the same farm-specific soil, management, and weather inputs--our analyses can be extended to other crops and regions.

Climate-related risks are not the same for all crops due to differences in the crops themselves, management systems, soils, and the climate that occurs during the growing season. We selected four crops because of their economic importance to the 3-state region and because they offer an opportunity to develop and evaluate risk reduction products for very different types of risks. For livestock winter forage and peanuts, the most important risk is limited rainfall during their different growing seasons. In the case of winter-grown tomato, excess rainfall reduces yields, and prices vary with monthly harvests. The potato crop requires high levels of nitrogen fertilizer, which may leach during high rainfall.

The SECC partnership of user-driven research and operational services builds on previous research for selected crops, to develop and evaluate risk reducing management options and decision aids that make use of climate and weather forecasts.