Management Plan

Proposal: Integration of Spatially Gridded, High-Resolution Remote Sensing Data for Scheduling Irrigation in Real-Time Grower Tools For the Caribbean

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Co-I: Carmen Gonzalez-Toro, Professor, University of Puerto Rico Ag. Extension
Co-I: James Cruise, Professor (retired from teaching) UAH
Co-I: Cameron Handyside, Associate Scientist UAH
CO-I: Kati Migglacio, University of Florida Ag. Extension Service
CO-I: Laura Warner, University of Florida Ag. Extension Service
CO-I: Stafford Crossman, University of the Virgin Islands Ag. Extension Service
Co-I: Martha Anderson, USDA-ARS
Co-I: Chris Hain, University of Maryland, NOAA

The management plan of this USDA AFRI will involve:

(1) Monthly meetings and teleconferences, in addition to as-needed emails, with all project research assistants, the Co-PD and Co-I. .PD Harmsen and CO-PD Mecikalski have been working closely on project for the last 5 years and have developed an close working relationship. CPresently, CO-PD Mecikalski and Co-Is Cruise and Handyside are within NSSTC just down the hall from the other. PI Mecikalski already communicates regularly with Drs. Hain and Anderson as part of monthly ALEXI-project related teleconferences. Therefore, we will leverage these ongoing communications for this USDA AFRI.

(2) Using the proposal as guidance, a Gantt chart will be formulated to organize the project over the five funding years. As outlined in the proposal, the main goals of the proposal will roughly occur as follows over time:
Research a)Year 1. Host several web-based meetings (e.g., webinars) to organize the science team across all universities for specific annual goals. Coordinate with extension universities to form an application-development schedule that will be followed over the lifetime of the project. b) Year 1. Obtain training on the large aperture scintillometry (LAS), and begin collecting and quality controlling area-averaged surface H fluxes across scales. c) Year 1-2. Perform developments to optimally use ALEXI SM/ESI within GriDSSAT with the objective of forming simulations without antecedent precipitation and soil information. d) Year 1-3. Calibrate the newly formed ALEXI-driven DSSAT system to NASS and other yield data without need for antecedent rainfall (gauge, or estimated from radar) where crops are rain-fed or irrigated, while at the same time utilizing actual ET within the DSSAT model to establish proper crop biophysics. e) Year 1-3. Develop database use of gridded rainfall, SM and ET for smartirrigation apps. f) Year 2-3. Cal/val GOES-WEB with ALEXI ET and SM values. Compare to USGS ET. g) Year 2-3. Perform cal/val work on ALEXI and GOES-WEB in PR, VI and FL using LAS. h) Year 3-4. Develop an operational GOES-WEB-type algorithm for FL. i) Year 3-5. Develop improved methods for using new GOES-R/-S 500 m- and 2 km-resolution data in ALEXI, GOES-WEB and the GOES solar insolation algorithm. j) Year 3-5. Develop and apply the DisALEXI method to GOES-WEB to estimate the water budget at the farm scale. Focus on small farms in PR that are less than the 1-km resolution of GOES-WEB, using MODIS, VIIRS and LandSat imagery. k) Year 4-5. Couple GriDSSAT crop yield output to the GOES-WEB, and customize for FL and VI, based on field-testing and experience gained over PR.

Extension a) Year 1-2. Identify focus teams (5-8 people per team) to introduce the new concepts of using remotely sensed SM and ET data for irrigation scheduling, and to explore tool/app development options.

Designated personnel (i.e., extension agents and specialists) will meet with the focus team and conduct discussions to collect information on new tool/app creation. b) Year 1-2. Training on crop water use and irrigation management. The training workshops will describe the project plans, and what will be provided the public in subsequent years. Trainings will focus on train-the-trainer events with extension agents. c) Year 3-5. Design/develop a web tool or smart device application that uses real-time SM and ET data, forecast data, and DSSAT predictions to generate irrigation scheduling information. d) Year 4-5. Test the tool/application with the focus groups and at research centers. Testing will include comparing irrigation schedules derived from the new tool or app to site conditions. At least three sites will be selected in each location. Sites may be grower based or from a research center, and include assessment of SM, ET, and irrigation. Suggested revisions will be incorporated. The three different areas (i.e., FL, PR, VI) may require some personalization of the tool to accommodate their particular needs. e) Year 4. Develop extension curriculum for training trainers/extension agents and clientele in English and Spanish. f) Year 5. Release the tool/application to the public via appropriate venues and advertisement. g) Year 5. Conduct 'train-the-trainer' workshops to train extension agents on use of tools and applications. Assist extension agents with workshops in local communities. FL, PR, VI each to have 2 train-the-trainer workshops; participate in at least 2 workshops for local clientele. h) Year 5. Write extension documents describing use of new applications. For FL, this will be published in EDIS system (http://edis.ifas.ufl.edu/). Publish similar documents for PR/VI. i) Year 5. Develop a website with self-training videos, handouts, demonstrations, and grower vignettes for clientele unable to attend a workshop or requiring more information. Each Land Grant institution (FL, PR, and VI) will have a website with mirrored information such that it reflects their clientele interests. UF will incorporate this effort into the UF IFAS IrriGator program that is a web-based product that organizes irrigation information. Each institution will be responsible for posting the web material to their affiliated site.

(3) PD Harmsen and CO-PD Mecikalski will co-direct the work of Extension CoIs. Co-PD Mecikalski will direct the work done by Dr. Martha Anderson and Dr. Chris Hain.

(4) Post-docs and PhD students will be expected to take on some level of project management duties, which will help the publishing of papers, and preparing material for reports and science talks, in addition to interfacing with end users of the irrigation scheduling tools. The PD and Co-PD will have clearly stated goals related to specific research tasks that result in the publishing of scientific papers based on original, significant new research, and the presentation of new research results at conferences and workshops.

The Center for Investigation and Development (CID) at UPRM uses the Kuali Coeus system to manage our research projects. Kuali Coeus (KC) is an open-source Electronic Research Administration system, which originated at MIT as "Coeus" and has been redeveloped by the Kuali Foundation. KC provides a comprehensive research proposal development and management system that can be integrated to the institutional financial system to become a "cradle-to-grave"

Advisory Group

An Advisory Group has been established for the purpose of providing recommendations to improve the management and functioning of the project. The group will hold two face-to-face meeting during the project, in years 2 and 4. The members of the Advisory Group, experts in the field of agriculture water and irrigation management, are listed below:

1. Shelby Krantz Coordinator, Southeast Climate Consortium
2. W. Barclay Shoemaker, Research Hydrologist, U.S. Geological Survey
3. Dr. Luis E. Peterson, Jr., Commissioner of Agriculture, USVI
4. Edwin Almodovar, Director USDA-NRCS, Caribbean Region

Letters of commitment from the Advisory Group members are attached to this proposal.