



## 27<sup>th</sup> Open Forum on Crop Modeling and Decision Support Systems

Sponsored by the DSSAT Foundation

**Meeting:** 2024 ASA-CSSA-SSSA International Annual Meeting, San Antonio, Texas  
**Date/time:** Monday night, November 11, 2024, from 7:30 – 9:00 pm at Hilton Palacio del Rio Hotel, Second floor, Room La Reina  
(<https://scisoc.confex.com/scisoc/2024am/meetingapp.cgi/Session/26694>)

### Introductions and Explanation

- Open Forum explained
- Introduction and interest in modeling and decision support systems
- The DSSAT Foundation update ([www.dssat.net](http://www.dssat.net))

### New

DSSAT YouTube Channel: <https://www.youtube.com/@DSSATFoundation>

### Discussion

- Do we need crop models in a world of AI?
- How to improve our crop models to address climate change and sustainability challenges for food and nutrition security
- Access to data for model evaluation and improvement

### Publications

- Advances in Crop Modelling for a Sustainable Agriculture; 2019; Ken Boote, Editor (<https://shop.bdspublishing.com/store/bds/detail/workgroup/3-190-82506>)
- Cropping Systems Modeling Under Changing Climate; 2024; Ahmed et al., Editors (<https://link.springer.com/book/10.1007/978-981-97-0331-9>)

### DSSAT/CSM Open Source

- GitHub (<https://github.com/DSSAT>)
- The 3-Clause BSD License ([opensource.org/licenses](https://opensource.org/licenses))

### DSSAT Cropping System Model

- DSSAT Version 4.8.5 to be released before the end of 2024
  - New crops: Strawberry, Carinata, Guar, Bambara Groundnut, Amaranth, Lentil
  - Y4K weather files
  - In-season yield forecasting
  - Greenhouse gas emissions
  - Updated soil temperature routine
  - SAMUCA-Sugarcane crop module
  - CERES-Rice-Teff crop module
  - Perennial Forage Model – Alfalfa, Bahia, Bermuda, Brachiaria, Guinea Grass
- Ongoing work, new features include:
  - New crops – Hemp, Cactus, Winter Pea, Onion, White Reddish, Sweet Potato, Camelina, Forage maize
  - Model for tree crops – TreeGro – Sweet oranges
  - Energy balance & canopy temperature
  - 2-D soil module
  - Soil temperature improvement
- Mixed languages: Fortran and C++
- Generic pest and disease model
- Intercropping
- XB2 (replacement for XBuid, FileX creator)
- GLUEP (update for Glue with parallel processing) - *Computers and Electronics in Agriculture* 227 (2024)
- TSE (Time Series Estimator) - *Transactions of the ASABE* 64(4):1391-1402 (2021)

## **DSSAT Development Sprint**

- To improve tools, data and models, including new crops, energy balance, structured evaluations, etc.
  - International Fertilizer Development Center, Muscle Shoals, AL, June 10-14, 2024 (21<sup>st</sup> Sprint)
  - University of Florida, January 6-10, 2025
  - *To be determined*, June-July 2025
- Crop Simulation Lab Seminars (<https://sites.google.com/ufl.edu/cropsimulationlab-seminars>)
  - Every other Friday from 11:00 am to 12:00 pm

## **Modeling Activities**

- Ag Model Intercomparison and Improvement Project (AgMIP; [www.AgMIP.org](http://www.AgMIP.org))
  - Wheat, maize ET, rice, potato, soybean, low input, model calibration, ozone, etc.
- Agricultural Model Exchange Initiative (AMEI; <https://crop2ml.org/#/AMEI/Vision>)
  - Crop Modeling MetaLanguage (Crop2ML; <https://crop2ml.org/>)
- The Open Modeling Foundation (OMF) (<https://www.openmodelingfoundation.org/>)

## **Other News and Resources**

### **DSSAT 4.x**

- DSSAT home ([www.dssat.net](http://www.dssat.net)). Check here for news of meetings, to post queries, etc.
- DSSAT List server: over 29,500 unique e-mail contacts
  - DSSAT Version 4.7, released in November 2017; a total of 18,660 download requests
  - DSSAT Version 4.8, released in April 2020; a total of 12,121 download requests
  - Downloads from 198 countries
- DSSAT Version 4.X NextGen: Mixed languages with C++

### **Past Events**

- DSSAT Training
  - DSSAT 2024 @ UGA, Griffin, Georgia, USA, May 20-25, 2024
  - DSSAT @ National University of Singapore, August 26-30, 2024
  - DSSAT @ Bahauddin Zakariya University, Pakistan, March 4-6, 2024
  - DSSAT @ Univesidad de la República, Uruguay, April 15-19, 2024

### **Upcoming Events**

- DSSAT Training
  - DSSAT 2025 @ UGA, Griffin, Georgia, USA, May 19-24, 2025
  - DSSAT @ RDA, Korea, *tbd*
  - DSSAT @ Thailand, *tbd*
- AgMIP10 Global Workshop @ CIMMYT, Mexico, March 31 – April 4, 2025

### **Software & Data News**

- NASA/POWER data set (<https://power.larc.nasa.gov/>)
  - 0.5 x 0.625 degree grid for daily and hourly solar, temperatures, etc.
- CHIRPS data set (<https://www.chc.ucsb.edu/data/chirps>)
  - 0.05 x 0.05 degree grid for daily precipitation
- MarkSim GCM (<http://gisweb.ciat.cgiar.org/MarkSimGCM/>)
  - Daily weather generated from multiple GCMs
- Soil WISE Version 3.1 soil database with 9,613 profiles & AFSIS soil database for Africa.
- Spatial modeling tools
  - CRAFT in cooperation with CCAFS (<https://craft.dssat.net/>),  
Environmental Modeling & Software 115 (<https://doi.org/10.1016/j.envsoft.2019.02.006>)
  - DSSAT Pythia (<https://github.com/DSSAT/pythia>)
  - GSSAT2

### **Other related activities**

- Data standards, ontologies, etc.
  - ICASA Version 2.0 Standards, Comp & Elec Agric. 96 (<https://doi.org/10.1016/j.compag.2013.04.003>)