

2017 Annual Meeting

California Water and Environmental Modeling Forum

Introducing the SWAP-RTS Model

CWEMF Pop Up Talk

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Statewide Agricultural Production Model (SWAP)

- Calibrated economic optimization models have a long history of being applied to California water and agriculture policy analysis
 - These models are able to directly interact with biophysical models (e.g. Calsim II, C2VSim, flood models, agronomic models, etc.)
- Recent history of models of California water and agriculture
 - CalAg > CVPM > SWAP 6 > SWAP 6.1 (as of 2014)
- Every model iteration is an improvement over previous versions reflecting advances in theory and calibration approaches
 - The most recent version of SWAP (version 6.1) features Constant Elasticity of Substitution (CES) production technology, exponential PMP calibration, updated (2010) calibration dataset, and various improvements to sub-routines

SWAP - RTS

- Recent advances in calibration approaches and theory warrant an update to the SWAP 6.1 model
 - First-order calibration: replicate baseline conditions
 - Second-order calibration: replicate observed response to changes in policy conditions
- We can now, in SWAP-RTS, achieve simultaneous, and sometimes exact, first and second-order calibration
 - Prior to these advances, in all previous models (CalAg, CVPM, SWAP), this was not possible
 - SWAP-RTS incorporates these changes
- Other SWAP-RTS improvements
 - Upstream linkage to dairy industry to correctly value feed and fodder crop production
 - Downstream linkage to water models (e.g. ability to model SGMA impacts)
 - Updated calibration to marginal cost of irrigation water by source, in turn improving the water value estimates resulting from the SWAP-RTS model
 - Ability to run dynamic simulations to quantify water supply variability in addition to a (static) mean change in water supply
- The ERA team has incorporated these updates to theory, data, and model linkage in SWAP-RTS

SWAP – RTS Data Management

- California water and agriculture data is messy, full of inconsistencies, and generally difficult to interpret
 - SWAP-RTS is linked to a cloud-based data-system that automates database development for the SWAP-RTS model
 - Allows for sequential updates of the model calibration data for the first time
- The updated database also allows for expanded analyses at a range of scales -- from the field, region, and statewide analyses
 - SWAP-RTS includes standard linkage to regional models such as IMPLAN
 - Expanded database allows to generate analysis at much more disaggregated level, if needed
 - Expanded database allows for direct linkage to econometric analyses, in turn expanding the applications of SWAP-RTS
- Work-in-progress
 - Building a web-based interface to quickly query regional economic information
 - Improving the user interface
 - Expanding calibration to multiple years (simultaneously)

SWAP – RTS Access and Details

- ERA intends to continue the history of collaboration with public agencies for the calibrated SWAP-RTS model package
- The SWAP-RTS model will be formally announced soon on a new website
 - Follow ERA Economics on Twitter *@ERA_Economics* for updates and SWAP-RTS release schedule