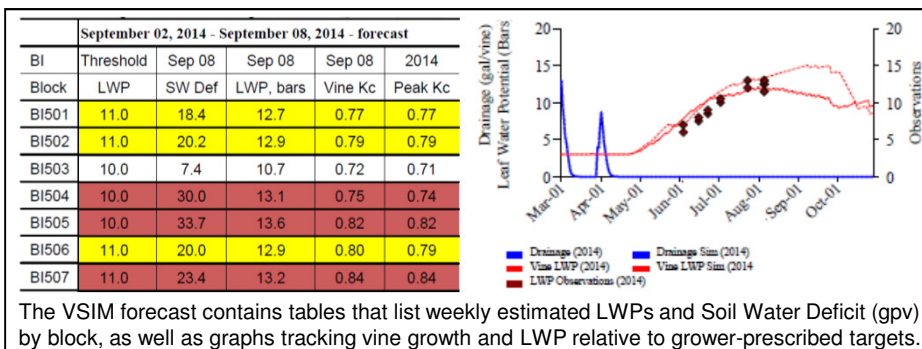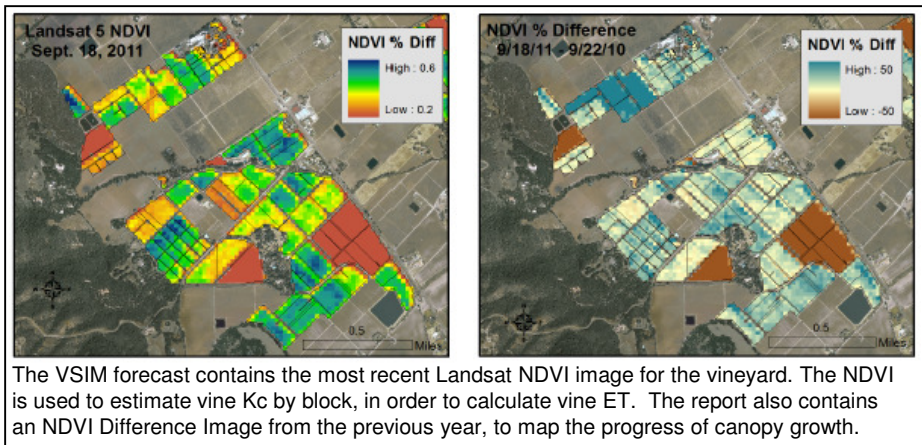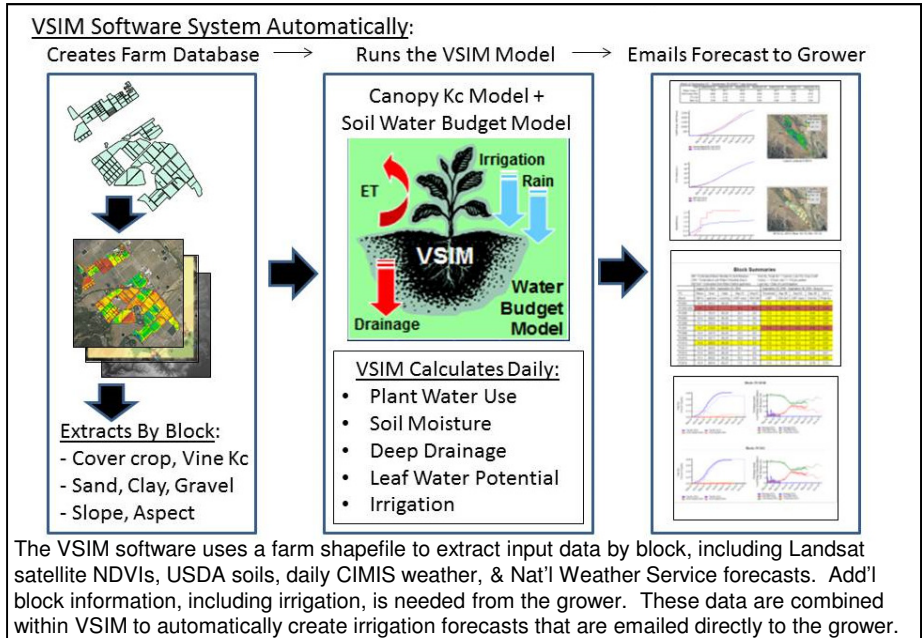# VSIM Farm-wide Irrigation Forecasting and Evaluation

Deficit irrigation in winegrapes has been shown to improve quality through controlling vine growth and enhancing ripening. We have developed the Vineyard Soil Irrigation Modeling System (VSIM) to assist growers in operating closer to critical water stress margins required by deficit irrigation schedules. VSIM combines several sources of online data within a water balance model to assist growers in more easily developing automated weekly irrigation forecasts and evaluating irrigation schedules by block.

- ✓ VSIM couples a vine canopy Kc – ETo model with a soil water balance model to track daily & seasonal block water balance.

- ✓ Based on real-time Landsat NDVIs, CIMIS weather data, NWS 7-day forecasts, USDA Soils, slope/aspect, irrigation.

- ✓ Grower defines LWP targets by date - VSIM estimates irrigation needed to achieve LWP targets.

- ✓ Data needed from Grower: Farm shapefile Block name, variety, spacing, emitter gph, emitters/vine Weekly irrigation

- ✓ VSIM uses a shapefile to build the farm database by block (easy to set up for new farms).

- ✓ Irrigation forecasts automatically generated whenever the grower emails updated irrigation logs to the VSIM server.

- ✓ VSIM report provides an 'early warning system' & documents efficient water use.

- ✓ VSIM currently being tested in vineyards in Sonoma, Napa, Monterey, and SLO counties.

- ✓ Early VSIM irrigation trial results: Water savings; No significant reductions in yield; Earlier ripening; Improved juice color.

- ✓ We seek to expand the no. of vineyards using VSIM forecasts. Funded by CA DWR.

The VSIM software uses a farm shapefile to extract input data by block, including Landsat satellite NDVIs, USDA soils, daily CIMIS weather, & Nat'l Weather Service forecasts. Add'l block information, including irrigation, is needed from the grower. These data are combined within VSIM to automatically create irrigation forecasts that are emailed directly to the grower.

The VSIM forecast contains the most recent Landsat NDVI image for the vineyard. The NDVI is used to estimate vine Kc by block, in order to calculate vine ET. The report also contains an NDVI Difference Image from the previous year, to map the progress of canopy growth.

	September 02, 2014 - September 08, 2014 - forecast			
BI	Threshold	Sep 08	Sep 08	Sep 08	2014
Block	LWP	SW Def	LWP, bars	Vine Kc	Peak Kc
BI501	11.0	18.4	12.7	0.77	0.77
BI502	11.0	20.2	12.9	0.79	0.79
BI503	10.0	7.4	10.7	0.72	0.71
BI504	10.0	30.0	13.1	0.75	0.74
BI505	10.0	33.7	13.6	0.82	0.82
BI506	11.0	20.0	12.9	0.80	0.79
BI507	11.0	23.4	13.2	0.84	0.84

The VSIM forecast contains tables that list weekly estimated LWPs and Soil Water Deficit (gpv) by block, as well as graphs tracking vine growth and LWP relative to grower-prescribed targets.

For more info, visit https://sites.google.com/a/csumb.edu/vsim or email lpierce@csumb.edu.