On-Farm Irrigation RESEARCH REPORT

Water Use Prediction Technologies for Trees and Vines

Goal: To investigate and demonstrate state-of-the-art techniques of plant, soil, and atmospheric based irrigation scheduling for orchard and vineyard crops. Goals are to obtain maximum growth and fruit yields.

Technology Path: This task will advance the development of farming practices for irrigation scheduling. To date no comprehensive research has been accomplished to determine the best farming practices in irrigation throughout the seasons to achieve desired growth in trees and vine.

Water irrigation is the single largest energy use in the agricultural industry. Conducting applied research is imperative to minimize water consumption thereby reducing pumping cost for water transport and thus achieve highest energy use efficiency. This project will demonstrate that continuous measurements of plant and soil water status can be incorporated by growers into irrigation scheduling regimes as stand-alone techniques or as a validation of atmospheric-based approaches.

At the completion of this task the researcher expects the LVLT or truck diameter fluctuation technology to be ready for commercial use by innovative growers. Software system for the LVLT is not commercially available at present and needs to be developed. To be available for all growers, the technology must be marketed by a commercial partner who can produce a "turnkey" LVLT system.

Energy Efficiency Benefits: Potential energy efficiency benefits to be gained from this research are estimated to reach 1,200 million kilowatt hours per year, as a result of 10% reduction in water use.

Technical Objectives:

Investigate and demonstrate state-of-the-art techniques of plant, soil, and atmospheric-based irrigation scheduling for orchard and vineyard crops as a means to reduce water consumption and conserve energy involved in water pumping and transport.

Economic Objectives:

Achieve sufficient energy and other production-cost savings to reach a positive return on investment for the proposed optimized irrigation scheduling system.

Principal Investigator: Dr. David Goldhamer, researcher with the University of California, Davis Land, Air, Water Resources Department is the project manager.