

**AGRICULTURAL RESEARCH FOUNDATION
INTERIM REPORT
FUNDING CYCLE 2016 – 2018**

TITLE: Assessment of Crop Water Use Through Stable Isotope Analysis

RESEARCH LEADER: Stephen Good

COOPERATORS: Kenneth Frost

SUMMARY: This project aims to develop a new approach that uses the stable isotope ratio of soil water to assess the efficacy of irrigation schemes so that non-productive water losses can be quantified and reduced.

OBJECTIVES: The direct objective of this project is to measure the ratio of rare (HDO) to abundant (H₂O) water molecules in agricultural soils of different irrigation treatments and relate these to the yields in producer fields.

PROCEDURES: Soils are collected from fields and analyzed in our lab at Oregon State University in Corvallis. Soil samples are retrieved with a hand auger from multiple depths (5-10cm, 15-20cm, and 25-30cm). Samples are sealed within a stainless steel ring with plastic end caps, and then double bagged in ziplock bags for transport to the lab. In the lab samples are split, weighed, and analyzed using liquid-vapor equilibrium laser spectroscopy.

SIGNIFICANT ACCOMPLISHMENTS TO DATE: During the summer of 2016 a successful trial was conducted at the Hermiston Agricultural Research and Extension Center (HAREC). Two plots with different irrigation scheduling demonstrated different stable isotope ratios consistent with what would be expected if one field experienced larger evaporation. These results were presented at the Hermiston Farm Fair in December 2016.

ADDITIONAL FUNDING RECEIVED DURING PROJECT TERM: Stephen Good has received NASA funding (~ \$300,000) for research into plant wilting points.

FUTURE FUNDING POSSIBILITIES: It is hoped that future funding from the USDA – AFRI program will be obtained to continue this work past 2018.