

BIOAG PROJECT FINAL REPORT

TITLE: Economic Costs and Benefits of Soil Improvement Practices

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KEY WORDS: soil health, soil quality, economics, cover crops, high residue farming, organic amendments

ABSTRACT

We conducted an economic valuation of soil improvement practices in the irrigated Columbia Basin. Starting with producer focus groups, we collected information on three soil-improvement approaches: adding soil amendments (e.g. compost, manure); using cover crops/green manures; and high residue farming and reduced tillage. We also conducted a literature search and made field measurements on nine treated fields, comparing them to nine adjacent untreated fields. Then we combined all this to estimate the benefits and costs of soil improvement practices. Partial budgets showed that all three practices generated positive changes in profit that were mostly due to savings in replant costs or reduced fumigation costs. Other non-cash benefits or costs not included in the partial budgets, but which could have a significant impact on the overall profitability of the cropping system, were increases in land value as soil productivity increased, the value of carbon sequestered, and learning and knowledge acquisition costs; all three can affect net returns. The soils work showed that each of these practices can maintain or improve soils in this region, though each practice differs from the others in its specific effects. The results were incorporated into an Extension bulletin on the soil analysis (summitted), another Extension bulletin on the economic analysis (final draft ready for submission) and a peer-reviewed paper which was submitted to one journal but rejected. We are preparing another draft to submit to a journal more open to our type of economic analysis. The results have also been disseminated through presentations and final results will be presented at a December 2016 soils conference.

PROJECT DESCRIPTION

Economic valuation of soil improvement practices in irrigated Columbia Basin agriculture.

OUTPUTS

- Work Completed:
 - ✓ We identified four or more producers identified for each of these practices: soil amendments, cover cropping, high residue farming
 - ✓ We conducted three focus groups in Moses Lake with these producers. A total of 9 producers attended these meetings. Information from an additional two producers was collected.
 - ✓ We compiled relevant literature about the economic benefits of different soil improvement practices. A write-up of the literature review is on-going.
 - ✓ We constructed a partial budget analysis for the different soil improvement practices using the information generated in the grower focus groups. We will follow up with some growers to collect additional data on input costs and savings, as well as validate the partial budget estimates.
 - ✓ We have identified 11 fields for paired soil sampling and testing (we will not sample all eleven)
 - ✓ We have identified a suite of soil tests which we think will best characterize the benefits grower told us about during the focus groups and stay within our budget.
 - ✓ We took soil samples from 9 pairs of fields (18 fields total) and analyzed them for pH, total soil organic carbon, water holding capacity, active C, soil protein, soil respiration, texture, and bulk density. We also ran ponded infiltration tests on these fields.

- ✓ We analyzed the soils data and presented the results to our farmer cooperators in 2015.
- Publications, Handouts, Other Text & Web Products:
 - ✓ We recorded audio and slides from the Dec. 10th conference (see below) speakers. Edited videos of the presentations are available online at <http://csanr.wsu.edu/program-areas/bioag/bioag-conferences-proceedings/soils/>
 - ✓ We have submitted a draft Extension publication on the results of the soils analysis to the WSU publishing system. See attached draft, **Soil Comparison Results**.
 - ✓ We have prepared a draft Extension publication on the economics analysis that will be submitted to the WSU publishing system by early July 2016. See attached draft, **Soil Improvement Economics**.
 - ✓ We have drafted a paper on the results of the economic study we did. We submitted it to one journal, but they would not publish it. We plan to submit it to another journal by Fall 2016.
- Outreach & Education Activities:
 - ✓ We held a soils conference in Moses Lake on Dec. 10th. The 142 people in attendance heard from various speakers on soil health indicators, nutrient effects, factors that affect soil organic matter levels, high residue farming in California irrigated systems, and organic amendments being applied in the Columbia Basin.
 - ✓ Project team member, David Granatstein, presented preliminary findings from our project at this conference.
 - ✓ We surveyed the audience at the conference for their use of soil building practices including the acres under these practices. The survey results will be available in early 2015.
 - ✓ We held a meeting on June 22nd in Moses Lake for all focus group and soil sampling cooperators where we presented them with the results of both the economic and soil analysis.

IMPACTS

- Short-Term: Farmer cooperators have gained an increased understanding of the economic value of their soil building efforts and the changes that those efforts have made on their soils.
- Intermediate-Term: Farmers participating in our events reported using organic amendments on over 18,000 acres, green manures on over 22,000 acres, and high residue farming on over 25,000 acres in 2015. A majority reported that WSU efforts have led to them increasing use of these practices.
- Long-Term: Growers report that soil improvement practices help them control wind erosion, increase yields, and lower fertilizer costs.

ADDITIONAL FUNDING APPLIED FOR / SECURED

We applied for an USDA-AFRI grant, Agriculture Economics and Rural Communities, but were not asked to submit a full proposal.

GRADUATE STUDENTS FUNDED

NONE

RECOMMENDATIONS FOR FUTURE RESEARCH

Wider monitoring of the effects of soil improvement practices in this region.