Can Producers in Five Montana Counties Successfully Use No-Till Methods for Renovation of Irrigated and Dryland Pastures?

Final Report for FW08-016

Project Type: Farmer/Rancher
Funds awarded in 2008: $29,999.00
Projected End Date: 12/31/2008
Region: Western
State: Montana
Principal Investigator:

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Co-Investigators:

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Project Information

Abstract:

No-till practices have been incorporated into small grain production for many years, and the group was interested to see if these same practices could be implemented into hay and pasture rotations. The producers wanted to see if they could do a no-till program on their pasture and hay renovations with their existing equipment or equipment readily available locally.

The project coordinator and technical advisors believe implementing knowledge gleaned from replicated research is a key component to successful farm and ranch operations. However, when that research is implemented at the individual farm/ranch level, producers need to be able to make adjustments to fit their constraints. The project demonstrated stand termination by herbicides, forage crops for rotation and no-till establishment of both annual and perennial forages in the system. The cooperator producers and county agents were interested in seeing how a no-till system could work with their current equipment constraints.

Producers found they could incorporate no-till principals into their current operations. Results from the implementation were varied based on environmental factors, machinery compliments, outside influences and labor constraints.

Introduction

In south-western Montana, optimum management of pastures and hay crops is critical for sustaining healthy landscapes. Southwest Montana has a large population of small acreage/part-time farmers who are looking for new techniques to use on their properties.

Traditional practices currently recommend intensive tillage for reseeding dryland

and irrigated pastures. Tillage is becoming more costly each year as fuel and machinery costs continue to skyrocket. Traditional tillage techniques are expensive and not suited for rocky soils or steep slopes. Although a no-till program may increase the use of petroleum-based herbicides, it more than offsets the petroleum consumed for traditional practices. The goal for this project was to demonstrate adapted techniques of no-till planting and crop rotation to minimize large quantities of fuel used in a traditional program while lowering input costs, and providing comparable income streams during crop rotation.

No-till practices have been incorporated into small grain production for many years and the group was interested to see if these same practices could be implemented into hay and pasture rotations. The producers wanted to see if they could do a no-till program on their pasture and hay renovations with their existing equipment or equipment readily available locally.

There were several farm/ranch operations involved in this project; during the course of this project one producer, Bernie Lucas, passed away from cancer and his family decided to drop out of the project as they needed to focus their attention on other ranch issues. All of the operations have both irrigated and dryland pastures and hay land. All operations raised beef cattle, and some sell excess hay produced. Traditionally these operations have utilized extensive tillage for pasture and hay land reclamation. Generally, producers plow old pastures or hay fields in the fall and invest two or three crop years in grain crops, which require applications of nitrogen and herbicides while producing no viable forage base.

This project demonstrated stand termination by herbicides, forage crops for rotation and no-till establishment of both annual and perennial forages in the system. The cooperator producers and county agents were interested in seeing how a no-till system could work with their current equipment constraints. High fuel prices and low economic return create a current situation that may not be sustainable using traditional methods.

Project Objectives:

The project coordinator and technical advisors believe implementing knowledge gleaned from replicated research is a key component to successful farm and ranch operations. However, when that research is implemented at the individual farm/ranch level, producers need to be able to make adjustments to fit their constraints. The true intent of the project was to see how implementing a no-till component affected real-life ranch operations, not a research-based replicated study. With this in mind, the project sponsor and technical advisors felt it was important to allow cooperating county agents and producers to incorporate factors that affected their participation in this project.

Objectives/Performance Targets and Methods in the original application:

2008 - Finalize site selection, herbicide treatment, monitor sites, grower tours, site evaluation to determine herbicide treatment. Plant forage winter wheat utilizing grower’s equipment. Grower meeting to present data and pictures collected from all the plots.

2009 - Evaluate stand of forage winter wheat and determine if broadleaf herbicide is needed, individual tours of each site, harvest forage winter wheat for hay or graze forage winter wheat depending on individual producers forage needs collect yield data. Group meeting of individuals involved in the grant to discuss the project and review each location. Site evaluations to determine the need for herbicide treatment. Technical advisors and cooperators will plant “Willow Creek Forage Winter Wheat.” If field is weed-free as determined by technical advisors and

cooperators, winter field peas will be planted with the forage winter wheat. Winter grower meetings for area producers to look at results from the project to date.

2010 – Same procedures as 2009. Fall 2010 - frost plant permanent vegetation in sites.

Spring/Summer 2011 – evaluate stands of permanent vegetation establishment. Finalize cost comparisons of traditional vs no-till for this project, including a survey of participating producers.

Research

Materials and methods:

What really happened for Objectives/Performance Targets and Methods

Please see attached table.

- What really happened

Research results and discussion:

Affect on overall farm production levels?

Producer A: Conventional tillage program out-performed the no-till operation on Producer A. The major factor on this operation was that there was not adequate seed to soil contact for good stand establishment. Producer A used a hoe drill in the fall of year 1 and a disk drill in the fall of year 2; neither performed well on his site. Producer A has implemented a no-till system on his irrigated grain farming with success; he does feel that you need to use conventional practices on year 1 when going from hay to grain.

Producer B: Implementing a no-till component did work for Producer B, and production was comparable to a conventional tillage program. Producer B plans to use no-till unless there is a terrible weed or rodent problem, where no-till would leave the ground too rough to establish a perennial crop. Producer B did note the no-till was slow to emerge compared to conventional tillage.

Producer C: Producer C utilized no-till successfully on year 1 for his forage winter wheat crop. On the year he established a perennial crop, he chose to work the ground prior to seeding. He did this to level the ground and make it smooth for haying equipment.

Producers D: Producer D had several factors combined to make the implementation of no-till undesirable. On that operation, lack of rainfall and animal pests would have limited production on either no-till or conventional till. Utilizing a no-till drill provided by the local Conservation District did not provide adequate seed to soil contact in his conditions.

Evaluating no-till and conventional operations on Producer A and Producer B showed contrasting results. See attached costs table.

- Costs

Participation Summary

Educational & Outreach Activities

PARTICIPATION SUMMARY:

Education/outreach description:

This project has been discussed at producer meetings. And now with the completion of the project, Extension Specialists and agents will be able to disseminate the information.

A website was established for the project and will be maintained by Extension personnel.

http://www.msuextension.org/park/WSARE%20No-till.html

Area Extension agents have attended trainings at project locations. These trainings involved the agronomic aspects of hay and pasture renovation using no-till, and also philosophies on promoting change and positive impacts.

Project Outcomes

Project outcomes:

Producer A and two neighboring operations converted their irrigated grain operations to a no-till system that utilizes principles learned from this project and the knowledge gained from looking into no-till systems. Machinery components were not changed to make the switch. In the 2011 crop year, 390 acres were seeded implementing a no-till methodology. The change resulted in a fuel saving of 3.5 gallons per acre to raise the grain crop to harvest. Stand establishment and yield were not affected by the use of no-till.

Producer B is working with area neighbors to begin fine tuning no-till for hay and pasture renovation. He does feel it is better to cross seed if possible for denser stands. Producer B does not plan to use conventional methods, unless he has rodent problems on a field and needs to level out ground squirrel mounds.

Producer C utilizes a custom farming operation in his area to no-till his pasture and hay lands. Advanced planning and organization are keys to making this arrangement successful.

Producers D showed the importance of outside factors contributing to the success or failure of an operation. Neighboring pests, both mule deer and ground squirrels, can have major impacts on the success of either no-till or conventional tillage.

Recommendations:

Potential Contributions

The title for this project is “Can Producers in five Montana Counties successfully use no-till methods for renovation of irrigated and dryland pastures?”

The short answer is: YES.

The real benefit from this project was not if it can be done; we could have used small test plots at the MSU Experiment Stations to answer that question, or better yet, computer modeling based on studies done in other parts of the world. This

project fit the last piece of the puzzle into place, "can no-till be implemented into real life scenarios?" For agricultural professionals, promoting change solely based on computer modeling, bench research or even field research could be a recipe for economic and environmental catastrophe. The lessons learned from this project were: start small and build upon the constraints of the individual operation. When looking at constraints, remember to consider environmental constraints, economic constraints, machinery constraints and human labor constraints. In this project, the size of the machinery was not as important to success at the environmental conditions.

Future Recommendations

Producers and technical advisors involved in this project are interested in the merit of renovating hay fields utilizing a glyphosate application in the early fall and no-till seeding perennial stands the following spring. One of the drawbacks to hay and pasture renovation is trying to fit cereal hay into a cow/calf system. The chance of having nitrates at levels too high to feed the livestock is a reality.

Moving an idea or concept from computer modeling to a controlled environment to an Agricultural Experiment Station to farm field studies and implementation in working environments is important as demands on agricultural producers increase. The Western SARE producer program serves an important function for agriculture and should be supported as strongly as any of the other functions of research and outreach.

SARE Sustainable Agriculture Research & Education US Department of Agriculture

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