Program Focus Team Action Plan:

Crop Residue Management in Kansas

2012-2013

Strategic Opportunities Addressed:

- Sustain Profitable Agricultural Production Systems
- Ensure an Abundant and Safe Food Supply for All

Situation:

Crop residue management is a vital component of sustainable cropping systems for the Great Plains. One to two inches of additional soil water was available with mulched fallow vs. tilled fallow (Greb. 1979. USDA Bull. 420). Runoff and soil losses from stover mulched soils are lower than those from unmulched soils (Lindstrom, 1986; Agric. Ecosyst. Environ. 16:103-112.). Reduced soil erosion reduces transport of nonpoint source pollutants (e.g., fertilizers, pesticides, and herbicides) to rivers and streams. (Torbert et al., 1999; Agron. J. 91:606-612). Farm Management Association Data for central Kansas indicates greater net farm income and a greater percent of farms with above average profit margin for no-till farms than for mixed tillage farms on average (Langemeier. 2008. Agmanager.info). Stover removal can affect plant growth through its impact on soil structure, water content, temperature, organic matter pools, and nutrient supply. (Blanco and Lal, 2006; Soil Sci. Soc. Am. J.; 70:266-278; Wilhelm et al., 2007, Agron. J.; 99:1665-1667). Stover removal rates as low as 25% can reduce grain yields, soil organic matter pools, and water infiltration after 4 yr of removal on some soils (Blanco and Lal, 2007: Geoderma 141:355-362). In wet, cold soils, corn yields may increase with removal of stover. The inclusion of cover crops into a fallow portion of the particular farm cropping system can provide residue and capture available soil watrer for additional soil-building benefits (Roozeboom et al., 2012; KSU AES & CES MF3066:18-23). There is a need for educational programs targeted at producers and their crop management advisors that will allow them to make sound, science-based residue management decisions. As of 2004, only about 20% of the planted acres in Kansas were some form of no-till (CTIC). Most continuous no-tillers will say that their reasons for adopting no-till included increases in efficiency and environmental stewardship. Today's adopters may include the last to adopt. What is the best method for reaching these groups? What are their barriers to adoption today? Do the majority and laggards still need information of switching from reduced or conventional tillage to no-till? What financial incentives will it take for these adoptions to occur? Do the innovators and early adopters need information on optimizing conservation tillage? Crop reside can increase utilization of available water from rainfall and irrigation. Maintaining high levels of crop residue can decrease water and wind erosion. Proper residue and vegetation management can increase crop production and enhance sustainability in highly variable environments. High-residue cropping systems can increase farming efficiency by decreasing a farmer's time investment into each acre as well as the amount of energy (fuel, fertilizer, etc.) used to farm each acre.

Public Value:

When you support the K-State Research and Extension Sustainable Crop Residue Management for the Cropping Systems of the Great Plains Program, participants will gain knowledge and increase adoption of recommended cropping systems and associated production practices, which will lead to them saving money and increasing efficiency, which will benefit other community members by increasing the viability of rural communities and having access to a more safe and less expensive food supply.

Outcomes:

Short-Term:

- Participants will raise their awareness of and interest in profitable, sustainable residue management, including trade-offs involved in bio-energy production systems.
- Participants will increase their knowledge and understanding of residue management issues, such as soil and water impacts, no-till crop production, declining irrigation availability, integrated pest management, and nutrient management.
- Participants will build their knowledge and expertise in selecting and utilizing cover crops for soil building, soil saving, water efficiencies and potential yield improvements in their crop production systems.

Evaluation Questions:

- What awareness and interest did participants gain about profitable and sustainable residue management?
- What knowledge and understanding did participants gain about residue management issues?
- What knowledge and expertise of successfully implementing cover crops into their cropping systems did participants gain?

Medium-Term:

- Participants improve their management of crop residue to maintain or improve soil quality and sustainability of crop production.

Evaluation Questions:

- How have participants sought to improve their management of crop residue?

Long-Term:

- Kansas producers will have efficient, sustainable and competitive cropping systems.
- Kansas producers will save water and increase efficiency.

Evaluation Questions:

- How many Kansas producers demonstrate efficient, sustainable and competitive cropping systems?
- How much have Kansas producers saved water and increased their operational efficiency due to improved residue management?

Outputs:

- Producers, land owners, extension agents, consultants, agribusiness, public officials and the general public.
- Tillage practices survey: Statewide survey of cropping practices to document residue management. This will involve training and data collection and summary by specialists and will be carried out by extension agents for their own counties/districts. The survey will be conducted in even years to provide current baseline and future

progress information. Funding is being sought to compensate agents for expenses associated with conducting the survey.

- Diffusion of innovation assessment: County surveys – 12 copies will be sent to each county agent who will send them to 12 producers in their county.
- Residue Management Workshops: Sharply focused, half-day or day-long Residue Management Workshops to equip producers for the specific challenges that come with management of high-residue cropping systems, how to optimize no-till, and the agronomic, economic, soil, and water quality benefits of maintaining appropriate amounts of residue for their soils and crop rotations. Content will be specifically tailored for specific audiences, particularly those who are just beginning in no-till or other high residue systems vs. those with extensive experience in those systems.
- Winter meetings and summer field tours will be conducted in response to demand from agents who will work with specialists to set up demonstrations and/or comparisons.
- Summer demonstration ideas will be developed as a result of focused discussion from the winter meetings.
- On-farm Demonstrations and Studies: Specialists and agents will work together to establish demonstrations and/or replicated strips of residue management and/or no-till practices of particular interest in a given area. Demonstrations and studies might include, but are not limited to: Planter/drill settings and components

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