

13. Dry Land Farming Risk and Profit: How Are They Affected by Tillage & Opportunity Cropping in Western Kansas?

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Ray is the owner of Smith Land Company, Chalk Creek Farms, LLC., and Smith Gateway Farms, LLC. all family owned farms based in Sharon Springs Kansas. The farms specialize in dry land farming of wheat, corn, and milo in Greeley and Wallace Counties and have been in complete no-till since 2006. All field work for the farms is done by custom farmers and there are no full time employees. Smith is a native of Tribune, Kansas and holds a Masters Degree in Agricultural Economics and a Masters of Agribusiness, both from Kansas State University. Smith currently serves on the board of the Northwest Farm Management Association and the advisory board of the Southwest Research-Extension Center, Tribune.

Robert Burton, Jr.

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At Kansas State University, Bob Burton teaches Farm and Ranch Management, Production Economics, and Computer Applications in Agricultural Economics and Agribusiness. He also teaches Farm and Ranch Management as a distance learning course. Bob has participated in disciplinary and interdisciplinary research, often focusing on risk and return in whole-farm or ranch management. His training in Agricultural Economics includes B.S. and M.S. degrees from Virginia Tech and a Ph.D. from Purdue. He served in the U.S. Navy during the Viet Nam war. He worked in a research and teaching position at West Virginia University before starting his current job at Kansas State in 1984.

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Alan Schlegel is Professor and Agronomist in Charge of the Tribune Unit of the Kansas State University, Southwest Research-Extension Center. He has a B.S. in Agronomy from Kansas State, and an M.S. in Soil Fertility and a Ph.D. in Soil Microbiology/Fertility from Purdue. He has been employed at the Southwest Research-Extension Center since 1986. Primary research efforts have been with water and nutrient management strategies for cropping systems in a semi-arid environment. The focus of the dryland cropping systems research is to develop cropping strategies that reduce or eliminate tillage, increase capture and storage of precipitation, and reduce evaporation and erosion potential while enhancing crop yields and profitability. The goal is to replace traditional fallow systems using conventional tillage with more profitable systems that better preserve soil, water, and air quality.

Abstract/Summary

For a dry land case farm located in Greeley County, Kansas, risk and profit are determined for reduced-till and no-till rotations with and without opportunity cropping. Profit is defined as gross revenues minus variable costs during the 10-year study period. Because farmers are not adverse to high income years, risk is defined as the number of annual losses out of 10 and the average of the three lowest income years. Opportunity cropping involves planting a potentially more profitable crop when rainfall is adequate and using more fallow when rainfall is inadequate. Results indicate that the no-till rotation with opportunity cropping is most profitable; but the reduced-till rotation without opportunity cropping is least risky.

Dry Land Farming Risk and Profit:
How are they affected by Tillage and
Opportunity Cropping in Western Kansas?

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Cropping in Western Kansas. 2009 *Journal of the
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Authors

Bob Burton

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Benefits of No-till

- Increase yields over time
- Higher yields when moisture is limited
- Protects the soil from wind and water erosion

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Reduce Till Vs. No-till

- Reduced till uses tillage during the summer fallow period to prepare seed beds and control weeds.
- No-till uses chemicals and relies more on sanitation, competition, and rotations to control weeds.

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Three Barriers to No-till

- Native perennial grasses are resistant to herbicides
- Crust from dryness in September hinders fall planting
- Low residue levels-seeding destroys residue cover

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Sanitation, Competition, Rotation

- Higher intensity crops
- Higher water-use crop
- Shade weeds

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Three Agronomic Strategies

- Sorghum planted in narrow rows
- Intensive opportunity cropping to decrease moisture availability
- Recommended rates of glyphosate herbicide

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Opportunity Cropping

- The overwhelming factor for opportunity cropping in semi-arid regions is rainfall
- Opportunity cropping means that the cropping system is interrupted if adequate rainfall allows planting of a potentially more profitable crop or if inadequate rainfall indicates that more fallow is needed

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Current Normal: Eco-fallow with Reduced-till

- 3-year rotation
 - Year 1 – summer fallow and fall planted wheat
 - Year 2 – harvested wheat
 - Year 3 – summer crop
(corn, grain sorghum, or sunflower)

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Location of Case Farm, Greeley County, Kansas

On the Kansas-Colorado Border

Kansas State University
Southwest Research-Extension Center
Tribune Unit Located in Greeley County

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Objective

- To compare per acre variable expenses, net revenue, and the risks of high cropping intensity no-till (NT) with reduced tillage (RT) eco-fallow with and without opportunity cropping
- Net revenue is calculated for each crop in each system

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Reduced-till in this Study

- Eco-fallow or opportunity cropping with tillage in summer fallow period

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Reduced Till Rotation

- 1/3 wheat, 1/3 corn, and 1/3 reduced tillage fallow

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No-till Rotation

- Wheat\corn\grain sorghum\summer fallow
- Studies comparing reduced till to no-till were not available
- Assumed no-till increased
 - Corn yields 15%
 - Grain sorghum yields 23%

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Procedures

- 10 years yield & rainfall data-Tribune Branch of the Kansas Agricultural Experiment Station (Some yields were estimated)
- Crop price-Kansas Agricultural Statistics West Central District
- Crop insurance payments were calculated
- Costs of production are actual farm costs

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Procedures

- Crop enterprise budgets
- Net revenue is calculated for each crop in each system
- Net revenue is gross revenue minus variable costs
- Focused on crop system, not the most profitable crop

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Procedures

- If fields do not produce enough revenue to cover the cost of harvest-no harvest (no harvest expense and no grain income)

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Criteria for Comparisons

- Per acre average expenses, net revenue, and risks

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Goal

- Find the best rotation

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Risk

- Farmers not adverse to higher income years
- Loss is failure to recover variable costs
- Number of annual losses
- Average of the worst three years

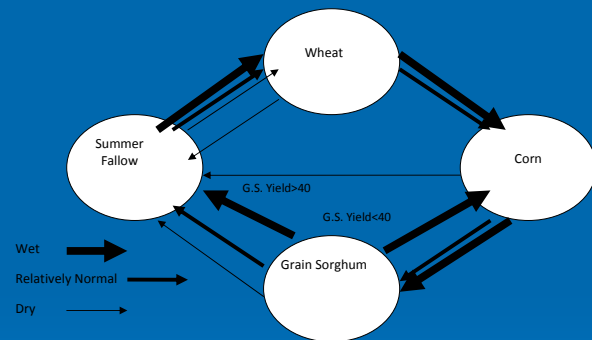
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Cropping Systems

Tillage	Set Rotation	Opportunity Cropping
Reduced-till	Wheat/corn/ summer fallow (eco-fallow)	With wheat, corn, grain sorghum, and tilled fallow
No-till	Wheat/corn/grain sorghum/summer fallow	With wheat, corn, grain sorghum, and NT fallow

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Guidelines for RT Opportunity Cropping Sequence



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Guidelines for NT Opportunity Cropping Sequence

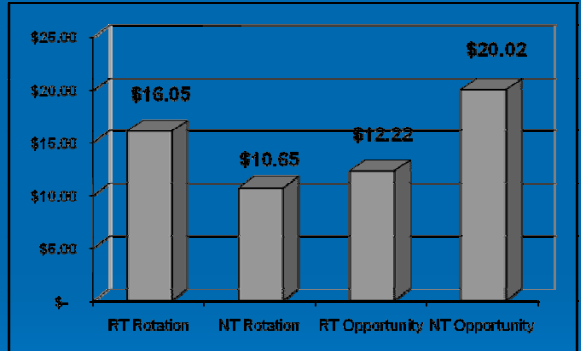


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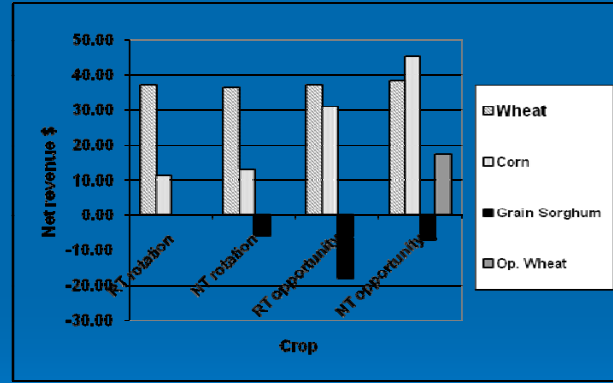
Cropping System	Avg. Gross Revenue per Tillable Acre	Avg. Expense per Tillable Acre	Avg. Net Revenue per Tillable Acre
Reduced-Till Rotation	\$80.69	\$64.64	\$16.05
No-Till Rotation	\$92.88	\$82.24	\$10.65
Reduced-Till Opportunity	\$88.03	\$75.81	\$12.22
No-Till Opportunity	\$98.47	\$78.45	\$20.02

Cropping System	Number of Years with Losses	Average of 3 Worst Years
Reduced-Till Rotation	1	\$1.19
No-Till Rotation	3	(\$4.73)
Reduced-Till Opportunity	4	(\$11.96)
No-Till Opportunity	3	(\$5.50)

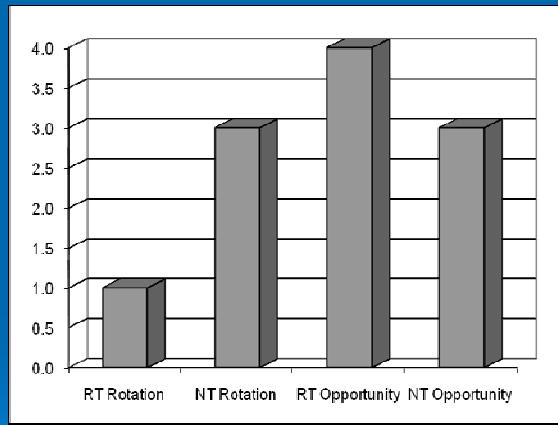
Average Net Revenue per Tillable Acre



Average Net Revenue by Crop

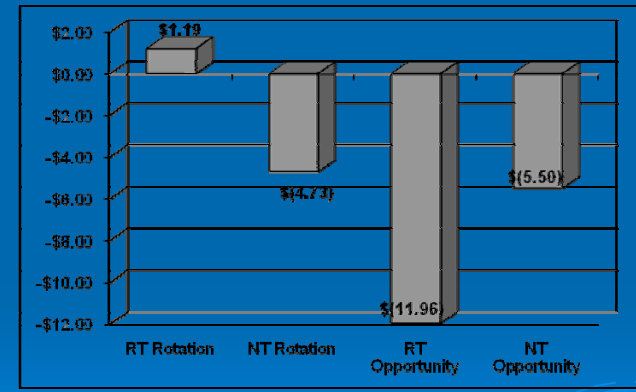


Number of Years with a Negative per Acre Net Revenue by Cropping System



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Averages of Worst Three Years of per Acre Net Revenue by Cropping System



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Observations and Interpretation

NET REVENUE

- Switching from the RT rotation to other practices increased variable costs
- RT rotation has higher net revenue than either the NT rotation or the RT opportunity cropping
- NT and opportunity cropping had largest net revenue
- NT has a crop insurance advantage over RT

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Observations and Interpretation (continued)

RISK

- Increasing intensity with reduced till was less profitable and increased risk.
- Risk was greatly decreased when using either no-till rotation compared to Reduced-Till Opportunity Cropping.
- RT rotation had lowest expenses and lowest risk
- No-till increased risk compared to the reduced till rotation.
- May explain why no-till is slow to be adapted.

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Observations and Interpretation (continued)

PLANTING BASED ON SUBSOIL MOISTURE

- Planting based on sub-soil moisture does not reduce risk.
- It increases the profitability of profitable crops when using no-till.
- Planting based on sub soil moisture at planting did not help reduced till rotation as much as it helped the no-till rotation.

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Observations and Interpretation (continued)

PLANTING BASED ON SUBSOIL MOISTURE

- The NT rotation appears to be too intensive when subsoil moisture is inadequate
- Opportunity cropping increases NT profitability by not planting when subsoil moisture is low

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Observations and Interpretation (continued)

GRAIN SORGHUM

- Grain sorghum on average does not cover variable costs under any cropping system considered
- Grain sorghum is necessary to increase residues and compete against perennial grasses
- Long-term NT rotations are difficult to achieve without grain sorghum

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Observations and Interpretation (continued)

OTHER

- The NT opportunity cropping system involves lower cropping intensity (not planting some fields) during dry times.
- NT farming increases net revenues, expenses and risk
- NT provides the major benefit of preserving soil

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Conclusions

- Higher intensity NT cropping can increase net revenues as long as intensity is decreased when soil moisture at planting is not adequate
- However, NT Opportunity Cropping risks and expenses are greater than RT rotation