Comparison of Efficiency of No-Till and Mixed Tillage Farms

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  - Ag Profitability Conference
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  - Salina

Introduction

- Over the last decade there has been a noticeable decrease in the number of tillage operations performed in the production of crops in Kansas and surrounding states, and an increase in the number of farms adopting no-till production practices.
- For example, in the NC Kansas Farm Management Association (KFMA), the number of no-till farms has increased from 7 farms in 1996 to 76 farms in 2008.

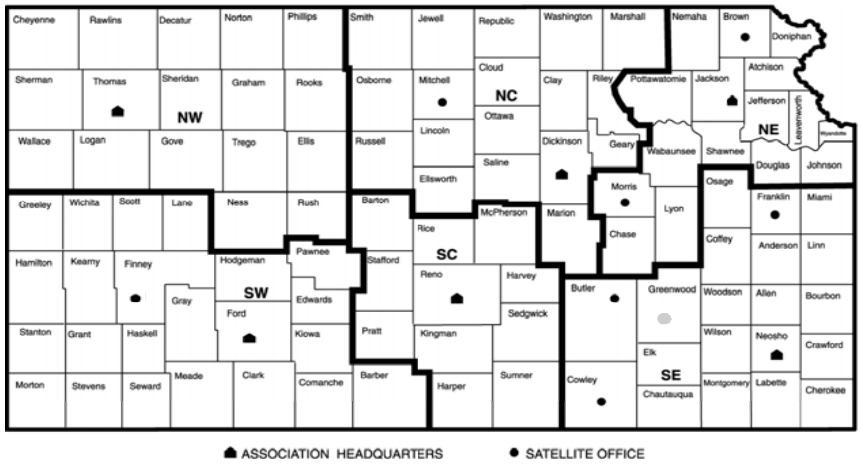
Introduction

- This presentation uses data from the NC and SC KFMAs to compare the efficiency and profitability of no-till and mixed tillage farms.
- Wheat enterprise efficiency and profitability will also be discussed.

Outline of Presentation

- Detailed Cost Analysis
- Whole-Farm Efficiency
- Wheat Enterprise Efficiency
- Continuous Wheat Rotations
- Conclusions and Further Work

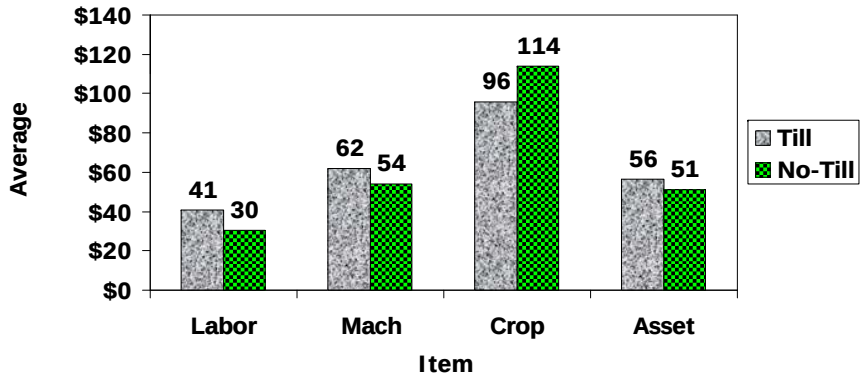
Kansas Farm Management Associations



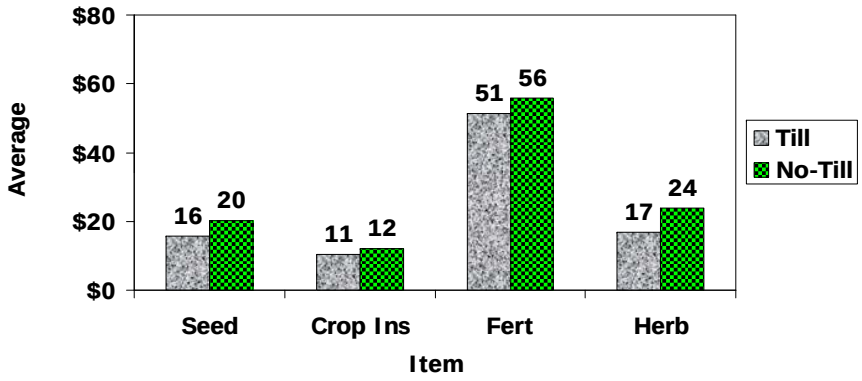
Detailed Cost Comparisons

- KFMA Data, Central Kansas, 2008
  - Crop Cost Comparisons on a per Harvested Acre Basis
    - Labor
      - Hired labor and opportunity charges on operator and family labor
    - Machinery
      - Repairs on machinery and equipment, machine hire, gas, fuel, oil, and depreciation on machinery and equipment
    - Crop
      - Seed, crop insurance, fertilizer, herbicide, and miscellaneous costs such as irrigation energy, crop storage and marketing, and crop supplies
    - Improvements
    - Asset Charges
    - Other Expenses

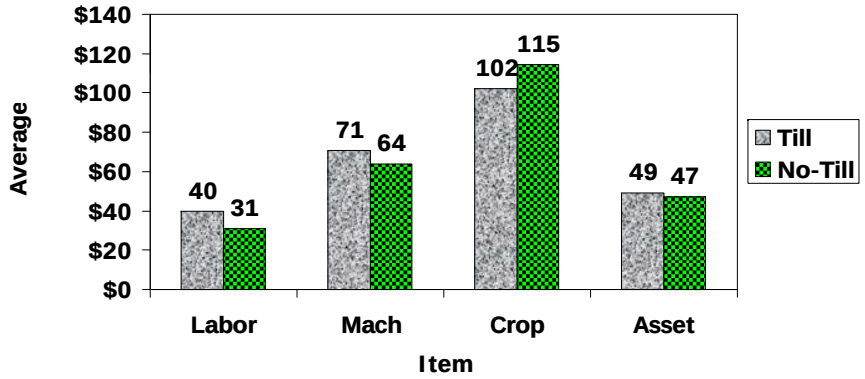
Detailed Cost Analysis
Cost Categories: NC KFMA, 2008



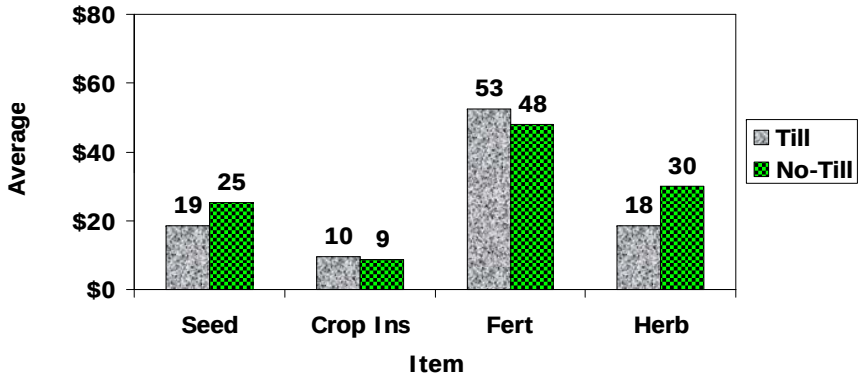
Detailed Cost Analysis
Crop Expense: NC KFMA, 2008



Detailed Cost Analysis
Cost Categories: SC KFMA, 2008



Detailed Cost Analysis
Crop Expense: SC KFMA, 2008



Whole-Farm Efficiency of No-Till Production

- KFMA farms in central Kansas with continuous data from 2004 to 2008.
- To be classified as a “no-till” farm, a farm had to utilize a no-till production system for all of their crops.
- Number of Farms
  - 77 no-till farms
  - 234 mixed tillage farms

Whole-Farm Analysis

- Central KFMA Farms
  - Farm size and type
  - Financial ratios and efficiency measures
  - Income shares (feed grains, hay and forage, oilseeds, small grains, beef, dairy)
  - Cost shares (labor, livestock, seed, fertilizer, chemicals, and capital)

Whole-Farm Data Definitions

- Value of Farm Production
  - Sum of livestock, crop, and other income computed on an accrual basis minus accrual feed purchased.
- Net Farm Income
  - Return to operator's labor, management, and equity (net worth) computed on an accrual basis.
- Less Tillage Index
  - Computed by dividing herbicide and insecticide cost by total crop machinery cost which includes repairs, fuel, auto expense, machinery and equipment depreciation, crop machine hire, and an opportunity interest charge on crop machinery and equipment investment.

Whole-Farm Data Definitions

- Profit Margin
  - Computed by dividing net farm income plus cash interest paid minus opportunity charges on operator and family labor by value of farm production.
- Asset Turnover Ratio
  - Computed by dividing value of farm production by total farm assets.
- Technical Efficiency Index (ranges from 0 to 1)
  - Farms with an index of 1 are using the best available technologies and producing on the production frontier.
- Cost Efficiency Index (ranges from 0 to 1)
  - Farms with an index of 1 are producing at the lowest cost per unit of aggregate output.

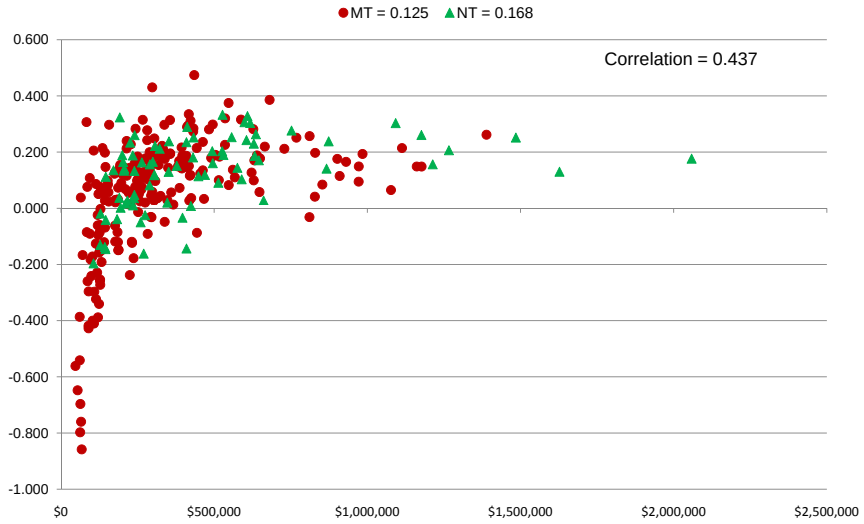
Comparison of Tillage and No-Till Farms, Central Kansas

Farm Characteristics	No-Till	Mixed Tillage
Value of Farm Production	$468,629	$324,832
Net Farm Income	$108,467	$71,510
Total Acres	2,173	1,780
Less Tillage Index	0.173	0.115

Comparison of Tillage and No-Till Farms, Central Kansas

Financial Ratios and Efficiency	No-Till	Mixed Tillage
Profit Margin	0.1676	0.1247
Asset Turnover Ratio	0.4070	0.3199
Cost Efficiency	0.662	0.605
Note: Technical Efficiency was not significantly different between the two groups of farms.		

Profit Margin and Value of Farm Production



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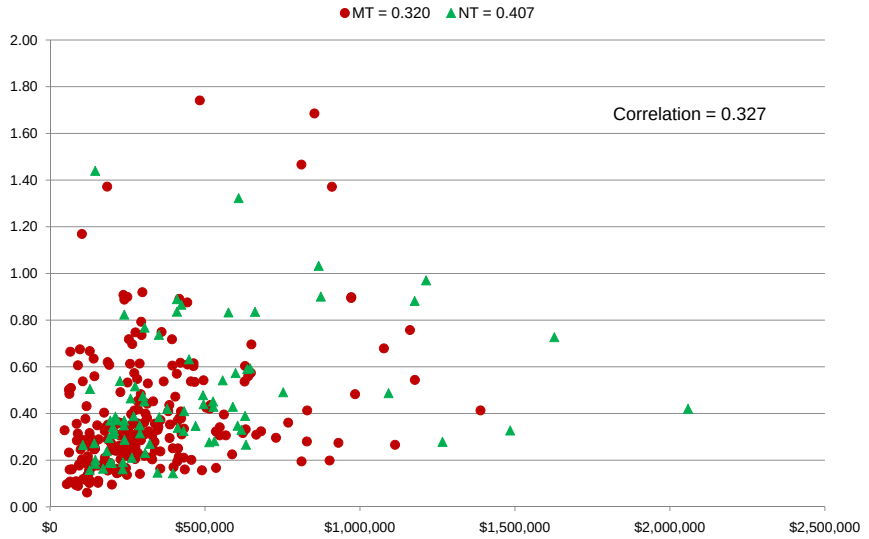
Asset Turnover Ratio and Value of Farm Production



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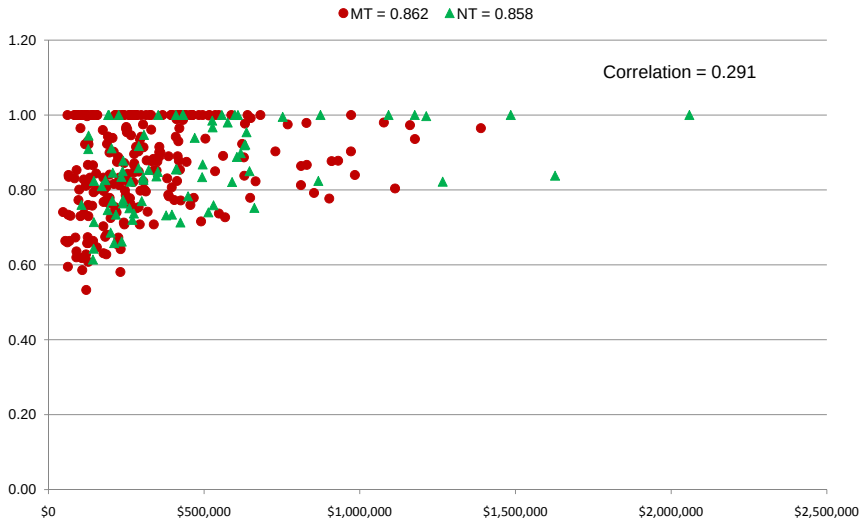
Technical Efficiency and Value of Farm Production



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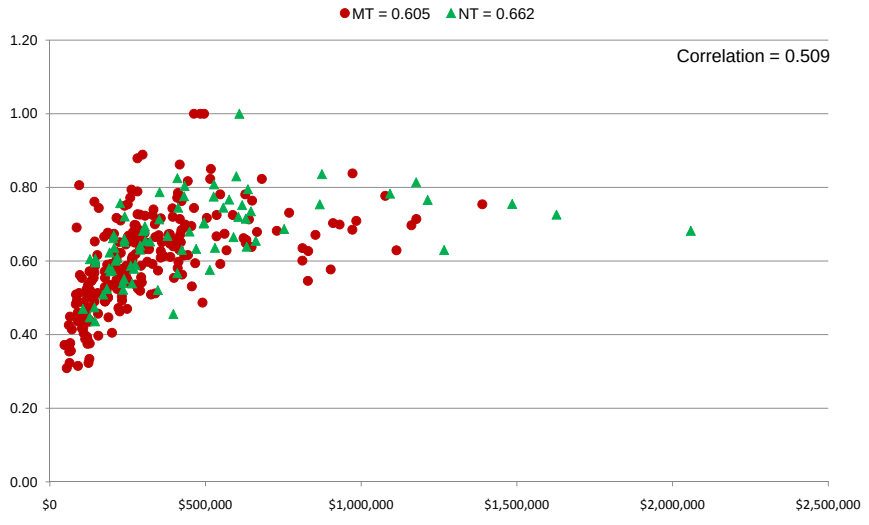
Cost Efficiency and Value of Farm Production



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Comparison of Tillage and No-Till Farms, Central Kansas

Income Shares	No-Till	Mixed Tillage
Feed Grains	0.2303	0.1805
Oilseeds	0.1687	0.1059
Small Grains	0.2271	0.3071
There was not a significant difference between hay and forage, beef, or dairy income shares.		

Comparison of Tillage and No-Till Farms, Central Kansas

Cost Shares	No-Till	Mixed Tillage
Labor	0.1702	0.2299
Seed	0.0663	0.0534
Chemicals	0.0797	0.0552
Capital	0.5626	0.6695
There was not a significant difference between livestock and fertilizer cost shares.		

Wheat Enterprise Efficiency

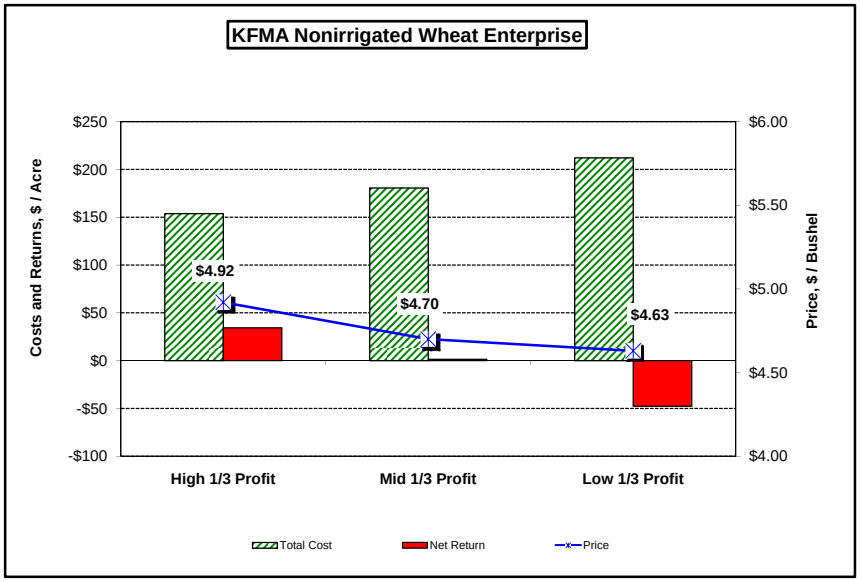
- Trends in Crop Acreage
- Data and Methods
  - Enterprise data for 185 KFMA farms with continuous wheat enterprise data from 2004 to 2008
  - Computed enterprise efficiency (cost of production) and profitability for each farm

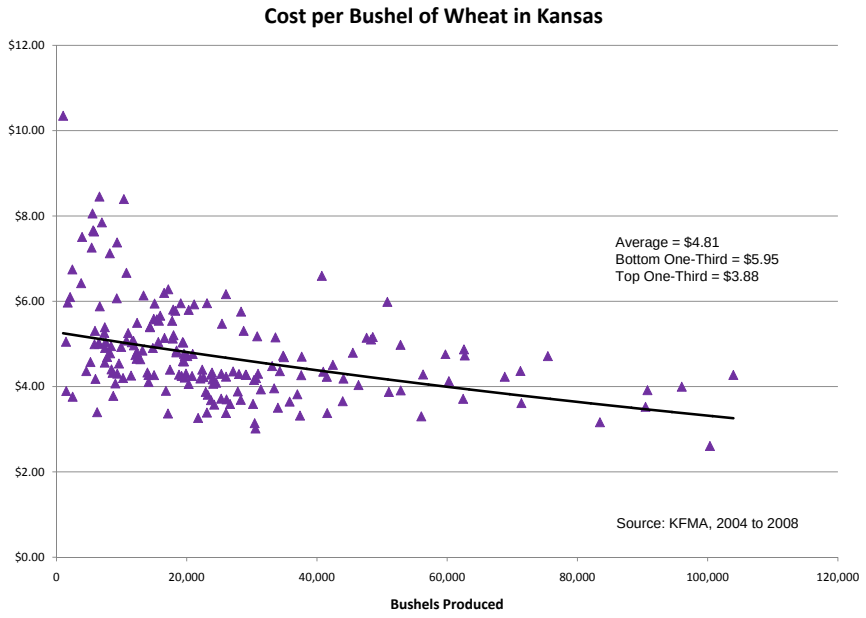
Trends in Crop Acreage

- **Wheat Acres**
  - 1973 to 1979 12,157,000
  - 2000 to 2009 9,890,000
- **Corn Acres**
  - 1973 to 1979 1,966,000
  - 2000 to 2009 3,470,000
- **Soybean Acres**
  - 1973 to 1979 1,199,000
  - 2000 to 2009 2,950,000

Enterprise Efficiency and Profitability

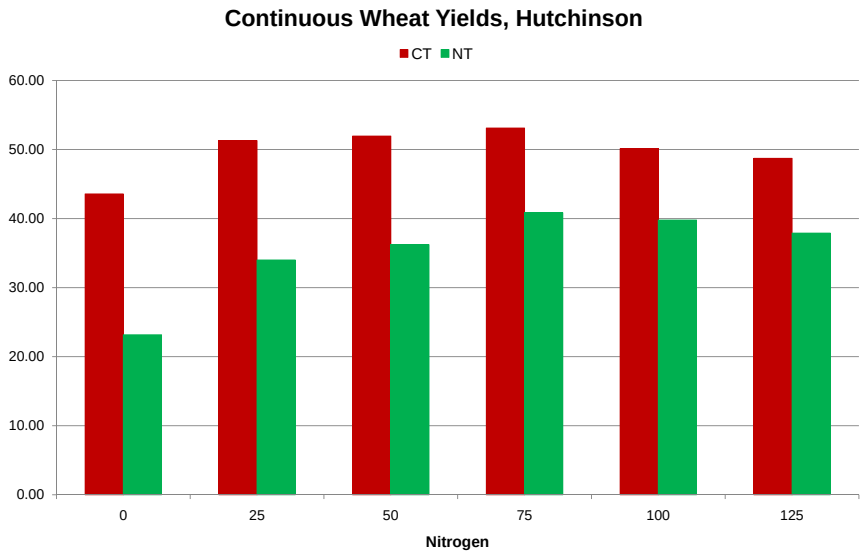
- The high profit group was more efficient, had more wheat acres, more crop acres, a higher yield, a higher price per bushel, and significantly lower costs.
- Total cost per acre for the high profit group was 28 percent lower.
- Fertilizer, machinery, and labor costs per acre were from 23 to 33 percent lower for the high profit group.





Continuous Wheat Rotations

- Researchers at the Hutchinson experiment station explored the relationship between wheat yield and nitrogen from 1988 to 2005 for conventional till continuous wheat and no-till continuous wheat.
- Using 75 pounds of nitrogen, the difference in yields was approximately 12 bushels per acre.



Conclusions

- This presentation discussed the relative efficiency and profitability of no-till and mixed tillage farms in central Kansas.
- No-till farms in central Kansas were on average larger, produced relatively more feed grains and oilseeds, produced relatively less wheat, were more cost efficient, and had higher profit margin and asset turnover ratios.

Further Work

- Information in this presentation will be updated in June and published on the Ag Manager web site (www.agmanager.info) and discussed in the KFMA newsletter.
- The relationship between efficiency and years of experience with no-till production practices is currently being explored.

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