Comparing Winter Wheat/Fallow and Winter Wheat/Proso Millet/Fallow Rotations in Cheyenne County Nebraska

By Chris Johnson
October 27, 2008
Purpose

• The purpose of this research was to determine whether a wheat/fallow rotation or a wheat/millet/fallow rotation achieves the greatest returns.

• This research provides a potential decision making tool for producers who are looking to re-evaluate their cropping procedures in the future.
Overview

• We will discuss:
  – Background information of the two systems
  – The how the study was conducted
  – The results of the study
  – Conclusions and recommendations based on the results of the study
Location of Study

- The study is located in Cheyenne County Nebraska.
- Semi-arid climate with 14-17 inches of annual precipitation
- Growing Season of 133 to 135 days
Winter Wheat

• Planted in the fall and harvested in summer
• Can grow with as little as 7.5 inches of moisture
• Must be fertilized to produce a profitable production level
• Rule of 50 pounds of anhydrous ammonia/acre
Proso Millet

• Planted in the spring
• Can produce grain within 60 to 90 days of planting
• Shallow rooting
• Very efficient topsoil water use
• Does not effect wheat yield in a rotation
• Catch crop to replace winter wheat that has been destroyed
• Rule of 40 pounds of anhydrous ammonia per acre
Wheat/Fallow Cropping System

• Each year, half of the acreage is planted to wheat the other half is fallow
• Each plot of land produces one crop every two years
Wheat/Millet/Fallow

- Each year, one third of the total acreage is planted to wheat, one third is planted to millet, and the remaining third is fallow.
- Each plot of land produces two crops every three years.
- Introducing millet into the rotation reduces the level of disease, weeds, and insects in the following wheat crop.
Marketing Differences

- Wheat
  - Traded on established futures trading institutions
  - Provides price discovery for the cash market

- Millet
  - Not traded on any futures trading institution
  - Majority of crop purchased by few buyers who control the price
Economic Feasibility Study

• Based on a 6000 acre farm in Cheyenne County
• Utilizes historical price data from 1999-2008
• Based on the historical prices and yields, which system provided the greatest return for the time period
• Calculated on a per acre basis
• Returns for each year were then recalculated into 2008 dollars in order to compare the total return and average return for each system
Costs

• **Field Operations**
  – Regional western Nebraska data obtained from the biennial Nebraska Custom Farm Rates publication by the University of Nebraska

• **Anhydrous Ammonia**
  – Annual data from NASS stating the cost per ton for the Northern Plains Region

• **Chemicals**
  – National average data for the respective years.

• **Seed**
  – The average price per bushel plus three dollar per bushel handling fee

• **Land Tax**
  – Obtained from a landowner in Cheyenne County, land was currently in one of the two rotations

• **Total Costs** were obtained by adding up all these costs on a per acre basis
Revenues

• Yields
  – Nebraska state average yields were obtained through NASS records

• Prices
  – Nebraska state average prices received for the commodities were also obtained through NASS records

• Total per acre revenues were calculated by multiplying the average yield by the average price received

• Two different wheat prices were analyzed in 2008.
Results

• The wheat/millet/fallow rotation was more profitable in 7 out of 10 years.
• Total profit of wheat/millet/fallow system for 1999-2008 was $142.75, for the wheat/fallow system, the figure was $102.42.
• The wheat/millet/fallow rotation yielded the greatest total returns and the greatest average returns, with one exception—when the price of wheat was extraordinarily high in 2008.
• In the last two years, the wheat/fallow system has outperformed the wheat/millet/fallow system, due mostly to high yields and an upward price trend.
• If this upward price trend continues, wheat/fallow system would become consistently more profitable than the wheat/millet/fallow system.
Price Sensitivity Study

- Seeks to analyze the effect of a volatile of wheat price on subsequent return for each system.
- Can be used to make decisions for the future based on wheat prices.
- The ten year averages were used for wheat and millet yield, as well as millet price. Costs were maintained at the 2008 levels.
- The wheat price in which each system produces the same amount of return to land is $4.69 per bushel.
  - Above this price, the wheat/fallow system produces greater returns
  - Below this price, the wheat/millet/fallow system produces greater returns
Conclusions and Recommendations

• Wheat/millet/fallow system provides consistent returns to land and also provides benefits such as disease, weed, and insect control.
• Wheat/fallow system has produced much more variable returns over the ten year period, but an upward price trend in wheat has greatly increased the potential returns.
• Plan to take advantage of the upward price trend by utilizing wheat/fallow system in the near future.
• If upward price trend for wheat reverses, and goes below the $4.69 threshold (or recalculated equivalent), revert back to the long term returns of the wheat/millet/fallow system.
Questions?