CONSERVATION TILLAGE FACTS

Cost of Production and Yields of Alternative Dryland Crops

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The Fact: Several alternative crops have potential for our region. However these crops sometimes require special management and may have limited market potential.

Introduction

Winter wheat is a dominant dryland crop in the central Great Plains. Government-program price supports and the generally good adaptation of winter wheat to the region has insured its success and dominance. Recently however, several alternative crops to winter wheat have been evaluated at the USDA-ARS Central Great Plains research station (Akron, CO) for their agronomic and economic potential on dryland.

Many of these crops do not have developed markets in the region and may require special contracting for specific qualities, Others require special management making their adoption on dryland difficult. One example, Garbanzo beans, can be grown in our region on dryland for restaurant salad-bar use. However, the salad bar patron is accustomed to a certain size bean with a familiar color. Many of the Garbanzo beans we produce on dryland are small and darker in color than the consumer is used to. So eventhough our dryland yields are relatively high, the actual marketable yield may be much less than reported here. Another example, is with dry edible beans. Dry beans definitely have a market, but they leave minimal amounts of crop residue after harvest and require special management for erosion control.

The estimated average net returns reported here do not include land and machinery payments, or hail insurance, and so may appear somewhat inflated. However, this fact sheet provides a relative estimate of what to expect.

How the Comparisons were developed: some notes on the analysis

* The two tables reported here were developed from long term average prices in northeastern Colorado and from dryland yields measured at the Central Great Plains Research Station.

* Boxes in the tables with "?" indicate that we have not gathered enough data to make "reliable estimates" of net returns for these crops under dryland conditions. They are included because we have

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How the Comparisons were developed: some notes on the analysis (continued from previous page)

collected recent yield data on dryland for these crops at the research station and we believe these crops may have potential in our region. Best management practices for dryland have not been established for these crops and so for now they should be considered high risk.

* Estimated average net returns are based on average yields for the last 4 years at the Central Great Plains Research Station. The frequency of tillage and herbicide application reflect practices used in the last 4 years for these crops.

* Harvesting, planting and tillage costs are based on custom rates typical to northeastern Colorado. These are $6.00/acre for sweep plow tillage (stubble mulch), $8.00/acre to plant or drill seed, $26/ton to swath, rake, bale and stack hay, $30 to combine harvest and haul corn and $13/acre to combine wheat plus $0.13/bu for every bushel over 20 plus $0.06/bu to haul to the elevator (custom rate sources: personal communication with area producers, "Custom rates part I and part II" published in the Colorado Rancher Farmer, March, 1995 pages 4-33, and Colorado Rancher Farmer, April, 1995, pages 6-19). Fertilizer costs are based on a cost of $0.25/lb of actual N (this would include the application cost for anhydrous ammonia and is approximately the actual cost per lb of N as UAN (32%-N solution)) and $0.57/lb of actual P as 11-52-0, applied with the seed at planting time.

* Herbicide costs include the cost of the chemical and the cost of application for all chemicals except Sonalan and Treflan which are applied as granules with a sweep plow/mulch treader. This is a combination chemical application/tillage operation performed just prior to planting.

* At the research station, we have found that certain weeds are less of a problem if several crops are grown in rotation. For example, cheat grass (downy brome) and jointed goat grass are not a problem in our wheat-corn-millet-fallow rotation plots but are a terrible problem in our wheat-fallow plots. The extended rotation provides the opportunity to use herbicides and mechanical tillage at critical times that are effective in controlling these weeds in the non-wheat years. Also, it is easier to control problem broadleaf weeds like kochia, Russian thistle (tumble weed), and redroot pigweed in corn and proso millet than in such crops as sunflowers and winter wheat. After a few cycles of the rotation, our wheat-millet-sunflower-fallow rotation has fewer kochia and tumble weed problems than wheat-sunflower-fallow. The millet year provides an additional opportunity to control the broadleaf weeds.

*To be successful, many of the alternative crops require some reduce till or no-till managed chemical fallow in rotation with winter wheat. For example, if one is to expect success with dryland corn (for most soils in our region) that corn should be planted into no-till managed wheat stubble (Eco-fallow, or chemical fallow). For many of the soils in our region and with our limited rainfall no-tillage will insure greater success most years than sweep tilled fallow. This is because with chemical fallow more moisture is stored in the soil profile than stubble-mulch tillage managed fallow. We have measured precipitation storage efficiencies (PSE) of 48% with no-till chemical fallow whereas stubble mulch tillage PSE is only around 33%. Weed control using tillage unfortunately drys out the soil more than weed control using chemicals. Chemical fallow is needed to store enough soil water to grow many of these crops successfully.

Table 1. Yields, typical market prices, cost of production and estimated net returns of alternative dryland crops grown at the Central Great Plains Research Station.

Crop	Yields measured under dryland conditions	Market price	cost to produce[1]	Estimated range of net returns	Estimated average net returns
	lbs/acre	$/lb	$/acre	$/acre	$/acre
Field peas	700-2100	0.06-0.22	$73-77	$-35 to$389	?
Garbanzo bean (chick peas)	300-1600	0.15-0.25	$86-95	-$50 to $314	?
Field beans[2]	300-1100	0.14-0.28	$91-95	-$53 to $217	?
Canola, Crambe	500-2100	0.09-0.13	$93-97	-$52 to $180	$23/acre
Triticale (forage)	2000-6000	0.035-0.045	$68-113	$ 2 to $157	$27/acre
Proso millet	1000-2500	0.06-0.12	$74-82	$ -24 to $226	$17/acre
Sunflowers	750-1600	0.09-0.13	$80-100	$-33 to $128	$25/acre
Winter wheat	1500-3600 (25-60 bu/acre)	0.06-0.08 ($3.60-$4.80/bu)	$78-103	$ -13 to $210	$37/acre
Corn	1680-4000 (30-80bu/acre)	0.04-0.07 ($2.24-$3.90/bu) pasture $10/acre	$86-92	$ -9 to $230	$50/acre
Kenaf	6000-8000	?????????	???????	??????	???????

[1] Includes cost of seed, fertilizer, chemical weed control, harvest, planting and tillage costs, for land preparation based on custom rates (table 2.)
[2] Field beans could include: pinto, great northerns, kidney, black turtle or navy beans

The Take home message(s)

What can be said about the comparisons? Each farmer should consider the numbers in the tables but should use their own numbers for their farm. For example, one farmer may believe he can till his land for $4.00/acre as compared to the $6.00/acre that we used in our calculations. Another farmer may believe that for some soils on his farm that 60lbs of N/acre and 20 lbs of P/acre is not enough fertilizer (others may think that it is too much). The point is individual changes in management will change the cost budget for an individual crop and farmer.

One should also consider the time required to learn how to manage these crops. New herbicides, markets and varieties should be explored before moving too quickly with these crops. Some farmers may have to schedule custom work to plant, spray and harvest these crops. If custom work is not an option, then one should consider purchasing a field sprayer and a corn planter (no small expense).

A farmer considering these alternatives needs to realize there is a learning period with any new crop. We at the station have made plenty of mistakes in learning how to grow these crops. Mistakes that were bad enough that if done on a large (1000 acre or more) field scale, would have caused considerable loss in income. Much of the yield variability reported in table 1 is due to mistakes while in the learning period, as much as it is to weather variability. If a farmer tries any of these alternative crops he/she should try it on a small scale first. Make the mistakes on a small scale before committing to a large investment. Most importantly investigate the market potential for such alternatives before getting too excited about any of them. Of the crops evaluated, dryland corn and triticale for hay look the best if a buyer is available and prices remain competitive.

Table 2. Production practices and costs of production for various alternative dryland crops. Dryland winter wheat and dryland corn are included for comparison.

Crop	Cost per acre to purchase, apply or conduct the operations listed based on local custom rates				Total cost
	N&P fertilizer lbs /acre	herbicide application	planting/harvest	tillage	
Field peas	P only 20 lbs ($11.00) at planting time	Sonalan, Treflan or Prowl ($8-12)	$28.00/$14.00	Sweep, mulch treaders ($12)	$73-77
Garbanzo beans (chick peas)	" "($11.00)	Sonalan, Treflan or Prowl ($8-12)	$28.00/$27.00	" "	$86-95
Field beans	" "($11.00)	Sonalan,Treflan or prowl ($8-12)	$28.00/$32.00	" "	$91-95
Canola, Crambe	N&P 75 lbs N 20 lbs P ($29.75)	" "	$16.00/$27.00	" "	$93-97
Triticale	N&P 75lbs N 20 lbs P ($29.75)	2,4-D ($6.00)	$16.00/$39.50	no-till into wheat stubble	$91
Proso millet (Hershey)	N&P 60 lbs N 20 lbs P ($26.00)	2,4-D incrop, Roundup preplant($12-20)	$9.00/$27.00	no-till into wheat stubble	$74-82
Sunflowers	N&P 60 lbs N 20 lbs P ($26.00)	Sonalan, Poast Treflan, Prowl ($8-28)	$16.00/$18.00	Sweep/mulch treaders ($12)	$80-100
Winter wheat	N&P 60lbs N 20 lbs P ($26.00)	2,4-D+banvel+ Ally ($6.00) Atrazine during fallow ($4.50)	$16.00/19.00	$12-36 2-6 passes in fallow	$78-103
Corn	N&P 60lbs N and 20 lbs P ($26.00)	Atrazine, paraquat, 2,4-D or Roundup $21.00	$25.00/$20.00	no-till into wheat stubble	$86-92

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