IMPROVING FINANCIAL PERFORMANCE BY DIVERSIFYING CROPS

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In a time of generally depressed farm commodity prices, the Net Accrual Farm Incomes of grain and livestock farms have suffered. In Kansas, the 2139 participating extension farm management operations averaged only $ 16,778 in 1998. A simple average of the Illinois, Iowa and Kansas farm business management associations indicates only 21% of the previous four years average farm incomes in 1998. 1999 data is in process currently, but the aggregate numbers from several sources indicates a similar poor financial performance in 1999. In the face of these difficulties, the NW Kansas Farm Management Association experienced a $ 50,485 average accrual net farm income in 1998. This is 133% of the four prior years average incomes. This is explained in part by new found diversity and intensity in dryland (non-irrigated) crop production.

The Northwest Kansas area is located in the high plains region. The seventeen county area will range from 16 to 22 inches of average annual rainfall. The soils are moderately deep, silt loams and are subject to wind and water erosion. Corn, wheat, soybeans and sunflowers are common on center pivot irrigated acres. Recent year's analysis reports average 32% of cropland acres under irrigation. This region is remote from major populations making direct and value added farm sales extremely infrequent. The area is focused on field crop production. During most of the last fifty years, dryland crop production has predominantly been hard red winter wheat in typically a wheat/fallow rotation to allow sufficient soil moisture recharge between crops to assure profitable production. Cultural practice during the fallow period has been dependent on the stubble mulch characteristics of the V-blade plow.
Large fields with high horsepower four wheel drive tractors pulling from 35' to 54' of blade plow make this a low cost and effective process. The advent of no till row cropping came slowly to the region, as wheat-fallow fits nicely into the allotment and base acreage government programs which were in place in one form or another for decades prior to 1996. Trash tillage effectively prevents noticeable erosion problems so little added conservation benefits from no till were perceived by farm decision makers.

During the late 1980's dryland sorghum acreage averaged only about 6.6% of dryland acres each year. During this period a few producers started to substitute dryland corn for grain sorghum in the area. **Figure 1**, illustrates this. In 1992 dryland corn finally exceeded 2% of dryland crop acreage in the NW Kansas Farm Management analysis summary. These early adopters were attempting to capture the modest price benefit that corn normally affords in western Kansas. In addition, if base acres could be established the government program payments of the time favored corn. Many of these early adopters already owned corn producing equipment (planters, cultivators, corn heads) since they were already raising irrigated corn. These producers were used to irrigated corn inputs and were not especially cautious about expenditures. Some of the earliest (late 1980's early 1990''s) corn enterprise work in the Northwest data indicated a high cost per unit of production for this reason and the technology was new and being learned.

No till technology had grown from its start in the late 1960's. In Nebraska, the concept of eco-fallow caught on and started to appear in NW Kansas in the late 1980's. Eco-fallow is basically a wheat, corn or sorghum, fallow rotation using chemical herbicides for weed control. This shortens the fallow period. It leaves wheat stubble to catch and hold moisture before the row crop and allows two crops in three years. Many producers moved some production this direction assuming that the extra production would be profitable, looking almost entirely at production and income without much attention to the cost side of the situation. This process takes time to implement. Arrangements with landlords must be considered. Chemical, equipment needs and timing issues must be learned.

As the substitution of chemicals for tillage occurs, a way to measure this change without attempting to define no till or reduced till is to measure chemical costs as an index of overall tillage/weed control costs.

Less Tillage Index = Chemical Costs / Chemical Cost + Crop Labor + Machinery Costs

As herbicides are substituted for tillage this index will indicate the relative adoption of the reduced tillage technology. When the technology is mature, this ratio may better reflect the cost efficiency of chemical substitution for tillage. **Figure 2** demonstrates this index over the last nine years. In dryland grain sorghum tillage has gradually given way to more herbicide use. Corn, on the other hand, has had a high level of chemical substitution since dryland production rose sharply in 1990. The corn index varies more with specific weather related years. These values are the weighted averages for dryland corn and grain sorghum production including both no till and reduced tillage systems. These are specific to enterprise analysis for these crop years, not whole farm values, which will easily be misleading because of chemical uses on wheat and irrigated acres. **Figure 3** indicates this index for dryland corn showing specifically the differences between no till and reduced tillage approaches.
Figure 4 will show this same relationship for no till and reduced tillage dryland grain sorghum. This index might be expected to stabilize at about .35 with changes from there probably dependent upon chemical, machinery and labor relationships. For instance an unexpected rise in herbicide prices or labor costs changing rapidly.

Another way to look at these cropping changes is shown in **Figure 5**. Dryland spring planted row crop acreage gained rapidly especially in the 1996-98 period. This has been lead by corn which graphically represents most of the acreage growth. The portion of corn and sorghum produced under no-till conditions is shown in **Figure 6**. This is as a percentage of dryland devoted to these two crops. One might expect these percentages to “not” approach 100%. The high plains is volatile from a weather perspective. Moisture conditions outside a perceived “normal” range will require flexibility from producers. They may avoid losses by stepping out of the rotation to produce no spring planted crop if inadequate soil profile moisture is apparent. Or a substitution may occur from corn to grain sorghum where less cash outlay is required. In dryer seasons yet, dryland oil sunflowers perform well. **Figure 7** illustrates the return above variable costs of oil sunflowers relative to corn and grain sorghum in recent years. Northwest Kansas does have sunflower processing capability. The real limiting factor for sunflowers is the lack of good residual herbicides labeled for sunflowers and the inability to use atrazine based fallow chemicals in the stubble laying idle the Fall before planting sunflowers. The relationship of sunflower loan rates and the average cost of production for sunflowers actually favors this crop over sorghum and corn. Inconsistent stands, yields and the lack of better herbicides has prevented further expansion of this crop in the area.

Along with the changing mix of dryland crops, intensity of cropping is also increasing. In some cases the wheat-corn-fallow rotation has given way to a wheat-corn-sorghum-fallow rotation. Individual farm operations will abandon fallow periods altogether if moisture remains plentiful enough. The soil structure improvements that come with no tillage help this along, but overall weather patterns on the high plains must cooperate. **Figure 8** provides a picture of the dryland acreage fallowed as a percentage of all dryland. In 1988, just over half the dryland acreage was fallow, this would be due to the high set aside requirement in 1988 and little production of dryland feedgrain crops at the time. This change to 38% fallow in 1998 is significant in that a 33% fallow rate would be expected if all farms were using a wheat-corn/sorghum-fallow crop rotation. The changes described are dramatic in the countryside. Work schedules are changed. Chemical herbicide commercial ads are found even in prime time on Western Kansas television and radio. The commercial grain industry in the area was caught under prepared for the last four years. Large amounts of Fall harvested crops have been stored outdoors during these years and farm managers are making the move to increased on farm storage capacity in part to counteract the unreliable and unfavorable local grain basis in cash markets during the Fall through late Spring. This cropping intensity appears to be a fairly permanent part of Western Kansas agriculture. The more astute managers are asking however if Government Policy changes will
negate their cropping and storage decisions.

Finally, to what extent have these cropping mix and intensity changes resulted in improved net farm incomes? The analysis averages are not totally convincing that net income has been helped. **Figure 9** shows the theoretical average income using the dryland acres actually cropped over the last nine years, using the NW enterprise average returns above variable costs for wheat, corn and sorghum and the actual average dryland returns above variable costs. Wheat-corn-fallow shows excellent potential but also significant variability. Wheat-sorghum-fallow lacks overall potential yet does not present the downside risk of the corn rotation. The traditional wheat-fallow, particularly because of its lack of intensity is weak in net income generating capacity by comparison. What is disappointing to those who would prefer to focus on production volume, is that actual group performance has only been slightly better than the wheat-fallow theoretical amounts. In 1996 and 1998, what was actually done was better than the traditional approach. Notice however, that the theoretical two crops in three year averages consistently have more potential than the wheat-fallow and are better income producers than the average situation. For those producers who have put the more intense rotation in place, one would expect to find better than average financial performance. Individually, this is what is found. Those producers who skillfully have implemented intense cropping rotations have significantly improved income statements, assuming of course that other factors (livestock losses, marketing problems) haven't overridden the cropping income.

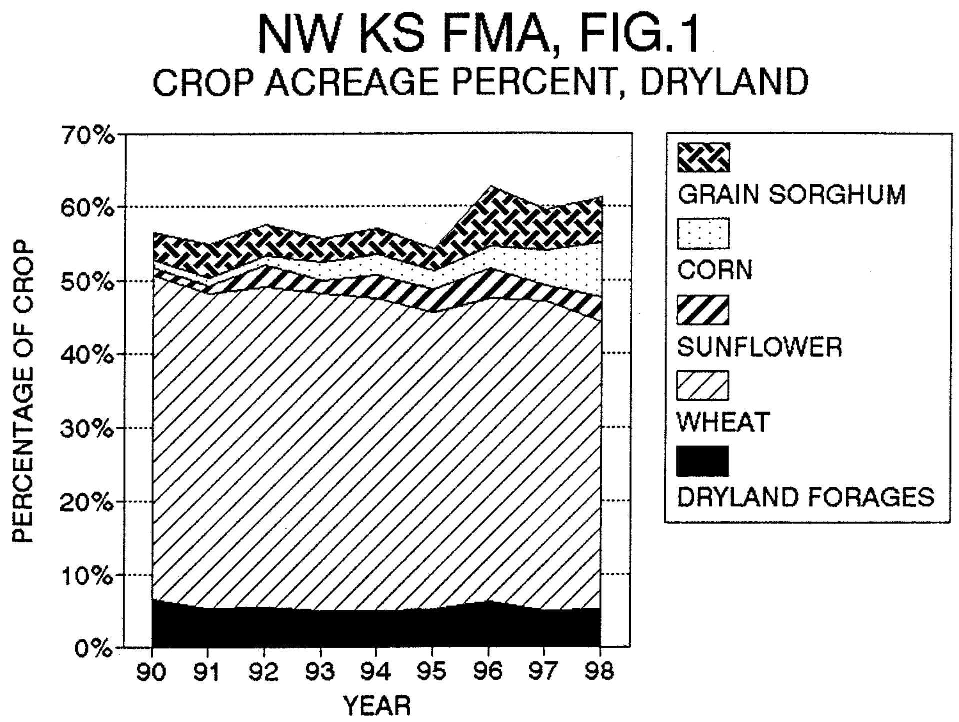
NW Kansas dryland farmers need to be mindful of several points when undertaking intensified cropping sequences:

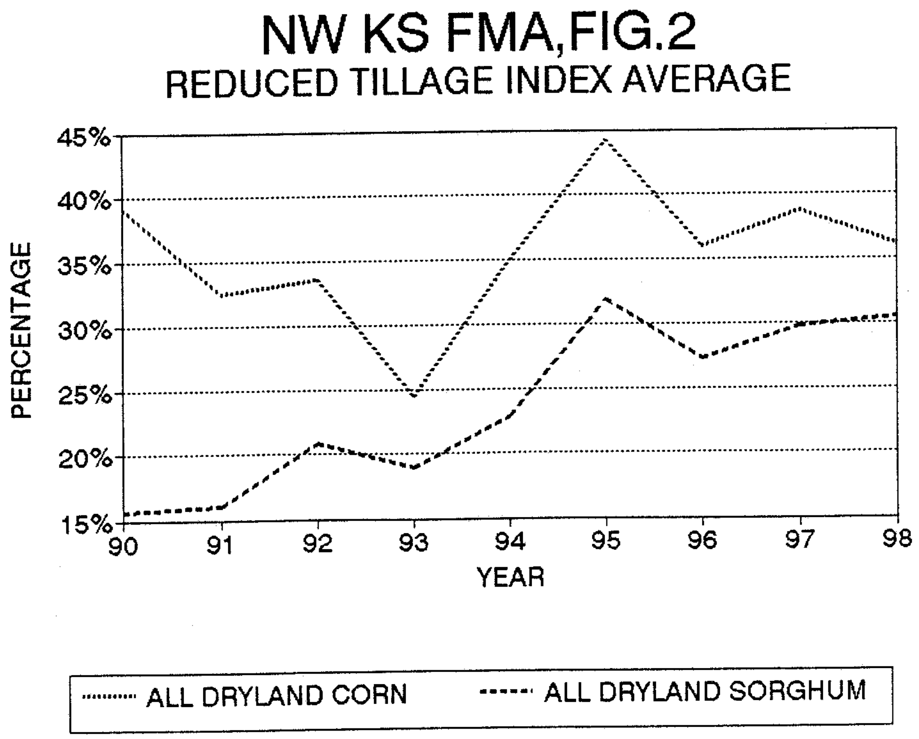
- Make sound seed and population choices.
- Know preplanting soil moisture reserves and adjust appropriately.
- Make herbicide selections carefully, keeping effectiveness and cost in mind.
- Understand the increased income potential and also cash loss potential when cropping corn

versus grain sorghum relative to the farm's financial position.
- Make rational equipment choices relative to cropping sequence and acreage volume.
- High Plains weather and markets are volatile, maintain a degree of flexibility in cropping.

Implications for US and world agriculture:

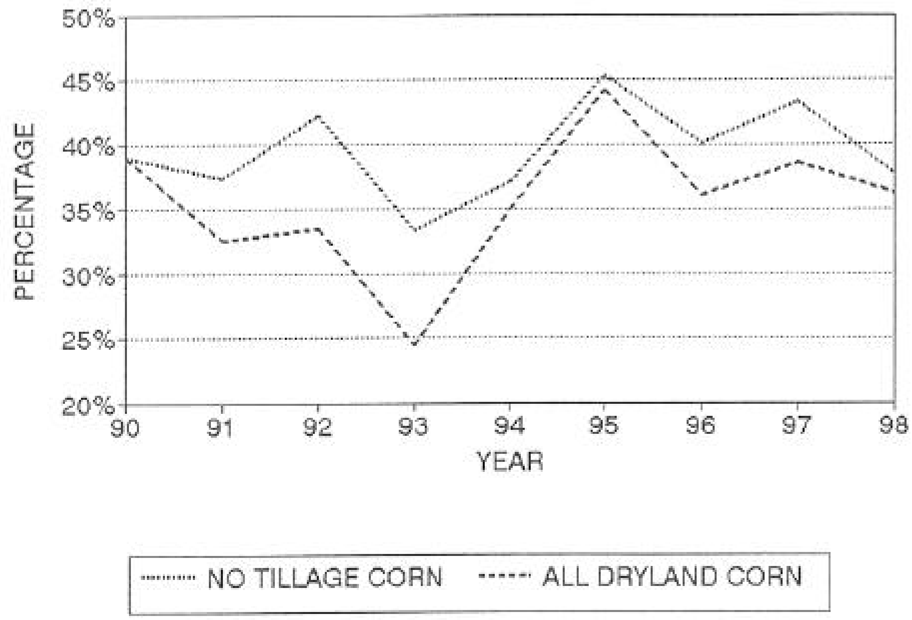
- Marginal production areas can make overall crop size and mix more difficult to predict.
- Technology shifts are real with sometimes unexpected results.
- Not all geographical areas are equal in the potential for cropping intensity or diversity.


NW KS FMA, FIG.1
CROP ACREAGE PERCENT, DRYLAND
70%
60%
50%
40%
30%
20%
10%
0%
PERCENTAGE OF CROP
90
91
92
93
94
95
96
97
98
YEAR
GRAIN SORGHUM
CORN
SUNFLOWER
WHEAT
DRYLAND FORAGES


NW KS FMA,FIG.2
REDUCED TILLAGE INDEX AVERAGE
45%
40%
35%
30%
25%
20%
15%
PERCENTAGE
90
91
92
93
94
95
96
97
98
YEAR
ALL DRYLAND CORN
ALL DRYLAND SORGHUM

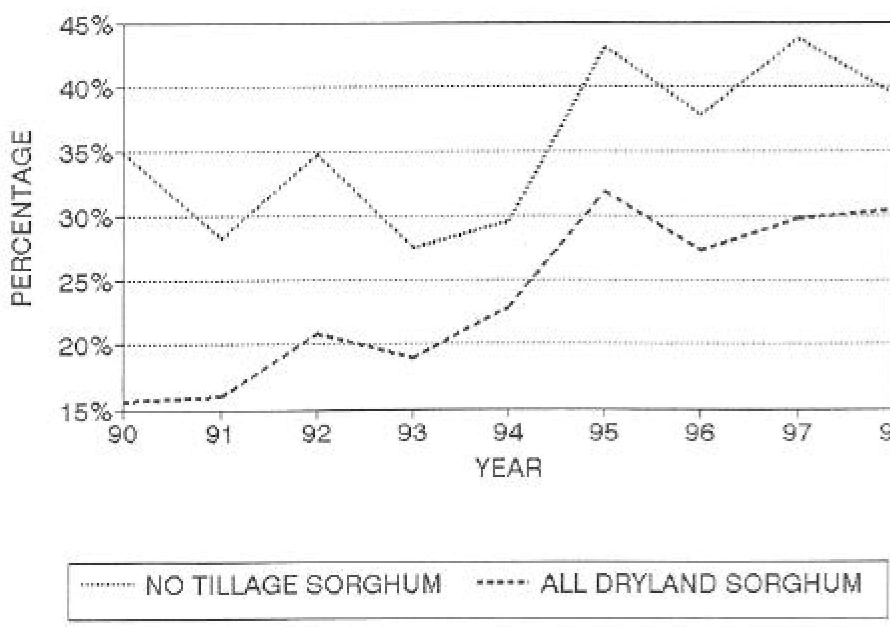
NW KS FMA, FIG.3

DRYLAND CORN REDUCED TILLAGE INDEX

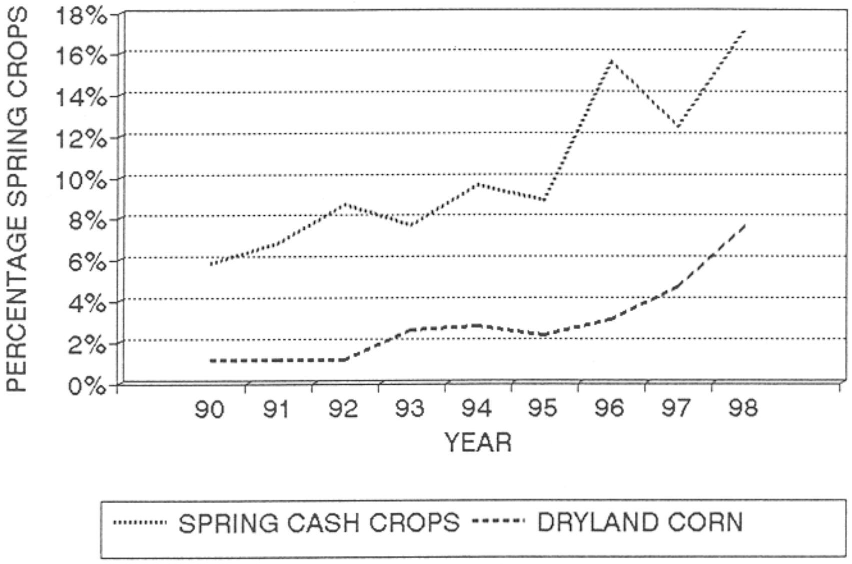


NW KS FMA, FIG.4

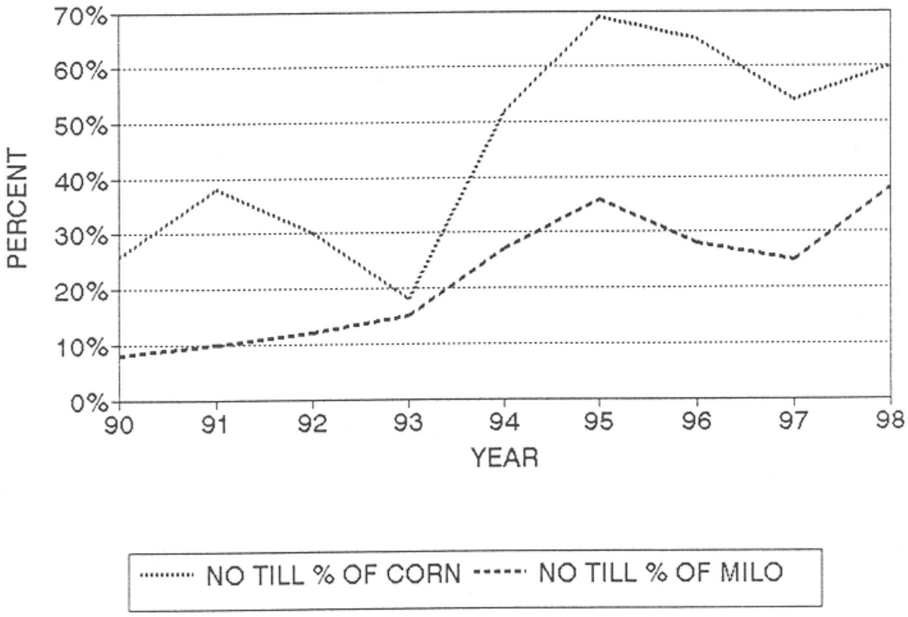
DRYLAND MILO REDUCED TILLAGE INDEX



NW KS FMA, FIG.5
DRYLAND SPRING CROPS

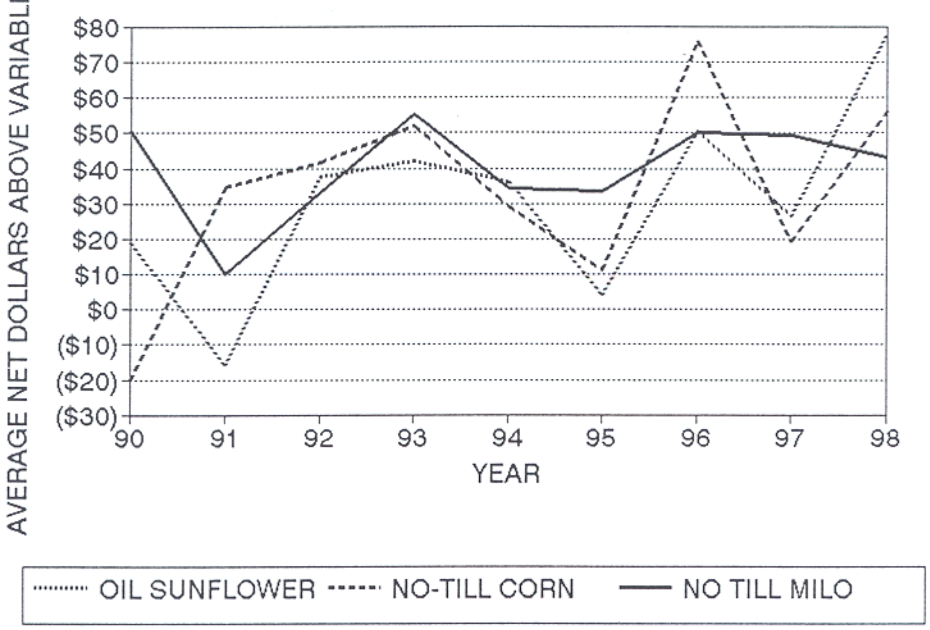


NW KS FMA, FIG.6
PERCENTAGE NO TILL



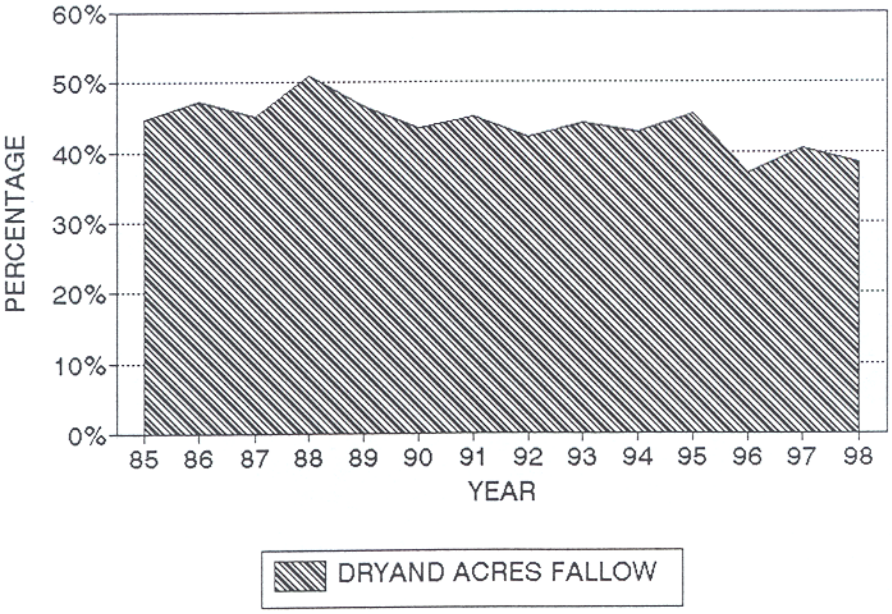
NW KS FMA, FIG.7

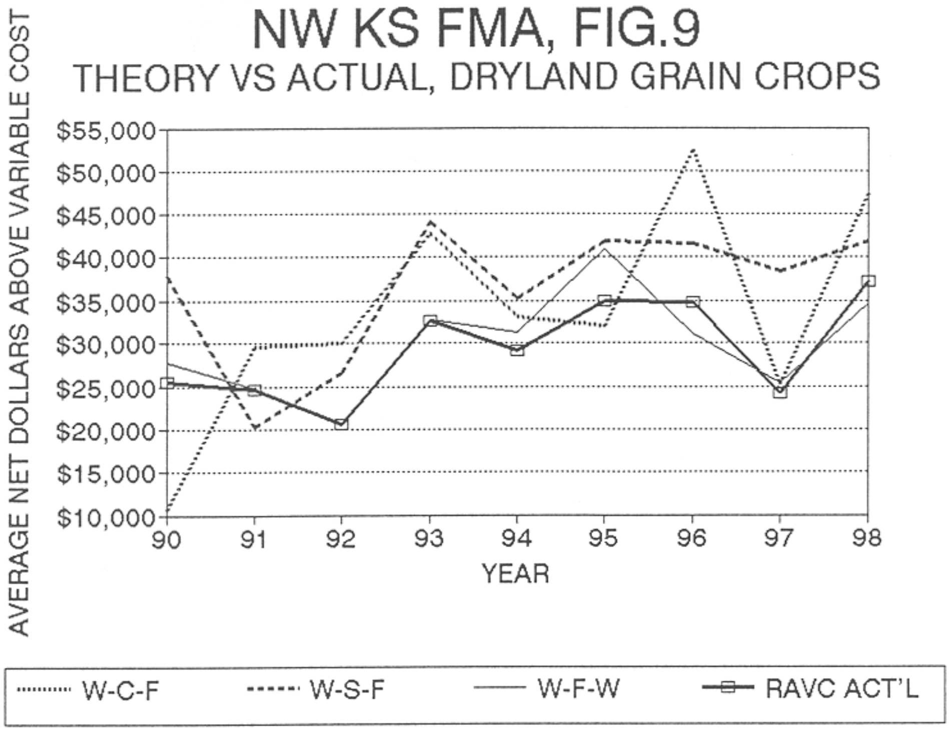
RAVC, ROW CROPS IN ROTATION



NW KS FMA, FIG. 8

CROP INTENSITY/FALLOW LAND %





NW KS FMA, FIG.9
THEORY VS ACTUAL, DRYLAND GRAIN CROPS
AVERAGE NET DOLLARS ABOVE VARIABLE COST
$55,000
$50,000
$45,000
$40,000
$35,000
$30,000
$25,000
$20,000
$15,000
$10,000
90
91
92
93
94
95
96
97
98
YEAR
W-C-F
W-S-F
W-F-W
RAVC ACT'L