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# FARM ORGANIZATION PRACTICES IN THE SHEYENNE DELTA PROPOSED IRRIGATION AREA

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and

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cooperating

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FARM ORGANIZATION AND PRACTICES IN THE  
SHEYENNE DELTA PROPOSED IRRIGATION AREA<sup>1</sup>

By L. W. Schaffner<sup>2</sup>

SUMMARY

The Sheyenne Delta proposed irrigation area includes approximately 110,556 acres of irrigable land in Cass, Ransom and Richland Counties.

This study is a summary of the present resources and their utilization in the Sheyenne Delta Area. The purpose of the study was to obtain data on farm investments, farm organization and farming practices. A farm schedule was taken of the 1957 land use and the 1956 farm operations on 79 farms in the area.

The average size of farm was 602 acres of which 66 percent was cropland. Corn occupied the largest proportion of the crop acres. Eighty-two percent of the corn was grown for grain. Oats ranked second and tame hay third in importance of cropland devoted to the various crops. Wheat was seventh in importance of the acreage of the various crops grown.

Ninety-eight percent of the farmers reported having some livestock. Sixty percent of the farmers reported a dairy and/or a hog enterprise, and 56 percent had a beef enterprise.

Sixty-six percent of the farms were classified as livestock farms, 18 percent general farms and 16 percent grain farms.

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<sup>1</sup>This study was carried on under Project Hatch 3-12 of the North Dakota Agricultural Experiment Station, in cooperation with the Bureau of Reclamation, Missouri-Souris District, Bismarck, North Dakota.

<sup>2</sup>Assistant Agricultural Economist, North Dakota Agricultural Experiment Station. The author acknowledges the cooperation and assistance given through the course of study from Mr. Ned Williams and his associates in the Bureau of Reclamation and to Walter Wilson, Department of Agricultural Economics.

The average total per farm investment for all farms was \$39,899 or \$66.00 per acre of land. Sixty-six percent of the investment was real estate, 21 percent machinery and 13 percent livestock.

The average per farm expenditure was \$8,789 or \$14.66 per acre of land. Sixty-two percent of the total expenditure were cash expenditures and the remainder were non-cash, such as depreciation and interest on investment.

The farm operator contributed an average of 11.9 months of labor, unpaid family labor 5.0 months and hired labor 1.5 months. The livestock enterprises, on the average, required 60 percent and the crop enterprises 40 percent of the working time.

#### PURPOSE OF THE STUDY

The Sheyenne Delta Area of North Dakota is being studied for possible irrigation by the Bureau of Reclamation as part of the Garrison Diversion Project. The area includes approximately 110,556 acres of potentially irrigable land in Cass, Ransom and Richland Counties.

This study is a summary of the present resources and their utilization in the proposed irrigation area. Its specific purpose is to obtain data on farm investments, farm organization and farming practices. These data will be used as a basis for evaluating the alternatives of dryland versus irrigation farming in the area.

#### SAMPLE DESIGN

The total area sampled was the arable land of the Sheyenne Delta Area (Figure 1). Approximately 250 farms were identified and numbered by using the highway maps to locate all the farmsteads within the area.

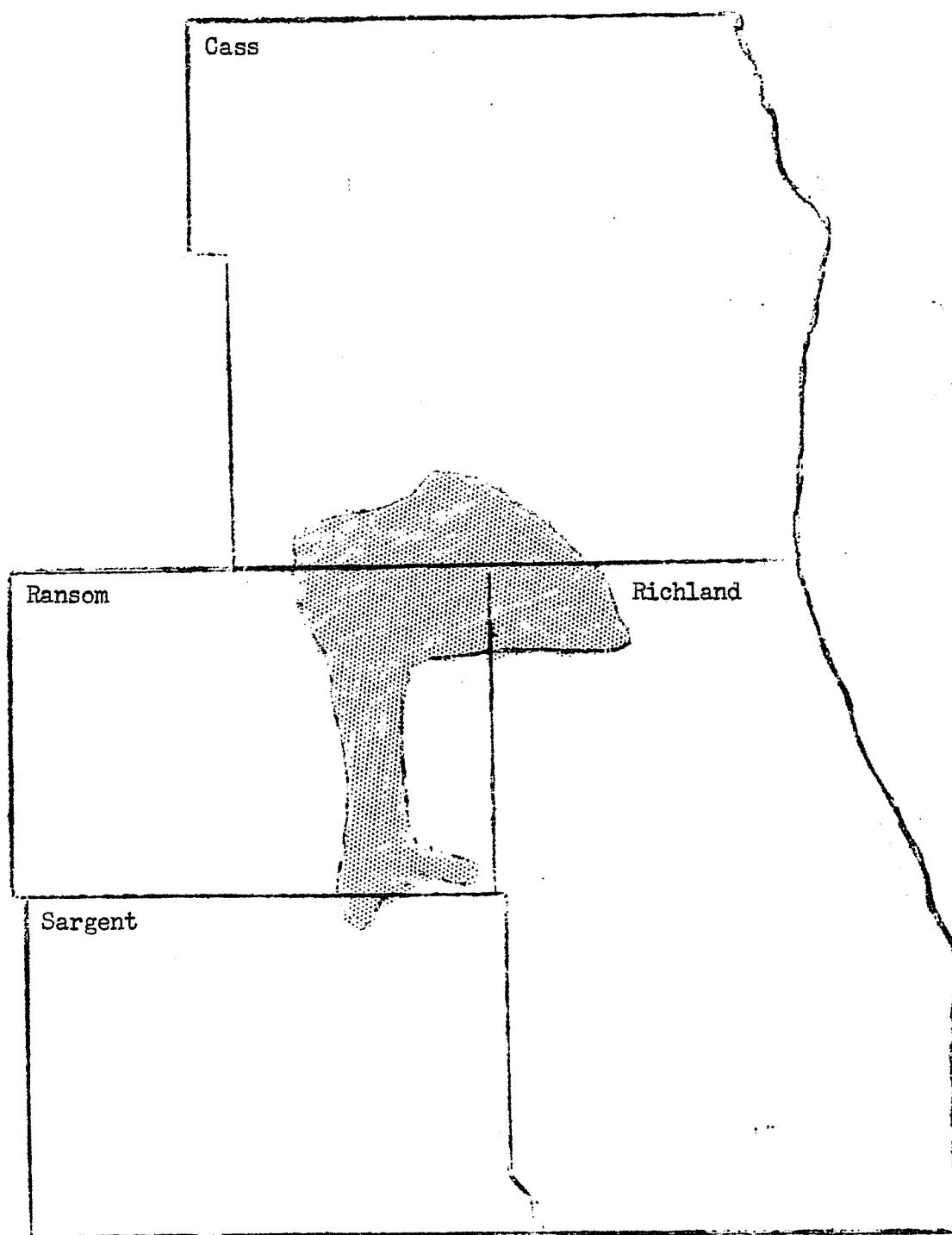


Figure 1. Sheyenne Delta Proposed Irrigation Area.

Funds were available to obtain 80 farm schedules. Seventy-nine schedules were used in the study as one schedule was discarded for lack of adequate data. In picking farms for the sample, a starting point was picked at random. From this starting point, every third farm was selected. Some alternate farms were picked at random to be substituted for those farms in which a schedule could not be obtained.

A schedule was taken of the 1956 farm operations. It was designed to obtain the physical organization, input and output relationships, and the asset structure of the present dryland farms.

#### PRESENT AGRICULTURE

Soils in the proposed irrigation area are light and well drained. This has a relationship to the present land-use system and may be one of the reasons why the results found in the study may be different from another area nearby.

The area proposed for irrigation in Cass, Richland and Ransom Counties traverses the sandy Sheyenne Delta, which was built up by disposition of sand and gravel where the Sheyenne River entered the glacial Lake Agassiz. The topography varies from nearly level to dune-like. The soils in this area belong to the Emden-Glyndon, Hecla-Ulen and Denbigh-Tiffany Associations. They range in texture from fine sandy loam to fine sand. These soils tend to be droughty and are subject to wind erosion.

Land Use - About 66 percent of the total land in farms was cropland (Table 1). Permanent pasture and wild hay land make up 29 percent of the total land. The average size of farm for the 79 farms was 602 acres.

Corn occupies the largest proportion of the cropland acres with 18 percent of the acreage. Eighty-two percent was grown for grain and 18 percent was grown for silage in 1957. Oats ranked second with 16 percent of the acreage in this crop and tame hay was third with 11 percent. Wheat ranked seventh occupying seven percent of the crop acres.

TABLE 1. LAND-USE SYSTEM IN PERCENT OF TOTAL ACRES AND IN PERCENT OF TOTAL CROPLAND, 1957

Land-Use	Percent of Total Acres	Percent of Cropland
Wheat	4.4	6.7
Durum	0.7	1.1
Barley	6.4	9.8
Flax	6.4	9.7
Oats	10.8	16.3
Corn	11.8	17.9
Grain	9.8	14.8
Silage	2.0	3.1
Soybeans	1.0	1.4
Rye	2.2	3.4
Millet	1.2	1.9
Tame hay	7.5	11.4
Cropland pasture	4.2	6.4
Fallow	2.6	3.9
Soil bank	6.6	10.0
Barley and oats	0.1	0.1
Total cropland	65.9	100.0
Permanent pasture	23.5	
Wild hay	5.1	
Farmstead	1.5	
Other	4.0	
Total acres operated	100.0	
Average size of farm	602 acres	
Number of farms	79	

About four percent of the cropland was summerfallowed in 1957. With 19 percent of the cropland in row crops, the amount of fallow will be less than in areas which have a smaller acreage of row crops. Also in areas of light soils, the amount of land summerfallowed is generally small because of the erosion problem. The acreage in summerfallow might have been smaller if it had not been for the acreage reserve program.

Table 2 shows the importance of the various crops by the percentage of the farmers which reported growing them. Ninety-one percent of the farms grew oats, 90 percent grew corn, 89 percent tame hay, 65 percent barley, 62 percent flax, 56 percent wheat. Forty-three percent of the farmers participated in the soil bank program. Forty-three percent of the farmers reported summerfallow. More farms may have had summerfallow but listed it as soil bank acreage.

Livestock System - Ninety-eight percent of the farmers reported having some livestock. Sixty percent of the farmers reported a dairy and/or a hog enterprise, 56 percent had a beef enterprise, 29 percent had sheep, and 51 percent had poultry (Table 3).

The average number of animals per farm for the farms having a specific type of livestock is nine dairy cows, 34 beef cows, 81 ewes, 11 sows and 111 chickens (Table 4). The average number per farm for all farms is six dairy cows, 19 beef cows, 24 ewes, seven sows and 56 chickens. Of the 59 farms that sold milk or cream, 53 farms sold cream and five farms sold whole-milk.

TABLE 2. PROPORTION OF FARMS REPORTING GROWING THE VARIOUS CROPS, 1957

Land-Use	Percent of Farms Reporting
Wheat	55.7
Durum	8.9
Barley	64.6
Flax	62.0
Oats	91.1
Corn	89.9
Grain	82.3
Silage	43.0
Soybeans	17.7
Rye	17.7
Millet	22.8
Tame hay	88.6
Cropland pasture	54.4
Fallow	43.0
Soil bank	43.0
Barley and oats	1.3
Total cropland	100.0
Permanent pasture	78.5
Wild hay	58.2
Farmstead	98.7
Other	68.4
Total	100.0
Number of farms reporting	79

TABLE 3. PERCENTAGE OF FARMS REPORTING THE VARIOUS TYPES OF LIVESTOCK, JANUARY 1, 1957

Type of Livestock	Percent of Farms Reporting
Horses	21.5
Dairy	59.5
Beef	55.7
Sheep	29.1
Hogs	59.5
Chickens	50.6
Reporting livestock	97.5
Reporting no livestock	2.5

TABLE 4. AVERAGE NUMBER OF ANIMALS PER FARM FOR FARMS REPORTING LIVESTOCK AND FOR ALL FARMS, JANUARY 1, 1957

Type of Livestock	Number of Farms Reporting	Average Number Per Farm Reporting Livestock	Average Number For All Farms
Horses	17	2.2	0.5
Dairy cows	47	9.2	5.5
Dairy heifers	20	6.2	1.6
Dairy calves	9	6.3	0.7
Dairy bull	9	1.1	0.1
Beef cows	44	33.5	18.7
Beef heifers and steers	36	25.7	11.7
Beef calves	6	15.8	1.2
Beef bulls	26	1.6	0.5
Ewes	23	80.8	23.5
Sows	47	11.1	6.6
Boars	13	1.1	0.2
Pigs	8	24.6	2.5
Chickens	40	110.6	56.0

Fifty-two percent of the farms having a beef enterprise, marketed the beef as yearlings or older, 30 percent sold calves and 18 percent sold both calves and yearlings or older. The average weight of the beef calves sold was 370 pounds and for heifers and steers sold it was 775 pounds.

The common denominator generally used for comparing the importance of various types of livestock on farms is animal units. On the animal unit basis, 63 percent of the total animal units were composed of beef animals, 19 percent were dairy, 11 percent were sheep and five percent were hogs (Table 5).

TABLE 5. LIVESTOCK SYSTEM IN PERCENT OF THE TOTAL ANIMAL UNITS,  
JANUARY 1, 1957<sup>a</sup>

Type of Livestock	Percent
Horses	1.3
Dairy	19.3
Beef	62.5
Sheep	10.6
Hogs	4.7
Poultry	1.6
Total	100.0

<sup>a</sup>Calculation of the animal units was based on the following animal unit values: Horses, 1.00; dairy cow, 200 lbs. butterfat, 1.00; dairy heifer over 1 year, .70; dairy calves, .25; dairy and beef bulls, .80; beef cow, .70; beef heifer and steers, .68; beef calves, .55; ewes, .16; sows, .205; boars, .196; pigs, .105; and chickens, .01.

Size of Farm - The modal size of farm was the 241 to 400 acre range (Table 6). The midpoint is 320 acres. Thirty-four percent of the farms were in this size group. The farms range in size from 160 to 2600 acres.

TABLE 6. FREQUENCY DISTRIBUTION OF FARM SIZE IN PERCENT OF TOTAL FARMS, 1957

Farm Size in Acres	Percent of Farms
81 - 240	6.3
241 - 400	34.2
401 - 560	21.5
561 - 720	13.9
721 - 880	8.9
881 - 1,040	5.1
1,041 - 1,200	3.8
1,201 - Over	6.3
Total	100.0
Number of Farms Reporting	79

Table 1 showed the average size of farm to be 602 acres which is larger than the modal size. The mode gives a more accurate picture of the distribution of farm size because it is not influenced by the very large or the very small farms.

Type of Farms - Farms may be classified as to type by various methods. In this study, farms were classified by type on the basis of animal units of livestock. A farm was classified as a grain farm if it has 15.0 animal units or less of livestock. If it has 15.1 to 30.0 animal units it was called a general farm, and if it had over 30.0 animal units it was classified as a livestock farm. This method of classifying farms by type has been used by the Bureau of Reclamation. in previous studies, and in order to make the data comparable the same method was used here. On the basis of the above classification, 16.5 percent of the farms were grain, 17.7 percent general farms and 65.8 percent were livestock farms (Table 7).

TABLE 7. DISTRIBUTION OF FARMS IN PERCENT OF TOTAL FARMS BY TYPE, 1957

Type of Farm	Percent of Farms
Grain Farms	16.5
General Farms	17.7
Livestock Farms	65.8
Total	100.0

Tenure - Forty-nine percent of the farms were operated by owners, 36 percent by part-owners and 15 percent by tenants. The part-owners

owned 56 percent of the land they operated. One of the factors for the high proportion of part-owners may be that the Sheyenne Delta Area is adjacent to the Sheyenne Valley Land Utilization Unit which is a grazing area under the supervision of the Forest Service. Thirty percent of the farmers were renting some land for pasture use.

Of the total land in the sample, 67 percent was owned and 33 percent was rented. Of the land rented, 34 percent of the acreage was rented specifically for pasture use.

#### FARM INVESTMENT

The average farm investment was 66 percent in land and buildings, 21 percent in machinery and 13 percent in livestock (Table 8). The average total per farm investment for all farms in the sample was \$39,899 or \$66.00 per acre of land.

TABLE 8. AVERAGE INVESTMENT PER FARM, 1957

Investment Items	Value	Percent	Dollars Per Acre
Real Estate	\$26,488	66	\$44.00
Machinery	8,331	21	13.84
Livestock	5,080	13	8.41
Total	\$39,899	100	66.23

The real estate value used was \$44.00 per acre, which was the value given for Ransom County in the United States Census of Agriculture of 1954 for North Dakota. The machinery and livestock value was the value as of January 1, 1957.

## FARM EXPENDITURES

The farm expenditures are divided into two groups, cash farm expenditures and total farm expenditures. The cash expenditures include all the items which require a cash outlay during the year. The total farm expenditures include the cash expenditures as well as the non-cash expenses like depreciation and interest on investment.

The average expenditures in 1956 of the 79 farms in the sample and the percentage distribution of expenditures is shown in table 9. The cash expenses accounted for 62 percent of the total farm expenditures.

The largest expense account was for machinery expenses which was 35 percent of the total farm expenditures. Real estate and improvement expenses were second largest, with 23 percent, and livestock expenses were third accounting for 22 percent of the expense. There were other expenses which are attributable to the above mentioned categories but cannot be separated out and applied directly to the proper category. For example, building and machinery insurance are not separated and personal property taxes were not broken down by machinery, livestock and household. Real estate and improvements expenses were combined because the expense of the improvements is a direct result of owning the real estate.

Interest on real estate investment was the largest single expense item of the total farm expenditures; machinery depreciation was second largest; fuel, grease and oil was third and livestock purchases was fourth largest.

TABLE 9. AVERAGE FARM EXPENDITURE AND PERCENTAGE DISTRIBUTION FOR 1956

Expense Item	Value	Percent
Livestock Purchases	\$1,006	11.4
Feed Purchased	527	6.0
Veterinary and Medical	69	.8
Artificial Insemination (\$7.00 per cow)	9	.1
Pasture Rental	78	.9
Seed	397	4.5
Crop Insurance	104	1.2
Fertilizer	190	2.1
Spraying	26	.3
Fuel, Grease and Oil	985	11.1
Machine Repair	475	5.4
Custom Work	86	1.0
Hired Labor	493	5.6
Real Estate Taxes	389	4.4
Personal Property Taxes	156	1.7
Building Repair	190	2.1
Building and Machinery Insurance	86	1.0
Truck Insurance	26	.3
Car Insurance	35	.4
Truck License	17	.2
Electricity	112	1.3
Telephone	35	.4
Other	17	.2
Total Cash Expenditure	5,508	62.4
Machinery Depreciation	1,063	12.0
Building Depreciation	254	2.9
Interest on Machinery Investment (6%)	500	5.7
Interest on Livestock Investment (6%)	305	3.5
Interest on Real Estate Investment (4%)	1,192	13.5
Total Farm Expenditures	\$8,824	100.0

There were several livestock feeders in the sample. The purchases of feeder cattle and lambs influenced the importance of livestock purchases as an expense item. Fifty-four percent of the livestock purchases were for feeder cattle and lambs and 46 percent were for purchases of breeding stock. On a per farm basis, this averages

\$460 for the purchase of breeding stock and \$546 for the purchase of feeder stock.

Feed purchases account for six percent of the total expenditures.

The feed purchases can be broken down on the following percentage basis:

Oilmeal	2.0%
Dairy concentrates	9.6%
Hog concentrates	15.5%
Poultry mashies	10.1%
Salt	2.5%
Minerals	4.4%
Grain	37.3%
Hay	18.6%
Total	<u>100.0%</u>

Pasture rental rates varied considerably within the area depending upon the quality of the pasture, location and demand. The rental rates were given by the per acre, per head and animal unit month basis. Information was not available to convert these figures to a common denominator. Some of the pastures were rented for 75 cents an animal unit month. On a per head basis, the rentals varied from \$4.50 to \$10.00. On a per acre basis, the rentals varied from \$1.00 to \$4.00. There were not enough cases to establish a most frequent rate.

Fifty-five percent of the farmers did not carry crop insurance. Of the 45 percent who did carry crop insurance, 38 percent carried Federal Crop Insurance, 50 percent carried hail insurance and 12 percent carried both Federal Crop Insurance and hail insurance.

The average total farm expenditure for the 79 farms was \$2,824, or \$14.66 per acre of land.

## LABOR

Some seasonal labor was hired but the majority of the labor was contributed by the operator and his family. The operator contributed an average of 11.9 months of labor and the family contributed 5.0 months. About 62 percent of the farms reported hiring labor. Ten percent of the farms hired labor the year around. The average amount paid for hired labor was \$493 in 1956. The number of days that the hired labor worked on the farm was not obtained, but assuming wages of one dollar per hour the hired labor contributed about one and a half months of labor on the average farm.

About 56 percent of the farms exchanged work with their neighbors. The type of work that was exchanged is largely harvesting and haying operations. These include combining, corn picking, field cutting, silo filling and baling hay. There were several cases where some of the spring work operations were exchanged.

The farms used an average of about 235 productive man-work units which is equivalent to about 235 days of labor.<sup>3</sup> Individual farms ranged from a low of 49 days to a high of 822 days of labor (Table 10). The farm with the 49 productive man-work units was a farm with 235 acres of crops and fallow and no livestock. The farm with the 822 productive man-work units was the largest farm in the sample with a large acreage of crops and a large number of livestock.

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<sup>3</sup>A productive man-work unit is the amount of work done by one man in a 10 hour day.

TABLE 10. PRODUCTIVE MAN-WORK UNITS, 1957

Item	P.M.W.U.	Percent
Crops	95	40
Livestock	<u>140</u>	<u>60</u>
Total	235	100
Range	49-822	

The livestock enterprises, on the average, required 60 percent and the crop enterprises 40 percent of the working time. Ninety-six percent of the farm operators spent the winter months on the farm.

#### CROPPING PRACTICES

Fifty-eight percent of the farmers followed a system of crop rotation. Of the farmers reporting a crop rotation, 39 percent used a four year, 33 percent a three year and 28 percent a five or six year rotation.

Corn was used as a weed control crop in the three and four year rotations. Wheat followed corn most often in the three and four year rotations. Other crops which followed corn were oats, barley, flax, alfalfa and rye. The sequence of the small grain crops following corn varied between farms so that it is hard to determine which sequence of crops was the most common in the rotation. The five year and longer crop rotations used alfalfa. Corn was most often used after plowing down the alfalfa.

Fifty-five percent of the farmers in the sample fall plowed or performed a tillage operation in the fall for the land seeded to wheat.

Twenty-seven percent of the farmers used a plow and pony drill. Of the farmers doing fall tillage, the most common operations included plowing in the fall, discing or cultivating in the spring, harrowing, drilling, swathing and combining.

Farmers that plowed and seeded in one operation performed the following operations: plow, pack and drill in one operation, swath and combine. This type of operation required 1.4 man-hours per acre compared with 2.1 man-hours for the fall plowed operations.

Farmers who plowed in the spring without using a pony drill generally performed the following operations: plow, harrow, drill, harrow, swath and combine. This method required 1.9 man-hours per acre.

Only about 40 percent of the farmers in the sample fall plowed or performed a tillage operation in the fall for barley. Thirty-three percent of the farmers used the pony drill. The tillage practices were about the same as they were for wheat.

Thirty-two percent of the farmers fall plowed or performed a tillage operation in the fall for oats. Twenty-nine percent used the pony drill and 39 percent spring plowed for oats. The type of field operations varied with oats so there was no one most common method.

Some of the cultural operations used for oats include:

1. Discing the land in the fall and using a plow and pony drill in the spring, then swathing and combining.
2. Plowing in the fall and in the spring using a field cultivator, harrowing, drilling, harrowing, swathing and combining.
3. Plowing in the spring, drilling, swathing and combining.
4. Plowing in the spring, harrowing, drilling, swathing, and combining.

Seventy percent of the farmers used spring tillage for flax. Thirty-five percent used the pony drill and 35 percent spring plowed, harrowed, drilled, swathed and combined.

The summerfallow operations consisted mainly of plowing and using the field cultivator three times. The second most common method was to plow, disc and field cultivate three times.

The most common operations for corn was to plow, harrow, plant, harrow, cultivate three times and harvest. The second most common operation was to plow, plant, harrow, rotary hoe, cultivate three times and harvest.

Forty-one percent of the farmers used fertilizer on some of the crops grown. Twenty-five percent of the farmers used fertilizer on corn, 20 percent on wheat, 16.5 percent on alfalfa, 15 percent on barley and 14 percent on oats (Table 11). Thirty-two percent of the wheat acreage was fertilized, 29 percent of the barley, 24 percent of the corn, 18 percent of the oat, 14 percent of the alfalfa and 12 percent of the soybean.<sup>4</sup> The most common rate of fertilizer used was 50 pounds per acre except on alfalfa where 100 pounds per acre was used. The most common analysis of fertilizer used was 11-48-0 on small grains, 0-45-0 on flax and soybeans and 8-32-0 or 16-20-0 on corn.

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<sup>4</sup>The percent of the total crop acreage fertilized refers to the percent the fertilized acres are of the total acreage for the 79 farms for the particular crop. For example, 24 percent of the total corn acreage for all the farms in the sample was fertilized.

TABLE 11. CROPS FERTILIZED, PERCENTAGE OF FARMS USING FERTILIZER ON THE VARIOUS CROPS, PERCENT OF ACRES FERTILIZED, MOST COMMON RATE USED PER ACRE AND THE MOST COMMON ANALYSTS USED<sup>a</sup>

Crop	Percent of Farms Reporting	Percent of Acres Fertilized	Most Common Rate Per Acre	Most Common Analysis Used
Wheat	20.3	32.2	50 lbs.	11-48-0
Barley	15.2	29.1	50 lbs.	11-48-0
Oats	13.9	18.2	50 lbs.	11-48-0
Flax	1.3	5.4	50 lbs.	0-45-0
Corn	25.3	23.8	50 lbs.	8-32-0 16-20-0
Alfalfa	16.5	13.5	100 lbs.	0-45-0
Soybeans	2.5	12.1	-	-

<sup>a</sup>Thirty-seven percent of the farms used manure on the fields. The average acreage manured was 26. Corn was the crop most frequently manured.

Fifty-three percent of the farmers used sprays for the control of weeds and grasshoppers. Twenty-eight percent of the farmers sprayed their wheat, 22 percent oats, 18 percent flax and 15 percent barley (Table 12). A small percentage of the farmers sprayed their summer-fallow, soybeans, hay, corn and rye. Forty-eight percent of the wheat acreage was sprayed, 25 percent of the barley and flax and 20 percent of the oats.<sup>5</sup> The most common chemical used for weeds was 2,4-D at the rate of one-half pint per acre.

<sup>5</sup>The percent of the acres sprayed refers to the percent the sprayed acres are of the total acreage for the 79 farms for the particular crop. For example, 48 percent of the total wheat acreage for all farms in the sample was sprayed.

TABLE 12. CROPS SPRAYED, THE PERCENTAGE OF FARMS SPRAYING THE VARIOUS CROPS, THE PERCENTAGE OF THE CROP ACRES SPRAYED, THE RATE PER ACRE AND THE CHEMICAL USED

Crop	Percent of Farms Reporting	Percent of Acres Sprayed	Rate Per Acre	Chemical
Wheat	27.8	48.0	$\frac{1}{2}$ pint	2, 4-D
Barley	15.2	25.1	$\frac{1}{2}$ pint	2, 4-D
Oats	21.5	20.0	$\frac{1}{2}$ pint	2, 4-D
Flax	17.7	24.6	$\frac{1}{2}$ pint	Heptachlor 2, 4-D
Fallow	2.5	3.1	1 pint	2, 4-D
Soybeans	3.8	8.8	1 quart	Toxaphene
Hay	1.3	1.1	$\frac{1}{2}$ pint	Heptachlor
Corn	2.5	2.1	$\frac{1}{2}$ pint	2, 4-D
Rye	1.3	3.8	$\frac{1}{2}$ pint	2, 4-D ester
Total		12.8 <sup>a</sup>		

<sup>a</sup>Percent of total crop acres.

#### INPUT-OUTPUT DATA FOR THE AREA

The information in this section includes data which may be helpful in working out farm budgets for the Sheyenne Delta Area.

Table 13 contains a summary of man-hours and fuel requirements per acre for the various types of implements. The values used are the most common ones given by farmers and are not average figures.

The seeding rate per acre for the various crops grown in the area is shown in Table 14. The range in seeding rates between farms is not as wide and there is more of a tendency toward a most common rate than is found in the man-hours and fuel requirements for the various field operations.

The yields that farmers expect to obtain by using their present cultural practices are shown in table 15. The yields are broken down

by the most common yield reported, the average yield, the lowest yield reported and the highest yield reported. In four cases, the number reporting were too small to establish a mode.

TABLE 13. LABOR AND FUEL REQUIREMENTS PER ACRE BY SIZE AND TYPE OF MACHINE, SHEYENNE DELTA AREA

Type of Implement	Number Reporting	Size	Man-Hours Per Acre	Fuel Per Acre
One-way plow	8	6-feet	.50	1.58 <sup>a</sup>
Moldboard plow	36	3-14 inch	.67	1.67
Moldboard plow	12	4-14 inch	.50	1.50
Harrow	13	20 feet	.18	.30
Harrow	26	25 feet	.10	.12
Field cultivator	8	8 feet	.50	1.00
Disc	14	10 feet	.33	.67
Corn planter	29	2-row	.50	.75
Corn planter	12	4-row	.33	.50
Corn cultivator	37	2-row	.50	.75
Corn picker	13	2-row	1.33	1.33
Corn picker	11	1-row	2.00	2.25
Combine	25	6 feet	.65	1.62
Combine	32	12 feet	.52	1.00
Swather	49	12 feet	.25	.50
Pony drill	15	3-14 inch	.67	1.67
Drill	15	10 feet	.27	.50
Drill	20	12 feet	.25	.50

<sup>a</sup>The average was used since there was no modal group.

TABLE 14. SEEDING RATE PER ACRE, SHEYENNE DELTA AREA

Crop	Number Reporting	Unit	Most Common		Second Most Common	
			Rate Per Acre	Percent <sup>a</sup>	Rate Per Acre	Percent <sup>a</sup>
Wheat	43	Bu.	1.25	65	1.50	33
Durum	7	Bu.	1.25	43	-	-
Barley	50	Bu.	1.50	70	2.00	14
Flax	49	Bu.	.75	45	1.00	18
Oats	72	Bu.	2.00	56	2.50	28
Corn (grain)	66	Lbs.	8.00	39	7.00	30
Corn (silage)	29	Lbs.	8.00	41	7.00	21
Soybeans	13	Bu.	1.00	77	-	-
Rye	9	Bu.	1.50	100	-	-
Millet	14	Lbs.	20.00	64	25.00	14
Alfalfa	13	Lbs.	10.00	46	20.00	23

<sup>a</sup>Percent of farms reporting this rate per acre.

TABLE 15. YIELD OF CROPS EXPECTED BY FARMERS WHEN USING THEIR PRESENT CULTURAL PRACTICES

Crop	Number of Farms Reporting	Unit	Most Common Yield			
			Reported	Ave.	Low	High
Wheat	39	Bu.	14-20 <sup>a</sup>	19.5	10.0	40.0
Durum	6	Bu.	20-26 <sup>a</sup>	22.4	15.0	27.5
Barley	47	Bu.	35	32.9	15.0	60.0
Oats	66	Bu.	41	40.2	20.0	65.0
Flax	47	Bu.	11	10.8	5.0	17.5
Rye	7	Bu.	14-29 <sup>a</sup>	22.9	10.0	40.0
Millet	9	Bu.	26	23.6	20.0	30.0
Corn (grain)	50	Bu.	41	33.5	15.0	55.0
Corn (silage)	7	Ton	4-8 <sup>a</sup>	4.0	2.0	9.0
Soybeans	12	Bu.	14	14.2	9.0	20.0
Tame Hay	28	Ton	2.5	2.17	.5	8.0
Wild Hay	11	Ton	1.0	1.27	.5	4.0
Cropland pasture	35	Acres/A.U.	2.5	2.4	1.0	5.0
Permanent pasture	37	Acres/A.U.	2.5	2.96	1.0	8.0

<sup>a</sup>Two modal groups.

The expected yields reported by farmers were higher than the average county yields for Ransom County in most years. County yields reflect all soil types, a wide range of management, a wide range in growing conditions and expected yields tend to be higher than actual yields which makes the actual yield more conservative than expected yields.

TABLE 16. AVERAGE WEIGHT OF LIVESTOCK SOLD BY TYPE OF LIVESTOCK

Type of Livestock	Average Weight <sup>a</sup>
Dairy cow (dairy breed)	1,133
Dairy cow (general purpose)	1,053
Dairy heifer	800
Dairy calves	261
Beef cows	1,010
Heifers and steers	775
Beef calves	370
Beef bulls	1,712
Ewes	98
Lambs	98
Sows	372
Boars	280
Pigs	220

<sup>a</sup>Weighted average.

The average weight of the various types of livestock when sold is shown in table 16. The weight of dairy cows was 1,133 pounds and the general purpose dairy cow was 1,053 pounds. The dairy cows were cows of dairy breed of which holstein was the most common breed. The general purpose dairy cow was a cow being milked which had a mixture of dairy and beef breed. Beef cows average 1,010 pounds, heifers and steers 775 and calves 370 pounds. Sows average 372 pounds and pigs 220 pounds when sold. The ewes and lambs averaged out at identical weights (98 pounds). There might have been some error or misunderstanding in the reporting of the weights. The figures given in table 16 were weighted by the number of head sold.

TABLE 17. PERCENT OF FARMERS REPORTING VARIOUS KINDS OF MACHINERY BY  
TYPE OF FARM, SHEYENNE DELTA AREA

Type of Machine	Grain	General	Livestock	All Farms
Tractor (Number)	100.0	100.0	100.0	100.0
1 tractor	11.8	57.1	4.2	15.2
2 tractors	23.5	28.6	58.3	45.6
3 tractors	52.9	14.3	18.8	25.3
4 tractors	5.9	-	12.5	8.9
5 tractors	5.9	-	4.2	3.8
6 tractors	-	-	-	-
7 tractors	-	-	2.1	1.2
Trucks (Number)	76.5	42.9	81.3	73.4
1 truck	69.2	83.3	69.2	70.7
2 trucks	15.4	16.7	25.7	22.4
3 trucks	15.4	-	5.1	6.9
Trucks (Size)				
1/2 ton	15.8	28.6	11.3	13.9
3/4 ton	21.0	14.3	26.4	24.1
1 ton	5.3	14.3	11.3	10.1
1 1/2 ton	36.9	42.8	30.2	32.9
2 ton	21.0	-	20.8	19.0
Cars (Number)	94.1	92.9	97.9	96.2
1	81.2	84.6	91.5	88.2
2	18.8	15.4	8.5	11.8
Combine (Number)	76.5	71.4	87.5	82.3
1	84.6	90.0	88.1	87.7
2	15.4	10.0	11.9	12.3
Combine (Size)				
6 foot	40.0	54.5	46.8	46.6
9 foot	-	-	6.4	4.1
12 foot	46.7	45.5	44.7	45.2
14 foot	-	-	2.1	1.4
16 foot	13.3	-	-	2.7
Swather (Number)	82.4	57.1	87.5	81.0
1	100.0	100.0	97.6	98.4
2	-	-	2.4	1.6
Swather (Size)				
9 foot	7.1	12.5	4.7	6.2
10 foot	14.3	12.5	7.0	9.2
12 foot	64.4	75.0	79.1	75.4
14 foot	-	-	2.3	1.5
15 foot	7.1	-	-	1.5
16 foot	7.1	-	7.0	6.2
Moldboard plow (Number)	88.2	100.0	100.0	97.5
1	40.0	92.9	41.7	50.6
2	53.3	7.1	47.9	41.6
3	6.7	-	6.2	5.2
4	-	-	4.2	2.6

(Continued)

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TABLE 17. PERCENT OF FARMERS REPORTING VARIOUS KINDS OF MACHINERY BY TYPE OF FARM, SNEYENNE DELTA AREA

Type of Machine	Grain	General	Livestock	All Farms
Moldboard plow (size)				
2-14	-	-	5.1	3.7
3-14	41.2	78.6	51.3	53.2
4-14	5.9	7.1	19.2	15.6
5-14	-	-	2.6	1.8
2-16	5.9	-	1.3	1.8
3-16	17.6	14.3	12.8	13.8
4-16	23.5	-	5.1	7.3
5-16	5.9	-	2.6	2.8
Disc plow	41.2	14.3	10.4	17.7
4 foot	28.6	-	-	42.9
6 foot	57.1	100.0	80.0	42.9
14 foot	14.3	-	20.0	14.2
One-way plow	5.9	-	16.7	11.4
6 foot	-	-	75.0	66.7
8 foot	100.0	-	25.0	33.3
Field cultivator (No.)	88.2	57.1	75.0	74.7
1	86.7	87.5	83.3	84.7
2	13.3	12.5	16.7	15.3
Field cultivator (Size)				
6 foot	5.9	-	-	1.5
8 foot	17.6	50.0	17.1	21.2
9 foot	-	12.5	7.3	6.1
10 foot	35.3	25.0	31.8	31.8
11 foot	5.9	-	9.7	7.6
12 foot	11.8	12.5	14.6	13.6
14 foot	17.6	-	19.4	16.7
16 foot	5.9	-	-	1.5
Disc (Number)	82.4	64.3	79.2	77.2
1	100.0	100.0	92.1	95.1
2	-	-	7.9	4.9
Disc (Size)				
6 foot	-	-	2.4	1.6
8 foot	14.3	11.1	-	4.7
10 foot	35.7	44.5	53.7	48.4
12 foot	7.1	-	7.3	6.2
13 foot	-	11.1	-	1.6
14 foot	-	-	4.9	3.1
15 foot	14.3	33.3	19.5	20.3
16 foot	-	-	2.4	1.6
18 foot	-	-	4.9	3.1
21 foot	28.6	-	4.9	9.4

(Continued)

TABLE 17. PERCENT OF FARMERS REPORTING VARIOUS KINDS OF MACHINERY BY TYPE OF FARM, SHEYENNE DELTA AREA

Type of Machine	Grain	General	Livestock	All Farms
Spiketooth harrow (No.)	82.4	50.0	85.4	78.5
1	78.6	87.5	95.1	90.3
2	21.4	14.3	4.9	9.7
Spiketooth harrow (Size)				
10 foot	-	-	7.3	4.5
15 foot	-	-	4.9	3.0
20 foot	35.3	-	29.3	27.3
25 foot	41.2	75.0	41.5	45.5
30 foot	11.7	25.0	7.3	10.6
35 foot	5.9	-	2.4	3.0
40 foot	5.9	-	7.3	6.1
Springtooth harrow	-	-	10.4	6.3
Drill	82.4	71.4	87.5	83.5
8 foot	-	-	2.4	1.5
10 foot	46.7	40.0	26.2	32.8
11 foot	-	20.0	11.9	10.4
12 foot	40.0	30.0	52.4	46.3
14 foot	13.3	10.0	7.1	9.0
Pony drill	52.9	35.7	45.8	45.6
Corn planter	76.5	71.4	83.3	79.7
2-R	69.2	80.0	60.0	65.1
4-R	30.8	20.0	40.0	34.9
Corn cultivator	82.4	71.4	95.8	88.6
2-R	85.7	100.0	81.0	84.3
4-R	14.3	-	19.0	15.7
Bean planter	-	7.1	2.1	2.5
Bean cultivator	-	7.1	2.1	2.5
Corn picker	52.9	28.6	66.7	57.0
1-R	33.3	75.0	40.6	42.2
2-R	66.7	25.0	59.4	57.8
Power mower	76.5	78.6	93.8	89.9
Dump rake	29.4	35.7	39.6	36.7
Side delivery rake	70.6	42.9	72.9	67.1
Baler	41.2	28.6	45.8	41.8
Stacker	5.9	21.4	41.7	30.4
Field cutter	35.3	-	20.8	20.3
Silage or hay blower	17.6	-	8.3	8.9
Grain elevator	76.5	50.0	81.3	74.7
Manure spreader	76.5	85.7	91.7	87.3
Brooder stove	-	42.9	18.8	19.0
Milking machine	23.5	57.1	35.4	36.7
Cream separator	29.4	85.7	72.9	65.8

(Continued)

TABLE 17. PERCENT OF FARMERS REPORTING VARIOUS KINDS OF MACHINERY BY TYPE OF FARM, SNEYENNE DELTA AREA

Type of Machine	Grain	General	Livestock	All Farms
Bulk milk tank	5.9	-	2.1	2.5
Weed sprayer	17.6	-	33.3	24.1
Feed Grinder	70.6	64.3	81.2	75.9
6 inch	9.1	-	-	2.0
9 inch	9.1	-	6.7	6.1
10 inch	36.4	87.5	23.3	36.8
11 inch	18.2	12.5	26.7	22.5
12 inch	-	-	3.3	2.0
13 inch	-	-	16.7	10.2
14 inch	27.3	-	20.0	18.4
15 inch	-	-	3.3	2.0
Welder	35.3	7.1	16.7	19.0

Machinery expenditures accounted directly for 35 percent of the total farm expenditures. Budgeting essential machinery is important to the accuracy of a budget. Table 17 gives the percent of farmers reporting the various kinds and sizes of machinery by type of farm.

Twenty-eight percent of the farmers hired some machine work. Baling was the most common operation hired. Other types of operations hired included silo filling, field chopping, combining, corn picking and haying. Twenty percent of the farmers reported doing machine work for others. The type of work included the same operations as the farms that hired machine work.

The miles driven by farm trucks for the farmers reporting trucks was 5,807 miles. The truck miles for all farms was 4,223 miles. Cars were driven 10,495 miles for farm business. Farmers, on the average, used their cars 66 percent of the time for farm business.

The majority of the farms (38 percent) had only one well. The depth of these wells ranged from eight to 800 feet. The modal depth was 18 to 22 feet. Thirty-two percent of the farms had two wells.

The farms in the sample had an average of 1.7 miles of fence per quarter section of land. The grain farms had 1.2 miles per quarter, the general farms had 1.9 and the livestock farms had 1.8 miles of fence per quarter of land.

Forty-three percent of the farms had a silo. Of the farms reporting a silo, 60 percent were trench and 40 percent were upright silos. The trench silos had an average capacity of 128 tons of silage and the upright silos had an average capacity of 102 tons.

All farms reported having grain storage facilities. The average storage per farm was 5,237 bushels. This amounts to about 13 bushels of storage space per acre of cropland.

The size of the operator's dwelling averaged 6.7 rooms. The modal size of dwelling was eight rooms.