



AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search

<http://ageconsearch.umn.edu>

aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

Agricultural Economics Report
Number 3

May 1951

25

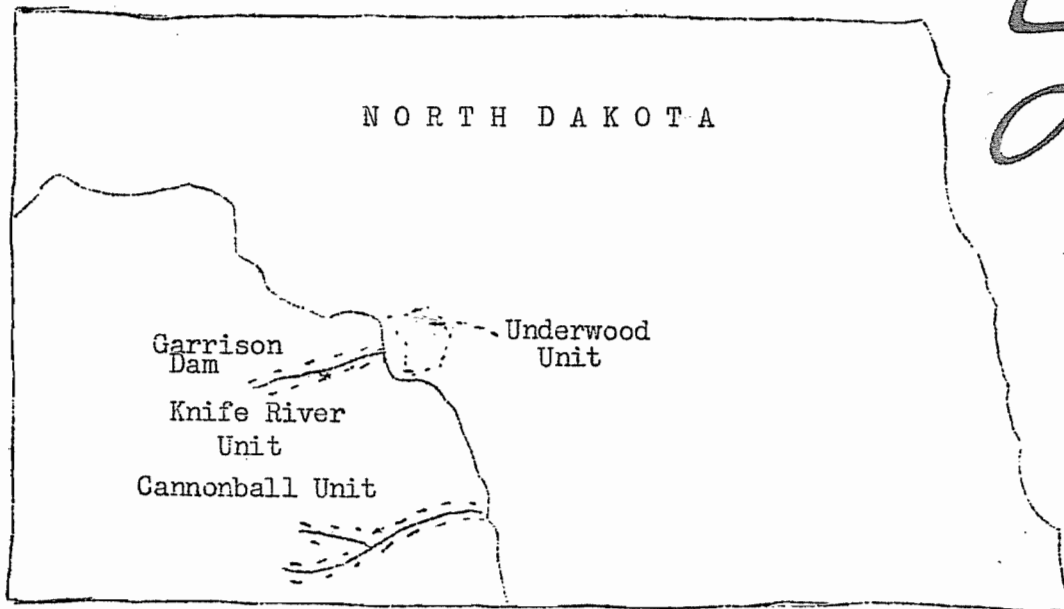
LAST COPY

PRESENT FARM ECONOMY
IN THREE PROPOSED IRRIGATION AREAS
OF NORTH DAKOTA

By
L. W. Schaffner

DEPARTMENT OF AGRICULTURAL ECONOMICS
NORTH DAKOTA STATE UNIVERSITY
STATE UNIVERSITY STATION
FARGO, NORTH DAKOTA 58102

SAVE



Agricultural Experiment Station
North Dakota Agricultural College

and

Bureau of Reclamation
United States Department of the Interior

Cooperating

Fargo, North Dakota

Table of Contents

	Page
Introduction.....	2
Purpose of Study.....	3
Sample Design.....	4
Farm Income.....	4
Farm Expenses.....	6
Farm Asset Structure.....	9
Real Estate.....	9
Machinery and Equipment.....	10
Livestock Investment.....	11
Tenure.....	11
Land Use and Crops.....	14
Land Use.....	14
Crop System.....	14
Crop Disposition.....	15
Cultural Practices for Grains.....	18
Wheat.....	18
Oats.....	18
Barley.....	19
Flax.....	19
Mechanization.....	19
Custom Work.....	20
Livestock Enterprise.....	20
Labor Input.....	23
Appendix.....	25

FOREWORD

Man's power of bending the forces of nature to his purpose is impressive indeed. Our nation has embarked upon a long-range plan to make the waters of the Missouri generate electric power and irrigate millions of acres of land. Much of the new land to be brought under irrigation lies in North Dakota.

Man's success in managing the prosaic economic forces that are set in motion by such vast water development programs has been somewhat less impressive. We have many lessons to learn from past mistakes. Many settler families were ruined by excessive debt loads and water charges, by inadequate farming units, by land that got waterlogged after some years of irrigation. One of these lessons is: Start with a thorough inventory, a clear knowledge of the physical conditions of the land and the economic conditions of farmers in the proposed irrigation areas at present. Get a good picture of "Before" so you can make sure that the picture of "After" looks better.

This study gives an intimate view of the farmers' present economic position in three proposed irrigation areas below the Garrison Dam. Many of the findings are applicable far beyond the boundaries of these specific areas.

A similar study in the northwestern part of the State has been published as Bulletin 367, Economics of Grain Farming in Renville County, by L. W. Schaffner. It can be obtained by request from the Bulletin Room, North Dakota Agricultural Experiment Station, Fargo, N. Dak.

Rainer Schickele, Chairman
Department of Agricultural Economics

PRESENT FARM ECONOMY IN THREE PROPOSED
IRRIGATION AREAS OF NORTH DAKOTA 1/ 2/

By L. W. Schaffner 3/

The Cannonball River, Knife River and Underwood proposed irrigation units are a part of the development plan for the Missouri River Basin. These areas are being studied by the Bureau of Reclamation to determine the feasibility of irrigation.

The proposed Cannonball unit includes about 12,400 acres of land. This acreage is composed of the bottom lands in the valley of the Cannonball River in Grant, Sioux and Morton counties, North Dakota. The proposed Knife River unit lies along the bottom lands of the Knife River in Mercer County. The area runs from the Dunn and Mercer County line east to the Missouri River. There are about 15,400 acres of land in the unit. The proposed Underwood unit lies just east of the Garrison dam. The area includes about 45,000 acres of land.

Purpose of the Study

The North Dakota Agricultural College and Federal agencies involved in the Missouri River Development have a direct responsibility for anticipating the many agricultural and economic problems that may arise from irrigation developments. In order to properly evaluate the economic feasibility of irrigation, information is needed for anticipating the effects of irrigation on farm income in the proposed irrigation areas. It is essential to have a good knowledge of the present income position of dryland farmers and their farm investment and organization in order to appraise realistically the changes in farming, capital requirements and tenure arrangements which will come about with irrigation development.

1/Cooperative project of the North Dakota Agricultural Experiment Station, Project N.D. 700, and the Bureau of Reclamation, U.S. Department of the Interior. See also Station Bul. 367, Economics of Grain Farming in Renville County, by L. W. Schaffner.

2/The author acknowledges valuable criticism from his colleagues in the Agricultural Economics Department and from Mr. Wallace McMartin and other staff members of the Bureau of Reclamation. In the painstaking job of ferreting out the needed information, the author was ably assisted by Burbank Kristjanson and William Day. He is especially grateful for the patience and understanding of the farmers who contributed their time, experience and knowledge, and without whose generous cooperation this study could not have been undertaken.

3/Assistant Agricultural Economist, North Dakota Agricultural Experiment Station.

In these areas, several years of high rainfall and good crops may come in succession followed by drought years. Many of the existing farms are large and highly mechanized. Some progress has been made in crop adaptation and land use practices so that dryland agriculture can better withstand drought.

This study of dry-land farm organization will be used as part of the basis for determining the increased capital requirements, changes in farm organization and size, in tenure arrangements and other changes which are expected to attend the transformation from dry-land to irrigation farming.

Sample Design

The sample used in the three areas was a random sample of farms that had land in the area being studied for irrigation. A farm schedule was taken at each farm drawn in the sample. These schedules were taken in the summer of 1949, covering the 1948 farming operations. Twenty-seven farms were visited in the Cannonball unit, 34 in the Knife River unit and 40 in the Underwood unit. The random selection of farms was made from the County PMA office, County Agent and the County Treasurer.

Table 1. Frequency Distribution of Farm Size in the Random Sample.

Farm Size (acres)	Cannonball	Knife River (Number of Farms)	Underwood
169 - 379	-	5	1
380 - 499	1	4	11
500 - 699	2	12	9
700 - 999	2	5	8
1,000 - 1,499	6	3	9
1,500 - 1,999	4	3	-
2,000 - 2,499	3	2	1
2,500 - 6,000	9	-	1
Total	27	34	40

The average size of farm in the Cannonball unit was 2,217 acres, in the Knife River unit 833 acres and in the Underwood unit 842 acres.

Farm Income

During 1948 farm returns were affected by a sharp drop in prices of a number of farm products. These price changes affected both the cash income from products sold and the inventory value of products on hand. The yields were also affected by a dry spell early in the season. Table 2 shows a summary of the gross farm income, expenses and net farm income for the three units

studied. The net farm income as used in this study is the gross farm income minus the cash farm expenses and the machinery and building depreciation. ^{1/}

There is very little difference between the three units in the relationship between gross income and farm expenses. This is indicated in Table 2 by the farm expenses in percent of the gross farm income.

Table 2. Summary of Gross Farm Income, Farm Expenses and Net Farm Income.

	Cannonball	Knife River	Underwood
Gross Farm Income	\$17,597	\$12,771	\$18,343
Farm Expenses	7,119	4,335	7,350
Net Farm Income	\$10,478	\$8,436	\$10,993
Net Income per Acre	\$4.73	\$10.13	\$13.06
Farm Expenses in % of Gross Farm Income	40	34	40

Table 3 shows the source of the farm income. This table gives a good picture of how the farm organization differs between areas. Other farm income includes income from doing custom work off the farm. Government payments were not included.

Table 3. Distribution of Gross Farm Income by Source.

Source of Income	Cannonball		Knife River		Underwood	
	Dollars	%	Dollars	%	Dollars	%
Crops	\$ 7,034	40.0	\$6,662	52.2	\$13,082	71.3
Livestock	10,539	59.9	6,052	47.4	5,232	28.5
Livestock sold	6,731		3,163		3,844	
Livestock products	1,072		1,363		707	
Increased inventory	2,736		1,526		681	
Other	24	0.1	57	0.4	29	0.2
Total Gross Farm Income	\$17,597	100.0	\$12,771	100.0	\$18,343	100.0
Gross Income per Acre	\$7.94		\$15.33		\$21.78	

^{1/}The budgets were based upon the average of the sample farms,

In the Cannonball unit the largest proportion or 60 percent of the gross farm income comes from the livestock enterprise. In the Knife River and Underwood units the largest proportion comes from grains, 52 percent and 71 percent respectively. The incomes shown in Table 3 are the average incomes for the farms reporting. The incomes were arrived at by using the average production for these farms and applying the average prices received by North Dakota farmers for 1948. This eliminates part of the managerial ability factor by applying standard rates, especially in the sale of grains and livestock and the time of sale. About the only place that managerial ability enters the picture is in the choice of crops, livestock and cultural practices.

Table 4 shows the range in net farm income by units. Extreme variations in operating efficiency are indicated throughout these data. Many factors make for these variations in income. No one factor accounts for all the variations. However, a few appear to be largely responsible for the lower incomes. Probably the outstanding one was the low yields obtained for some of the crops on some of the farms. In some cases farmers did not fully utilize the acreage of permanent pasture to the best advantage. Another important factor to watch is the investment in machinery. Machine repairs, fuel and depreciation make up about 43 percent of the total farm expense. Inefficient use of this machinery can affect the financial returns of the farm severely by increasing the cost of operation. Sometimes farmers may not fully realize how much land can be handled with a modern set of machinery, or may overstock themselves with equipment for other reasons, which may lead to a machinery investment per acre higher than what is normally required.

Table 4. Average and Range in Net Farm Income.

Unit	Per Farm			Per Acre		
	Average	High	Low	Average	High	Low
Cannonball	\$10,478	\$21,747	\$1,726	\$4.73	\$16.56	\$1.15
Knife River	8,436	23,835	646	10.13	25.57	2.73
Underwood	10,993	37,144	-4,510	13.06	37.42	-7.05

Farm Expense

Table 5 shows the average farm expenses for the farms reporting by units. There are some differences between the units in the proportions spent on certain expense items. For example, in the Cannonball area labor hired was the largest expense item while in the other two units it was seed. Seed was used in this

study as a cash expense. The Cannonball unit also had higher livestock expense since that was the major enterprise. The most outstanding feature of Table 5 is the large part machinery costs are of the total expense. Total machinery costs absorbed 37 percent of the total farm expenses in the Cannonball unit, 47 percent in the Knife River unit and 45 percent in the Underwood area.

The average expense per acre of land varied between the three units. The Cannonball had the smallest expense per acre of land, \$3.21, and the Underwood unit had the largest, \$8.73. Probably the reason why the Underwood area had a higher cost per acre is that the area had the highest proportion of its land cultivated. The Cannonball unit had the least cultivated land.

Farm expenses, as in the income data, have a wide variation between farms. The range in farm expenses is shown in Table 6.

Table 5. Farm Expenses.

Expense Item	Cannonball		Knife River		Underwood	
	Dollars	Percent	Dollars	Percent	Dollars	Percent
	Per Farm	of Total	Per Farm	of Total	Per Farm	of Total
Seed <u>1/</u>	\$ 771	10.8	\$ 656	15.1	\$1,139	15.5
Cleaning & Treating	15	0.2	11	0.3	26	0.4
Fuel, Grease & Oil	525	7.4	405	9.3	584	7.9
Machine Repairs	685	9.6	599	13.8	872	11.9
Auto <u>2/</u>	249	3.5	143	3.3	252	3.4
Truck <u>2/</u>	374	5.2	186	4.3	405	5.5
Custom Work	310	4.4	104	2.4	226	3.1
Labor Hired	884	12.4	247	5.7	668	9.1
Land Taxes	383	5.4	236	5.4	328	4.5
Personal Property Taxes <u>3/</u>	145	2.0	120	2.8	127	1.7
Insurance	223	3.1	148	3.4	311	4.2
Building & Fence Repair	379	5.3	253	5.8	735	10.0
Feed Bought <u>4/</u>	253	3.6	38	0.9	37	0.5
Livestock Bought <u>4/</u>	730	10.3	281	6.5	185	2.5
Miscellaneous	62	0.9	6	.2	18	0.2
Total Cash Expense	\$5,988	84.1	\$3,433	79.2	\$5,913	80.4
Machinery Depreciation <u>5/</u>	823	11.6	697	16.1	1,186	16.2
Building Depreciation <u>6/</u>	308	4.3	205	4.7	251	3.4
Total Farm Expense	\$7,119	100.0	\$4,335	100.0	\$7,350	100.0
Total Expense per Acre	\$3.21		\$5.37		\$8.73	
No. of Farms Reporting	27		33		39	

1/The quantity of seed used was obtained from the farmers. The value was obtained by using North Dakota 1948 prices received by farmers for grain at seeding time.

2/The number of miles the cars and trucks were driven during 1948 was obtained from the farmer. The cost per mile was taken from Farm Budget Standards for Irrigation Farming. United States Department of the Interior, Bureau of Reclamation, Region 6, Billings, Montana. Oct. 1948. pp. 66-67. (Unpublished data). An adjustment was made to compensate for the higher gasoline prices prevailing in the areas.

3/Personal property taxes were estimated from a few cases in the area.

4/1948 farm prices received and paid by farmers were used to arrive at the values. The quantities were obtained from the farmer.

5/Machinery depreciation was based on 1948 price of new machinery and that the machinery would last 12 years. The age of the machinery was obtained at the farm.

6/The depreciation on buildings was calculated at 3 percent of the value of the buildings.

Table 6. Range in Total Farm Expenses.

Unit	Per Farm			Per Acre		
	Average	High	Low	Average	High	Low
Cannonball	\$7,119	\$20,642	\$1,560	\$3.21	\$ 7.34	\$.55
Knife River	4,335	7,737	1,107	5.37	13.22	2.13
Underwood	7,350	31,563	2,310	8.73	19.99	4.66

Farm Asset Structure

The farm asset structure is made up of the value of the real estate, machinery and equipment and livestock. Table 7 shows the summary of the structural assets for the three units. The values were based on 1948 prices. The three units had about the same proportionate investment in real estate.

Table 7. Total Investment in Structural Assets.

	Cannonball		Knife River		Underwood	
	Dollars	Percent of Total	Dollars	Percent of Total	Dollars	Percent of Total
Real Estate	\$40,262	64	\$27,345	66	\$33,680	67
Machinery	5,644	9	5,610	14	9,137	18
Livestock	17,109	27	8,271	20	7,383	15
Total	\$63,015	100	\$41,226	100	\$50,200	100
Investment per Acre of Land	\$28.42		\$49.49		\$59.62	

Real Estate values as shown in this report represent the farmer's estimate of what the farm would sell for as of 1949 (Table 8). The values as reported by the farmers were on the average higher than estimates of land values from other sources. For example, in the Cannonball area, the Grant County average for 1945 was reported by the Census of Agriculture as \$10.08 per acre. For North Dakota as a whole, land values between 1945 and 1949 rose about 55 percent. This would place Grant County land values at about \$15.62 per acre in 1949. Using the same method, the Knife River (Mercer County) unit land values would be about \$24.44 per acre in 1949 and the Underwood (McLean County) unit \$23.34 per acre. There may be some question as to the validity of the figures. Probably one reason why the values for the farms interviewed were higher than the average for the county was that

the lowlands or river bottoms made up at least part of the farm. These soils are, ^{generally speaking,} heavier and more productive than the upland soils.

Table 8. Real Estate Investment.

Unit	Ave Value Per Acre	Range in Value per Acre	Average Per Farm
Cannonball	\$20.65	\$10.00 - \$40.00	\$40,262
Knife River	36.13	15.00 - 65.63	27,345
Underwood	40.00	25.00 - 60.00	33,680

Table 9 shows the farm real estate mortgages. Most of these farms are in pretty shound financial position as indicated by the small number of farms having mortgages and the low mortgage valuation.

Table 9. Farm Real Estate Mortgages.

Unit	No. of Farms Reporting	No. of Farms Reptg. Mortgs.	Average Mortgage	Range
Cannonball	27	6	\$6,933	\$100 - \$26,500
Knife River	29	2	2,500	2,000 - 3,000
Underwood	37	5	1,770	800 - 4,000

Machinery and equipment investment varies considerably between farms (Table 10). The value of machinery was based on new machinery prices in 1948 and depreciated according to the age of the machine. It was assumed that the machinery would have a life of 12 years.

Table 10. Average and Range in Machinery and Equipment Investment.

Unit	Per Farm			Per Acre		
	Average	High	Low	Average	High	Low
Cannonball	\$5,644	\$15,745	\$1,915	\$2.55	\$7.25	\$.56
Knife River	5,610	10,370	985	6.73	22.84	1.72
Underwood	9,137	30,200	1,895	10.85	23.80	3.20

The machinery investment per acre increases as the amount of cultivated land increases and the amount of permanent pasture decreases. In the Cannonball unit the main farm organization centers around the livestock enterprise while in the Underwood unit it centers around crop production.

Investment in livestock varies between areas (Table 11). The average investment in the Cannonball unit was \$17,109, more than twice as high as the Knife River and Underwood. Two farms in the Knife River, and 3 farms in the Underwood unit reported no livestock whatever.

The valuations for livestock were based on the number of animals on the farm January 1, 1948. The values were arrived at by using the North Dakota prices received by farmers for 1948.

Table 11. Average and Range in Livestock Investment.

Unit	Average	High	Low
Cannonball	\$17,109	\$49,584	\$2,478
Knife River	8,271	23,658	0
Underwood	7,383	60,614	0

Tenure

The three units studied have about the same proportion of owner-operators (Table 12). The other two tenure groups varied more between areas. In the Cannonball unit, there were no full tenants among the 27 farms reporting. Of the 34 farms the Knife River unit, 15 percent were full tenants, and of the 40 farms in the Underwood unit only 8 percent.

The owner and part-owners were the two major tenure groups in all three units. The importance of the part-owner group indicates the extent to which renting of land is used as a means of increasing the size of operating unit.

Table 12. Distribution of Tenure.

Unit	Owners		Part-Owners		Tenants		Total	
	No.	%	No.	%	No.	%	No.	%
Cannonball	11	40	16	60	-	-	27	100
Knife River	14	41	15	44	5	15	34	100
Underwood	16	40	21	52	3	8	40	100

Table 13 shows the average size of operating unit by tenure. The Cannonball unit had the largest proportion of land owner-operated, 81 percent. In the Knife River and Underwood units, about two thirds of the land was owner-operated. In all three units the part-owners had the larger size of operating unit. Note that in the Underwood unit, the full tenant farms were much smaller than the full-owner farms, while in the Knife River unit they averaged the same.

Table 13. Average Size of Operating Unit, by Tenure.

Unit	Owners	Part-Owners	Tenants	Total	
	Ave. Acres: Operated	Ave. Acres: Operated	Percent: Owned	Ave. Acres: Operated	Percent: Owned
Cannonball	2,025	2,349	70	2,217	81
Knife River	548	1,195	72	833	62
Underwood	736	979	56	842	69

Rental shares concentrate around two types, the $\frac{1}{4}$ share for the landlord and the cash lease (Table 14). In the Cannonball unit rental shares concentrate around three types, the $\frac{1}{4}$ and $\frac{1}{2}$ share and the cash lease. The cash leases are land rented for pasture or hay land. One farm reported using Government land free.

Table 14. Rental Shares, by Type of Tenure.^{1/}

Type of Tenure and Unit	Number of Leases Reported	Percentage of:				Total leases
		$\frac{1}{4}$ share leases	$\frac{1}{3}$ share leases	$\frac{1}{2}$ share leases	Cash leases	
		%	%	%	%	%
Part-Owners						
Cannonball ^{2/}	17	29	-	24	47	100
Knife River	18	44	12	-	44	100
Underwood	23	57	-	8	35	100
Tenants						
Cannonball	-	-	-	-	-	-
Knife River	6	80	-	-	20	100
Underwood	4	-	25	75	-	100

^{1/}Landlord's share.

^{2/}One reported using Government land free.

In the Underwood unit three out of the four tenants has a $\frac{1}{2}$ share lease. This may be the result of weaker bargaining and financial position of some tenants and of the tenants bidding for buildings provided on tenant farms.

In the Cannonball unit the cash lease charge for grazing land ranged from 10 cents to 25 cents per acre. The cash lease for hay land and cropland ranged from 90 cents to one dollar per acre. The average cash rent in the Knife River units was 35 cents per acre. The range was from $12\frac{1}{2}$ cents to \$1.83 per acre. The majority of the land rented for cash was pasture land. Two of the nine reported cash leases used the land for hay or for cropland. The cash leases in the Underwood unit ranged from 19 cents to \$3.63 per acre, the average was \$1.28 per acre.

The contribution of the landlord and tenant under the $\frac{1}{4}$ share lease was the same in all three units. Under the $\frac{1}{4}$ share lease, the tenant furnished all labor, machinery, fuel, seed and the harvesting and threshing expense; the landlord contributed the land, buildings and paid the taxes.

Of the two reporting $\frac{1}{3}$ share to the landlord, in the one case where the operator was a part-owner the tenant furnished all the machinery, fuel, harvest and threshing expense, labor and seed; the landlord furnished the land and taxes. In the second case where the operator was a full tenant, he furnished all machinery, fuel, the harvesting and threshing expense and labor; the landlord furnished the land, paid the taxes, and seed.

In the $\frac{1}{2}$ share lease we find the most variations. These variations are just as common in the part-owner group as they are in the tenant group. One cannot judge from the lease contribution which had the better bargaining position, the part-owner or tenant. Also, there cannot be any conclusions drawn as to field renting versus farm renting.

The most common $\frac{1}{2}$ share lease, the tenant furnished all the machinery, fuel, labor and $\frac{1}{2}$ the harvesting and threshing expense; the landlord contributed the land, taxes, seed and $\frac{1}{2}$ the harvesting and threshing expense. One of the variations of the $\frac{1}{2}$ share lease was that in addition to the tenant furnishing the items stated above he also furnished $\frac{1}{2}$ the seed. Another $\frac{1}{2}$ share lease reported the tenant furnishing all the machinery, fuel, labor and harvesting and threshing expense; the landlord contributed the land, taxes and seed. Another case reported the tenant furnishing all the machinery, fuel, seed and $\frac{1}{2}$ the harvesting and threshing expense; the landlord furnished all the hired labor, the land, taxes and $\frac{1}{2}$ the harvesting and threshing expense.

Table 15 shows the number and percent of leases written. Probably the reason for the high proportion of written leases was that the land rented for cash was generally owned by institutions which require written leases.

Table 15. Number and Percent of Leases Written, by Units.

Unit	Number of Leases Reported	Number of Leases Written	Percent of Total Lease Written
Cannonball	17	10	60
Knife River	24	12	52
Underwood	27	13	49

In general, written leases are of longer term than oral leases (Table 16). About all of the oral leases ran for one year only while half of the written leases ran from two to ten years.

Table 16. Term of Leases by Type of Lease.

Unit	One Year	Two Years	Three Years	Five Years	Ten Years	Life	Total
	<u>Number of Written Leases</u>						
Cannonball	3	-	2	4	-	-	9
Knife River	6	1	-	3	1	-	11
Underwood	7	-	2	3	-	-	12
	<u>Number of Oral Leases</u>						
Cannonball	5	-	-	-	-	1	6
Knife River	10	-	-	-	-	-	10
Underwood	11	-	-	1	-	-	12

Land Use and Crops

Land Use - Table 17 shows the land use system in percent of total land. The important part of this table is the difference between the three units in the proportion of the total land that is cultivated and in permanent pasture. The Cannonball unit has the least amount of cultivated land while the Underwood unit has the greatest. This table gives a good picture of how the farm must be organized to efficiently use the land resources.

Crop System - Table 18 shows the crop system in percent of the total cultivated land in the farm. Wheat was the main cash crop in all three units. About 44 percent of the cultivated land was planted to wheat in the three units. The proportion of wheat, oats and barley to the total cultivated land also runs about the same in the three units.

The second most important crop was corn in the Cannonball and Knife River units and flax in the Underwood unit. Oats ranked third in the Knife River and Underwood units while in the Cannonball unit tame hay was third. The fourth ranking crop varied in all three units as follows: Cannonball, oats; Knife River, tame hay and Underwood, corn. Flax was a very minor crop in all units except the Underwood which had 13 percent of the cultivated land seeded to flax.

About one-tenth of the cultivated land was summer fallowed. This amounts to about one-fourth of the total wheat acreage. Corn is used in place of summer fallow for controlling weeds. Farmers prefer summer fallow to corn in many cases because the increased yield of the wheat crop following summer fallow is about twice as great as the increase in yield of wheat following corn. In all three units about three-quarters of the total cultivated land was planted to small grains.

Crop Disposition

By December 1948 farmers had sold over half of the wheat they produced in 1948 and what they had carried over from the 1947 crop (Table 19). About 29 to 39 percent of the total wheat supply was still on the farm on December 31.^{1/} About 6 to 8 percent was used for seed. An inventory increase of 39 to 72 percent had occurred from the beginning to the end of the year. The largest increase occurring in the Cannonball unit.

The carry-over of wheat at the end of 1948 was probably higher than normal. Due to good yields and prices many farmers found it more advantageous to hold the grain on the farm rather than sell it and pay a high income tax when they did not need the money for their current operating expense and family living. The other grains also showed substantial inventory increases at the end of the year, probably for the same reason.

Barley and oats were used principally for feed in the Cannonball and Knife River units while in the Underwood unit it was stored on the farm. Barley is grown more for a cash crop than as a feed crop. Oats are grown for feed since it is a better feed to use with corn than barley.

One might conclude that on the average these farms are in a strong financial position as indicated by the larger inventories being carried over. ^{2/}

^{1/}Total supply includes the carry-over from the preceding year, the 1948 production and purchases in 1948.

^{2/}Farmers did not have to sell all their grain at harvest time to meet current expenses.

Table 17. Land Use System in Percent of Total Land

Unit	Number of Farms Reporting	Range of Land in Cultivation	Cultivated Land		Permanent Pasture	Wild Hay	Trees	Farmstead	Other	Total
			%	%						
Cannonball	27	0 - 54 1/2	19.1	71.8	8.6	-	0.4	0.1	100.0	
Knife River	34	20 - 100	39.3	53.0	6.6	0.4	0.7	-	100.0	
Underwood	39	30 - 98	64.6	27.6	6.2	0.2	1.1	0.3	100.0	

1/One farm had no cultivated land.

Table 18. Crop System in Percent of Cultivated Land

Unit	Number of Farms Reporting	Total Planted							Summer Tame Rotation			Idle Total	
		Wheat	Oats	Barley	Flax	Corn	Other ¹	Total	Fallow	Hay	Pasture	Crop- Land	Cultivated Land
Cannonball	27	41.7	8.7	7.3	1.6	13.5	.1.5	74.3	8.2	9.9	3.2	4.4	100.0
Knife River	34	48.1	11.7	5.5	1.1	12.3	.0.4	79.1	10.9	9.6	4	0.4	100.0
Underwood	39	42.3	12.9	3.3	13.0	7.4	.0.3	79.2	9.7	6.0	4.5	0.6	100.0

1/Other includes small acreages of rye and speltz.

Table 19. Disposition and Supply of Grain Crops, 1948, by Units

	Wheat		Flax		Barley		Oats	
	Cannon- ball %	Knife Under- River wood %	Cannon- ball %	Knife Under- River wood %	Cannon- ball %	Knife Under- River wood %	Cannon- ball %	Knife Under- River wood %
Total Supply								
(Jan. 1 - Dec. 31, 1948)								
Production, 1948 Crop	82	70	82	82	76	75	85	78
Jan. 1 Carry-over	17	28	16	16	23	24	13	25
Purchases	1	2	2	2	1	1	2	5
Total	100	100	100	100	100	100	100	100
Disposition								
Seed	8	6	4	5	6	5	6	4
Sold	62	55	75	75	27	32	17	5
Feed	1	-	-	-	31	37	13	54
Dec. 31 Carry-over	29	39	21	10	36	26	64	36
Inventory Change (Jan. 1 - Dec. 31, 1948)	+72	+39	+25	+190	+57	+8	+409	+41
								+30
								+148

Cultural Practices for Grains

Wheat - In the Cannonball unit most of the wheat is seeded on spring plowing. In 1948, 71 percent was seeded on spring plowing, 18 percent on summer fallow and 11 percent on corn ground. On spring plowing only one case reported plowing and seeding in the same operation. Twenty percent of the acreage was disced before seeding and 18 percent harrowed before seeding. Twenty-four percent of the acreage was harrowed after seeding. When wheat was seeded on summer fallow the land in all cases was disced or duckfooted before seeding. One farmer harrowed wheat on summer fallow after seeding. The cornground is disced before seeding.

Seventy-six percent of the total wheat acreage was combined, fifty-four percent was straight combined and twenty-two percent swathed before combining. Twenty-four percent of the total wheat acreage was threshed.

In the Knife River unit about 86 percent of the wheat acreage was planted on spring plowing and the remainder on summer fallow and corn ground. Of the acreage planted on spring plowing, 49 percent was plowed and seeded in the same operation. In preparing summer fallowed land in the spring the land was disced before seeding. There were no cases reporting dragging before or after seeding. Eighty-three percent of the wheat acreage was combined, 68 percent straight combined. Of the 17 percent threshed, about half was cut with a header and the other half with a binder.

In the Underwood unit 85 percent of the wheat acreage was planted on spring plowing and 15 percent on summer fallow and corn ground. The pony drill was used on 79 percent of the wheat acreage. When the spring plowing was done in a separate operation, the wheat was drilled right after plowing. One case reported discing and one reported dragging before seeding. In preparing the land in the spring after summer fallowing, the land was generally disced or duckfooted once before seeding. None of the cases reported dragging after the seeding operation. Ninety percent of the wheat acreage was harvested by combine and 10 percent was threshed. Of the total wheat acreage 53 percent was straight combined.

Oats - In the Cannonball unit 62 percent of the oat acreage was seeded on spring plowing and the remainder on summer fallow and corn ground. The spring plowing was seeded after plowing and only two cases reported harrowing before or after seeding. The summer fallow and corn land was disced before seeding. Sixty-six percent of the oat acreage was threshed and 34 percent combined, 19 percent straight combined.

Oats in the Knife River unit were planted on spring plowing, the land being plowed and then seeded. Forty-seven percent of the oat acreage was plowed and seeded in one operation. Eighty-nine percent of the oat acreage was threshed and 11 percent combined, 7 percent straight combined.

In the Underwood unit oats were planted entirely on spring plowing. Eighty-seven percent of the oat acreage was plowed and seeded in the same operation. When the plowing was done in a separate operation, the oats were seeded in the next operation. One case reported discing after plowing, and one case reported dragging after seeding. Eighty-eight percent of the oat acreage was combined, 33 percent straight combined.

Barley - Barley is handled about the same as for oats in each of the respective units.

Flax - In the Underwood unit the entire flax acreage was planted on spring plowing. Eighty-six percent of the total acreage was plowed and seeded in the same operation. All of the acreage was harvested by combine, 53 percent being straight combined.

Mechanization

One indication of the extent of mechanization on a farm is the number of tractors. In the Cannonball unit one of the farms studied did not have a tractor, 13 farms had one tractor, 11 farms had 2 tractors and 2 farms had 3 tractors. The average number of tractors per farm was 1.52. Forty-four percent of the farms had 2-plow tractors, 39 percent had 3-plow and 17 percent had 4-plow tractors. The reason for the high percentage of 2-plow tractors was that this size of tractor meets the farmer's needs for haying and cultivating corn better than a larger one. The amount of cropland that they have was not so great but what these tractors can handle it. The farms were pretty well supplied with machinery for preparing and planting seedbeds and for the haying operations. For harvesting grain, 41 percent of the farms reported no threshing machine or combine and relied on custom or exchange work for getting the job done.

In the Knife River unit one of the farms studied used horses exclusively as power for field operations. All other farms reported one and two tractors, averaging 1.48 tractors per farm. Seventeen farms reported one tractor, 15 farms had two tractors, one farm had three tractors and one reported no tractors. The 2-plow tractor was the most common size. Forty-one percent of the farms reported 2-plow tractors, 31 percent had 3-plow, 22 percent had 4-plow and 6 percent had 6-plow tractors. The 6-plow tractors were caterpillars. Farms having no combine or threshing machine amounted to 27 percent. Twenty-four percent of the farms had both a combine and a threshing machine. No farm reported more than one combine.

In the Underwood unit all of the farms studied reported tractors. Twenty-one farms reported having one tractor, 14 farms two tractors, two farms three tractors, two farms four tractors and one farm had five tractors. The average number of tractors per farm was 1.72. Three and four plow tractors were the most common. Twenty-five percent had 2-plow tractors, 39 percent had 3-plow and 36 percent had 4-plow tractors. Of the 39 farms, 85 percent had combines. One farm reported two combines and one reported having three. Two of the six farms without combines had a threshing machine. The 12-foot combine was the most common size.

Custom Work

Custom work for hire was common in the three units. In the Cannonball unit 48 percent of the farms reported having some work done by custom operation. Combining and threshing were perhaps the most common operation hired done. Other types of custom work hired included corn picking and hauling grain. Nine cases reported the work done by local people and five cases reported the custom work done by transient or people from outside the local community. Threshing and haying were the two most common jobs done by exchange work. Other types of work done by exchange included hauling livestock, combining, plowing, springs work and branding.

In the Knife River unit custom work for hire was reported by 36 percent of the farms. The most common operations were combining and threshing. Other types of custom work hired included corn picking, corn cutting and plowing. The custom work was performed by local people in all cases except one. Five farms reported doing work off the farm for hire. This included corn picking, threshing and plowing. The Knife River unit had 61 percent of the farms reporting exchange work, mostly for threshing. Other types of work exchanged included combining, haying and plowing.

About 40 percent of the farms reported having some custom work done on the farm in the Underwood unit. The types of custom work hired included combining, threshing, corn picking, swathing, baling hay and plowing. Eleven cases reported the work done by local people and five by transient custom workers. Combining and corn picking were the two most common operations performed. Six farms reported doing work off the farm for hire. The most common operation performed was combining. The Underwood unit had 14 farms reporting exchange work. Haying and combining were the two most common jobs done by exchange labor.

Livestock Enterprise

The numbers of livestock were reduced to a common denominator and expressed in animal units. One animal unit represents one

horse, cow, bull, steer, heifer, two head of other cattle, seven sheep, fourteen lambs, five hogs, ten pigs and one-hundred chickens. 1/

Table 20 shows the average number of animal units by type of livestock. Ninety-eight percent of the total animal units are roughage consuming livestock in all three areas. Eighty-two percent of the animal units are cattle in the Cannonball unit, 89 percent in the Knife River unit and 92 percent in the Underwood unit. In the Cannonball unit sheep amount to about nine percent of the total animal units. In the sample, two farms were large sheep farms so practically all the sheep were on these two farms. In general, sheep, hogs and poultry were very minor on these farms. The cattle are largely beef animals. Most farms milked only enough cows to get milk for family consumption.

Table 20. Distribution of Average Number of Animal Units by Type of Livestock.

Unit	Total Animal Units		Horses	Cattle	Sheep	Total		
	Average	Range				Roughage Consuming	Hogs	Poultry
Cannonball	107.17	15.86 - 275.80	7.22	88.31	9.47	105.00	1.57	.60
Knife River	49.94	0 - 141.60	3.30	44.61	.90	48.81	.98	.15
Underwood	44.42	0 - 371.40	2.79	40.76	.20	43.75	.47	.20

Table 21 shows the frequency distribution of the total animal units per farm. In general, the table shows that the farms in the Cannonball unit had large numbers of livestock per farm with the Knife River unit in the intermediate position.

1/See annual report of the Farm Management Service for TVA Phosphate-Fest Demonstration Cooperators in Northwestern Minnesota (March 1, 1946 to February 28, 1947). Mimeographed Report No. 165, Division of Agricultural Economics, University Farm, St. Paul, Minnesota. June 1947. p. 10.

Table 21. Frequency Distribution of the Animal Units Per Farm by Units

Animal Units	Cannonball Unit		Knife River Unit		Underwood Unit	
	No.	%	No.	%	No.	%
0	-	-	2	6	3	8
1.0 - 24.9	2	8	4	12	16	41
25.0 - 49.9	8	29	18	55	10	26
50.0 - 74.9	2	8	3	9	5	13
75.0 - 99.9	2	8	1	3	1	2
100.0 - 124.9	3	11	1	3	2	5
125.0 - 149.9	4	14	4	12	-	-
150.0 - over	6	22	-	-	2	5
Total	27	100	33	100	39	100

All farms in the Cannonball unit reported some livestock. Two farms in the Knife River unit reported no livestock. One farm was in the owner group and the other was in the tenant group. In the Underwood unit three farms reported no livestock and these farms were in the owner group.

On the average, the farms in the Cannonball unit grazed their permanent pasture at about one animal unit to 13.68 acres for 200 days. The stocking rate ranged from a low of 6.15 acres to a high of 30.49 acres per animal unit. In the Knife River unit the farmers, on the average, grazed one animal unit to 7.29 acres of permanent pasture for 177 days. The stocking rate ranged from a low of two acres to a high of 20.78 acres per animal unit. The average stocking rate of permanent pasture in the Underwood unit was 4.89 acres for 171 days. The stocking rate ranged from a low of 0.22 acres to a high of 36.00 acres per animal unit.

One must realize that pasture stocking rates vary within the same area depending on the soils and the topography of the land. About the only study that one can compare the above stocking rates with is the grazing studies carried on by the Northern Great Plains Field Station at Mandan.^{1/}

The studies carried on at Mandan were on native pasture. A 70 acre pasture was grazed at the rate of one two-year-old steer to seven acres, during the 20-year period 1916 to 1935. The amount of forage produced was ample to allow the steers to put on near the maximum gain per head. The native vegetation was not injured by this rate of grazing. The forage was sufficient to carry the cattle the full season, 150 days, during all years except for the severe drought of 1934 when it failed at the end of 120 days. The cattle

^{1/}Sarvis, J. T. Grazing Investigations on the Northern Great Plains. Agricultural Experiment Station, N. Dak. Agr. College, Fargo, in cooperation with the USDA Northern Great Plains Field Station, Mandan, N. Dak. Bulletin 308. Dec. 1941. pp 67-79--In terms of animal unit days the results are as follows: Mandan Station 21, Cannonball Unit 15, Knife River Unit 24, Underwood Unit 35.

grazing at the rate of one 2-year-old steer to seven acres made just as good gains as grazing at the rate of one 2-year-old steer to ten acres. The pastures were overgrazed when using one 2-year-old steer to five acres. Since farmers in general graze their pastures longer than the growing season, this would require a larger acreage per animal unit.

The type of livestock generally sold by the farmers in the three units was feeder cattle. Table 22 shows the average market weights by type of livestock sold.

Table 22. Average Market Weight by Type of Livestock.

Type of Livestock	Cannonball (lbs.)	Knife River (lbs.)	Underwood (lbs.)
Feeder cattle	709	710	700
Slaughter cattle	977	1,019	965
Bulls	-	-	1,525
Calves	550	225	367
Hogs	322	344	318
Pigs	193	218	188
Sheep	110	135	-
Lambs	85	96	-

Sioux City was the most common market in which cattle were sold from the Cannonball area and St. Paul and Mandan the next most common market. In the Knife River unit the local markets were most common, 1/ St. Paul next and West Fargo third. In the Underwood unit West Fargo was the principal market with the local markets at Garrison and Underwood next most common.

There was no correlation between the total labor on the farm and the size of the livestock enterprise. In some cases farms with little livestock had as much or more labor as farms with a large number of livestock. The size of the livestock enterprise depends more strongly upon the amount of permanent pasture and waste land than it does upon the amount of labor available.

Labor Input

Table 23 show the average and range in the hours put in by the various types of farm workers. On the average, the farms in the Cannonball unit put in more total hours than do the farms in the other two units. The reason for this is that the farms in the Cannonball unit have more livestock which require labor the year around (See appendix for the table showing the monthly man-hours by type of worker). The proportion of labor contributed by the operator, family and hired was about the same for all three units. Family labor included members of the operator's family who did work on the farm and were not paid for the work. For example, it included the work of the wife if she took care of the chickens or did other farm chores. Most of the farms are primarily dependent on operator and family labor.

1/These were Stanton, Beulah and Hazen.

Sixty-seven percent of the farms in the Cannonball unit reported having some hired labor, 64 percent in the Knife River and Underwood units. Six farms (22 percent) in the Cannonball unit reported a larger hired labor proportion than operator and family labor combined. Only one farm in the Knife River unit and two farms in the Underwood unit reported a larger hired labor proportion. On the basis of the type of labor used, there would be some question as to whether the farms with a larger proportion of hired labor than operator and family labor combined would meet the requirements of a family farm.

If one calculates the hourly wage by using the wages paid listed in Table 5 and the total hours of hired labor, the hourly wage is very much lower than that actually paid. This indicates that the hours the farmers estimated they worked are high. The wages paid are a more accurate figure since most farmers had a record of that.

Table 23. Labor Input by Type of Worker

Unit	Average and Range of Man-Hours of Labor 1/											
	Total			Operator			Family			Hired		
	Ave.	Low	High	Ave.	Low	High	Ave.	Low	High	Ave.	Low	High
Cannonball	7,151	1,734	14,282	3,641	1,734	4,550	1,433	0	7,600	2,077	0	7,508
Knife River	5,550	1,152	12,039	3,390	796	4,210	1,375	0	8,026	785	0	5,612
Underwood	5,912	2,355	17,312	3,275	1,644	4,816	1,490	0	7,970	1,147	0	7,680
	Percent Distribution											
Cannonball	100			51			20					29
Knife River	100			61			25					14
Underwood	100			55			25					20

1/As a standard of comparison, a year-round job in industry with 300 work days a year and an 8-hour day comprises 2,400 hours of labor. A yearly total of 3,400 hours represents a 63-hour week for 52 weeks, or a 10-hour day for 6 week days and 3 hours of chores on Sunday.

APPENDIX TABLE 1. Seasonal Distribution of Total Man-Hours of Labor, by Units

Month	Cannonball		Knife River		Underwood	
	Hours	%	Hours	%	Hours	%
January	413	6	288	5	277	5
February	392	6	269	5	264	4
March	440	6	340	6	308	5
April	649	9	576	10	648	11
May	690	10	573	10	668	11
June	685	10	568	10	591	10
July	805	11	625	11	692	12
August	867	12	685	12	785	13
September	794	11	587	11	610	10
October	519	7	465	9	446	8
November	454	6	300	6	330	6
December	443	6	274	5	293	5
Total	7,151	100	5,550	100	5,912	100

APPENDIX TABLE 2. Seasonal Distribution of Man-Hours of Operator's Labor, by Units

Month	Cannonball		Knife River		Underwood	
	Hours	%	Hours	%	Hours	%
January	221	6	195	6	174	5
February	211	6	180	5	165	5
March	231	6	208	6	189	6
April	368	10	359	11	356	11
May	377	10	360	11	362	11
June	350	10	334	10	312	10
July	368	10	352	10	343	10
August	380	10	357	10	361	11
September	359	10	350	10	338	10
October	296	8	304	9	281	9
November	244	7	199	6	208	6
December	236	7	192	6	186	6
Total	3,641	100	3,390	100	3,275	100

APPENDIX TABLE 3. Seasonal Distribution of Man-hours of Family Labor, by Units

Month	Cannonball		Knife River		Underwood	
	Hours	%	Hours	%	Hours	%
January	86	6	76	6	75	5
February	82	6	72	5	71	5
March	92	6	89	6	81	5
April	129	9	130	9	143	10
May	132	9	132	10	145	10
June	157	11	146	11	147	10
July	158	11	156	11	177	12
August	166	12	156	11	192	13
September	149	10	134	10	149	10
October	95	7	118	9	131	9
November	92	6	87	6	97	6
December	95	7	79	6	82	5
Total	1,433	100	1,375	100	1,490	100

APPENDIX TABLE 4. Seasonal Distribution of Man-Hours of Hired Labor, by Units

Month	Cannonball		Knife River		Underwood	
	Hours	%	Hours	%	Hours	%
January	106	5	17	2	28	3
February	99	5	17	2	28	3
March	117	6	43	6	38	3
April	152	7	87	11	149	13
May	181	9	81	10	161	14
June	178	9	88	11	132	11
July	279	13	117	15	172	15
August	321	15	172	22	232	20
September	286	14	103	13	123	11
October	128	6	43	6	34	3
November	118	6	14	2	25	2
December	112	5	3	-	25	2
Total	2,077	100	785	100	1,117	100

APPENDIX TABLE 5. Rates of Performance for Field Operations by Size of Implement

Implement	Number Reporting	Size	Man-Hours Per Acre	Gallons of Fuel Per Acre
Plow (moldboard)	7	2-plow	1.15	1.64
	26	3-plow	.80	2.00
	12	4-plow	.58	2.07
	1	5-plow	.60	1.75
Plow (one-way)	1	4-foot	.80	1.67
	2	7-foot	.43	1.40
	2	8-foot	.45	1.24
	4	10-foot	.42	1.19
	1	12-foot	.27	1.00
Plow, Pack & Drill	2	2-plow	1.17	2.08
	22	3-plow	.88	2.59
	22	4-plow	.62	1.99
	1	5-plow	.60	1.50
One-way & Drill	1	11-foot	.17	.50
Plow & Harrow	1	2-plow	1.17	1.67
Plow & Pack	2	2-plow	1.20	2.00
	2	3-plow	.79	2.00
	1	4-plow	.60	2.50
Disc	4	7-foot	.40	.80
	7	8-foot	.35	.91
	3	9-foot	.55	1.38
	17	10-foot	.38	.99
	1	15-foot	.28	.90
	1	21-foot	.24	.90
Disc & Drill	2	8-foot	.44	1.30
	8	10-foot	.31	1.17
Cultivator	1	8-foot	.46	1.00
	2	9-foot	.50	1.00
	9	10-foot	.31	.99
Cultivate & Drill	2	10-foot	.32	.95
Harrow (spike tooth)	1	15-foot	.43	.67
	1	18-foot	.12	.22
	1	20-foot	.22	.31
	1	22-foot	.12	.25
	2	26-foot	.17	.48
Harrow (spring tooth)	1	9-foot	.30	.75
Drill	1	8-foot	.60	.75
	2	9-foot	.34	.86
	28	10-foot	.33	.71
	5	11-foot	.36	.55
	3	12-foot	.28	.70
	2	14-foot	.20	.46
Drill & Harrow	1	10-foot	.40	1.20

(continued on next page)

APPENDIX TABLE 5. sheet 2

Implement	Number Reporting	Size	Man-Hours Per Acre	Gallons of Fuel Per Acre
Windrow	1	8-foot	.80	2.00
	6	10-foot	.32	.65
	16	12-foot	.38	.62
	2	14-foot	.27	.50
	5	16-foot	.22	.62
Combine	8	6-foot	.65	2.04
	5	8-foot	.74	1.32
	11	10-foot	.53	1.52
	31	12-foot	.47	1.63
	1	14-foot	.29	.86
	3	16-foot	.41	1.95
Binder	29	8-foot	.63	.90
	9	10-foot	.40	.76
Header	1	12-foot	.40	1.43
Thresher	6	22-inch	2.36	1.19
	21	28-inch	1.96	1.03

APPENDIX TABLE 6. New Machinery Prices for 1948, Northwest
North Dakota

Implement	Size	John Deere	Inter- national	Minneapolis- Moline
		Price	Price	Price
Tractor		Size	Size	Size
		A \$2,079	A \$1,425	R \$1,515
		B 1,688	C 1,650	Z 1,848
		D 2,565	H 2,000	U 2,319
		G 2,420	M 2,350	
		R 3,697	W-9 3,355	
	AR 2,045			
Moldboard Plow	2,14-inch	255	250	232
	3,14-inch	335	345	325
	4,14-inch	469	445	405
One-way Plow	6-foot	373	650	425
Disc, Tandem	10-foot	236	370	230
Disc, Single	11-foot	-	-	145
	15-foot	242	-	-
	18-foot	-	357	-
Field Cultivator, tractor mounted	8-foot	-	250	250
	10-foot	264	310	-
Rod Weeder	10-foot	178	-	-
Spike Tooth Harrow	20-foot	-	114	-
	25-foot	-	-	125
Spring Tooth Harrow	16-foot	-	-	160
Packer	3,14-inch	-	73	-
	4,14-inch	-	92	-
Drill	10-foot	-	575	662
	12-foot	556	650	-
Drill, Pony Press	3-plow	258	235	-
	4-plow	306	260	-
Grain Binder	8-foot	450	-	-
	10-foot	-	770	-
Swather	8-foot	-	-	435
	12-foot	682	850	-
	14-foot	-	-	660
	16-foot	800	-	-
Combine	6-foot	1,266	1,600	1,550
Combine, self-propelled	12-foot	4,678	3,300	2,500
Thresher	28-inch	2,399	-	-
Corn Planter	2-row	153	-	425
Corn Cultivator	2-row	202	-	-
Corn Binder	1-row	410	-	-
Corn Picker	2-row	1,288	-	1,250
Silage Cutter		590	-	-
Mower, horse	5-foot	177	-	-
Mower, tractor	7-foot	236	230	205
Rake, Dump	10-foot	108	-	-
	12-foot	-	115	114
Rake, Side Delivery	12-foot	-	-	240
Stacker		-	-	680
Pick-up Baler		2,010	-	2,550
Manure Spreader, horse		298	-	-
Manure Spreader, tractor		266	450	475
Sprayer	20-foot	-	-	415
Hammermill	10-inch	154	86	-
Elevator	28-foot	319	(less motor-	-
Cream Separator		-	190	-

APPENDIX TABLE 7. Prices Used in Arriving at Value for Livestock, Grains & Feeds, 1948

Item	Unit	Price <u>1/</u>	Price per Cwt. <u>1/</u>	Average Weight
		(dollars)	(dollars)	(pounds)
<u>Livestock</u>				
Dairy cows	head	\$195.60	---	1,039
Dairy heifers	head	137.76	20.50	672
Dairy calves	head	59.00	23.60	250
Dairy bulls	head	225.00	---	1,421
Beef cows	head	195.57	20.50	954
Heifers	head	137.76	20.50	672
Steers	head	155.18	20.50	757
Calves	head	59.00	23.60	250
Bulls	head	225.00	---	1,421
Sheep	head	8.94	8.60	104
Lambs	head	19.80	22.00	90
Hogs	head	72.27	21.90	330
Pigs	head	45.11	21.90	206
Chickens	head	0.96	0.24	4
<u>Grain</u>				
Wheat	bu.	2.03		
Oats	bu.	0.60		
Barley	bu.	1.09		
Flax	bu.	5.65		
Rye	bu.	1.28		
Corn	bu.	1.25		
<u>Seed Grain <u>2/</u></u>				
Wheat	bu.	2.50		
Oats	bu.	1.12		
Barley	bu.	1.98		
Flax	bu.	5.62		
Rye	bu.	2.20		
Corn	bu.	2.05		
<u>Livestock Products</u>				
Milk	cwt.	4.37		
Butterfat	lb.	0.80		
Eggs	doz.	0.36		
Wool	lb.	0.44		
<u>Feeds <u>3/</u></u>				
Salt	cwt.	1.53		
Calf meal	cwt.	6.60		
Chick mash	cwt.	5.69		
Mineral	cwt.	6.00		
Oyster shell <u>4/</u>	cwt.	1.14		
Chick concentrate	cwt.	6.01		
Laying mash	cwt.	5.79		

1/The 1948 prices received by North Dakota farmers.
2/The price received by farmers at seeding time, April and May.
3/Prices paid by North Dakota farmers.
4/Fargo price.

APPENDIX TABLE 8 Farm Budget Data for an Average Cannonball, Knife River and Underwood Farm, 1948.

Physical Structure of Farm Organization	Cannonball-	Knife River	Underwood
Total Acres Operated	2,217	833	842
Land Use Pattern			
Cultivated land, acres	423	327	514
Wild hay, acres	191	55	52
Permanent pasture, acres	1,592	442	232
Other, acres	11	9	14
Crop System			
Wheat, acres	176	160	230
Oats, acres	37	38	72
Barley, acres	31	22	18
Flax, acres	13	-	71
Corn, acres	57	40	40
Fallow, acres	35	36	53
Tame hay, acres	42	31	33
Rotation pasture, acres	13	-	24
Idle cropland, acres	19	-	3
Crop Yields (As reported by farmers)			
Wheat Bu. per seeded acre	13.0	15.6	14.3
Oats " " " "	27.3	32.7	32.8
Barley " " " "	19.4	23.0	22.6
Flax " " " "	9.6	10.8	9.1
Corn " " " "	28.6	31.9	29.0
Tame hay, tons	1.16	1.37	1.00
Wild hay, tons	.80	.84	1.13
Pasture Stocking Rate			
Perm. pasture, No. of A.U./Acre	13.0	7.29	4.89
Length of Stocking Season			
Permanent pasture, months	6.5	5.9	5.7
Livestock System			
Total animal units	107.17	49.94	44.42
Cattle	97.78	44.61	40.96
Horses	7.22	3.30	2.79
Hogs	1.57	1.53	.47
Poultry	.60	.50	.20
Number of breeding stock			
Cattle	63	23	32
Bulls	2	1	1
Hogs	7	5	2
Laying hens	50	45	20

APPENDIX TABLE 8. (continued)	Cannon- ball	Knife River	Under- wood
Livestock products produced			
Whole milk per year (gal.)	2,645	3,238	2,116
Eggs per year (dozens)	612	550	245
Labor force			
Operator (man-hours)	3,641	3,390	3,275
Family (man-hours)	1,433	1,375	1,490
Hired (man-hours)	2,077	785	1,147
Total	7,151	5,550	5,912
Machinery Inventory (Major Items)			
Tractor	3-plow	3-plow	4-plow
Tractor	2-plow	2-plow	3-plow
Moldboard plow	3-14"	3-14"	4-14"
Moldboard plow	2-14"	2-14"	3-14"
Disc (tandem)	10'	8'	10'
Drill	10'	10'	16'
Swather	--	12'	12'
Combine	12'	12'	12'
Corn planter	2-row	2-row	2-row
Corn cultivator	2-row	2-row	2-row
Truck	1½T	1½T	1½T
Mower (tractor)	7'	7'	7'
Stacker			
Rake	10'	10'	10'
Assets, Expenses and Income			
Asset Structure			
Value of land & buildings (including rented portions)	\$45,781	\$30,096	\$33,680
Value per acre	\$20.65	\$36.13	\$40.00
Value of buildings & fences	\$11,445	\$7,584	\$8,420
Value of machinery & Equipment	\$5,644	\$5,610	\$9,137
Value per acre	\$2.55	\$6.73	\$10.85
Value of livestock on farm, January 1	\$17,109	\$8,271	\$7,383
Total Structural Assets	\$68,534	\$43,977	\$50,200
Total per acre	\$30.91	\$52.79	\$59.62
Expenditure Structure			
Cash Operation Expense			
Seed	\$771	\$656	\$1,139
Seed cleaning & treating	\$15	\$11	\$26
Fuel, grease & oil	\$525	\$405	\$584
Machine repair	\$685	\$599	\$872
Auto	\$249	\$143	\$252
Truck	\$374	\$186	\$405
Custom work hired	\$310	\$104	\$226
Labor hired (wages)	\$884	\$247	\$668

APPENDIX TABLE 8. (continued)	Cannon- ball	Knife River	Under- wood
Feed bought	\$253	\$38	\$37
Livestock bought	\$730	\$281	\$185
Miscellaneous	\$62	\$6	\$18
Cash Maintenance Expense			
Land taxes	\$383	\$236	\$328
Personal property taxes	\$145	\$120	\$127
Insurance	\$223	\$148	\$311
Building & fence repair	\$379	\$253	\$735
Total Cash Expense	\$5,988	\$3,433	\$5,913
Total cash expense per acre	\$2.70	\$4.12	\$7.02
Int. on R.E. Inv. at 4%	\$1,831	\$1,204	\$1,347
Building depreciation	\$308	\$205	\$251
Int. on Machinery and livestock investment at 6%	\$1,366	\$833	\$991
Machinery depreciation	\$823	\$697	\$1,186
Room & board for hired labor	\$624	\$234	\$345
Total Farm Expense	\$10,940	\$6,606	\$10,033
Gross Income Structure			
Crops sold	\$11,786	\$5,821	\$12,807
Livestock	\$7,527	\$4,526	\$5,759
Livestock sold	\$6,731	\$3,163	\$5,232
Livestock products	\$796	\$1,363	\$527
Other	\$24	\$57	\$29
Total Gross Cash Income	\$19,337	\$10,404	\$18,595
Total gross income per acre	\$8.72	\$12.49	\$22.08
Value of home used products	\$318	\$304	\$278
Inventory changes	\$2,736	\$1,526	\$681
Total Gross Farm Income	\$22,391	\$12,234	\$19,554
Net Income			
Net cash income	\$13,349	\$4,294	\$12,682
Net cash income per acre	\$6.02	\$5.15	\$15.06
Net farm income	\$11,451	\$5,628	\$9,521
Net farm income per acre	\$5.17	\$6.76	\$11.31
Net income per man-hour of operator and family labor	\$2.26	\$1.18	\$2.00

RECENT PUBLICATIONS OF THE AGRICULTURAL ECONOMICS DEPARTMENT
North Dakota Agricultural College
Fargo, North Dakota

Bulletins

NO.

- 351 - Rural Communities and Organizations (1948), Anderson & Vergeront
352 - Barley Marketing (1948), L. W. Schaffner
353 - Land Values and the Land Market (1949), Schickele & Engelking
354 - Marketing Feeder Cattle (1949), B. H. Kristjanson
357 - Handbook of Facts about N. Dak. Agr. (1950), Kristjanson & Heltemes
360 - What About Our Large Farms in North Dakota? (1950), B.H.Kristjanson
362 - Stabilizing Farm Income Against Crop Yield Fluctuations (1950)
P. Thair
363 - Sugar beet Production in the Red River Valley (1950) R. Gilcreast
367 - Economics of Grain Farming in Renville County (1951), L.W.Schaffner

Agricultural Economics Reports

- Number 1 - Prospective Marketing Position of Farm Products (1951) J.C.Podany
" 2 - The Research Program in Agr. Economics and Rural Sociology (1951)
" 3 - Present Farm Economy in 3 Proposed Irrigation Areas (1951),
L. W. Schaffner

Articles (Reprints available upon request)

- North Dakota Farm Prices, P.V. Hemphill, in every Bimon. Bul.
Marketing Table-stock Potatoes, L.W.Schaffner, Bimon. Bul. Jan.-Feb. 1948
National Income and Demand for Dairy Products, R. Schickele, Bimon.
Bul. Jan.-Feb. 1948
Role of the Family Farm in Modern Society, R. Schickele, Bimon. Bul.
July-Aug. 1948
What Is Happening to Marketing Margins, R. Schickele, Bimon. Bul. Sept.-
Oct. 1948
Mechanization of Sugar Beet Production, R. Gilcreast, Bimon. Bul. Nov.-
Dec. 1948
The International Wheat Agreement, B.H.Kristjanson, Bimon. Bul. Mar.-
April 1949
Flaxseed Outlook for 1949, L.W. Schaffner, Bimon. Bul. Mar.-April 1949
North Dakota Farm Size Trends, Kristjanson & Schaffner, Jour. Farm Econ.
Feb. 1949
Comments on a Grass Roots Program, R. Schickele, Farm Policy Forum, April
1949
Variability of North Dakota Farm Income, R. Schickele, Bimon. Bul. July-
Aug. 1949
Livestock as an Income Stabilizer, R. Schickele, Bimon. Bul. July-Aug. 1950
Farm Business Survival Under Weather Risks, R. Schickele, Jour. Farm
Econ. Nov. 1949
Protect Farm Debtors Against Unnecessary Foreclosures, R. Schickele, Farm
Policy Forum, Aug. 1950
Farmers' Adaptations to Income Uncertainty, R. Schickele, Jour. Farm Econ.
Aug. 1950
Institutional Methods of Meeting Weather Uncertainty, Barber and Thair,
Journal of Farm Economics August 1950
Objectives of Land Policy, R. Schickele Ch.2 in Land Problems and Policies,
edit. by Timons and Murray, Iowa State College Press, 1950

Any of these publications will be mailed free upon request.