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ANALYSIS OF TAXES PAID BY NORTH DAKOTA FARM AND RANCH OPERATORS

**Glenn D. Pederson
Roger G. Johnson
Mir B. Ali
Randal C. Coon**

**Department of Agricultural Economics
North Dakota Agricultural Experiment Station
North Dakota State University
Fargo, North Dakota 58105**

PREFACE

This report presents an analysis of taxes paid by North Dakota farm and ranch operators. The authors conducted the study under North Dakota State University Experiment Station Project ND-3306. Description of the procedures used and major findings of the research project are contained in this report.

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Highlights

The level and distribution of federal, state, and local taxes paid by North Dakota farmers are reported in this study. Results are based on farm business records for 1981, 1982, and 1983. A computer model was developed to estimate income, self-employment, sales, fuel, and real estate taxes. Farm characteristics and taxes paid are summarized by type of farm (also by area for cash grain farms), size of farm and importance of non-farm income.

Farms included in the study are similar in type and geographic distribution to general farm characteristics reported in the 1982 Census of Agriculture for North Dakota. However, the farm operations analyzed had somewhat larger gross farm sales and fewer small farms than the Census, and contained proportionately fewer cash grain farms.

Results indicate that income as well as taxes vary considerably by type and size of farm. The median farm operator farmed 1,232 acres and had a gross income of \$98,000. The median household combined income (including farm profits, capital gains, and nonfarm income) totaled \$10,598. Median estimated total taxes paid were \$4,131 including \$1,330 in state taxes. An additional \$1,386 in real estate tax was assessed to landlords on rented land. Real estate tax represented the single largest tax category. The largest federal tax was the self-employment tax while the largest state tax was the sales tax.

Taxes paid increased from 1981 to 1983 due to a combination of tax rate increases and higher farm profits in 1983. Specialty crop (sugarbeets and potatoes) farm operators had higher income and paid more taxes than

other types of farmers. Red River Valley farmers paid higher taxes than cash grain farmers in other areas. Livestock farm operators (dairy and beef) generally paid less state and federal taxes than crop farmers.

Taxes as a percent of combined farm, nonfarm and capital gains income over the three years were 10.4 percent for federal taxes, 11.4 percent for state taxes, and 10.9 percent for real estate taxes paid directly by the farm operator. These ratios varied by type and size of farm.

ANALYSIS OF TAXES PAID BY NORTH DAKOTA FARM AND RANCH OPERATORS

National, state, and local taxation issues have received substantial public attention and scrutiny in recent years. Individuals and interest groups have expressed a need for tax simplification, tax-level reduction, and equitable distribution of the tax burden. At the same time federal, state, and local government units have seen the cost of providing public services rise with inflation while tax revenues have fallen below projected levels. Declining revenues in North Dakota were attributable to such factors as declining business activity, lower energy prices, and low agricultural commodity prices. In response to this complex problem legislative changes in the tax code are often based upon current available information on the level and distribution of taxes and projected revenues and impacts of alternative tax adjustments. The current tax information base needs to be periodically updated to provide current and adequate information to the legislative process. A partial remedy to this problem is to compile estimates of taxes paid by various taxpaying entities. This study focuses on taxes paid by North Dakota farm and ranch operators.

Study Objectives

The primary objective of this study is to estimate the level and distribution of income, sales, and real estate taxes paid by farm and ranch operators in North Dakota. Total taxes¹ were disaggregated into these major categories. Taxes were also reported by federal-state-local level designation to provide a better understanding of the significance of taxing entities among farmers and ranchers in the state.

A second objective is to measure impacts of those taxes on different types and sizes of farm and ranch operations. Impacts can be direct or indirect in nature and can be measured in numerous ways. This study attempts to assess only the direct impacts of taxes on the farm or ranch business.

Background

Farm business summaries from 1981, 1982, and 1983 were used to develop current farm-level estimates of taxes paid by farm operators. Unfortunately, that period does not characterize the "typical" farm economic situation in North Dakota or the nation. Farm earnings were generally depressed during 1981 and 1982 due to rising production costs and relatively low farm commodity prices. As a result, farm income tax liability and capital purchases were significantly reduced. Therefore, federal and state income taxes and state sales taxes paid by farmers

¹Federal excise taxes, notably those on tires and batteries, are not included in this study.

are lower than would have occurred in "normal" times. The 1983 farm income situation was significantly improved from the prior two years although capital purchases by farmers remained at low levels.

Evidence of reduced farm earnings appears in state-level farm income statistics. Table 1 contains North Dakota farm sector and per-farm income estimates for 1978 through 1983. Realized farm income estimates reflect farm earnings before changes in inventory value (due to changes in volume or price of farm crop and livestock held for sale). Since farm income taxes usually do not include tax on inventories (cash basis accounting), realized farm income is the appropriate measure of income for tax purposes. Higher farm production expenses offset stable realized gross farm income in 1981 and 1982, reducing total realized net farm income dramatically. Realized gross farm income greatly improved in 1983 due to the Payment-in-Kind (PIK) program for wheat and feed grain production and stronger commodity prices. Farm production expenses declined slightly in 1983, and total realized net farm income increased to \$858.5 million. Realized net farm income per farm reflected both the reduced farm profitability in 1981 and 1982, and the recovery of net farm income in 1983. Lower realized net farm income per farm translates into lower average taxable farm earnings and income taxes per farm in 1981 and 1982. The higher realized net farm income per farm in 1983 should be reflected in somewhat higher income taxes.

TABLE 1. NORTH DAKOTA FARM SECTOR INCOME AND EXPENSES, 1978-1983

Year	Realized Gross Farm Income	Farm Production Expenses	Realized Net Farm Income	Inventory Adjustment	Realized Net Farm Income Per Farm ^a	Net Farm Income Per Farm ^b
	million dollars				dollars	
1978	\$2,303.8	\$1,824.6	\$466.3	\$ 89.4	\$11,373	\$13,585
1979	2,558.1	2,127.2	430.8	5.6	10,638	10,775
1980	2,936.8	2,216.4	720.4	-475.3	18,010	6,130
1981	2,947.4	2,615.8	331.6	439.6	8,613	20,031
1982	3,076.4	2,758.4	318.0	61.4	8,595	10,254
1983	3,501.5	2,643.0	858.5	-206.8	23,521	17,852

^aNet farm income per farm before inventory adjustment.

^bNet farm income per farm after inventory adjustment.

SOURCE: U.S. Department of Agriculture, Economic Indicators of the Farm Sector: State Income and Balance Sheet Statistics, Economic Research Service, 1979-1984.

Reduced farm profitability has been reflected in the reduction in farm machinery and equipment sales in North Dakota. Table 2 contains the number of selected new farm machinery purchases and the corresponding total taxable sales of farm machinery and equipment in North Dakota between 1978 and 1983. The general trend of machinery sales has been down during that period. Farm machinery sales were slightly higher in 1981, but fell dramatically in 1982 and 1983. Resulting estimates of state sales taxes paid by farmers on capital purchases during those two years reflect the lower level of machinery sales.

TABLE 2. SALES OF SELECTED NEW MACHINERY ITEMS AND TOTAL TAXABLE SALES OF FARM MACHINERY, NORTH DAKOTA, 1978-1983

Year	Tractors	Combines ^a	Windrowers ^a	Total Taxable Sales
	- - - - - units - - - - -			- - - million - - -
1978	3,401	1,182	n/a	\$256.3
1979	3,562	1,383	922	n/a
1980	2,575	1,014	588	274.7
1981	2,772	1,352	762	389.0
1982	2,062	910	472	269.1
1983	1,845	682	319	226.9

^aSelf-propelled units only.

SOURCES: Intertec Publishing Corporation, Implement and Tractor, Kansas City, 1979-84; and North Dakota State Tax Department, Sales Tax Division, Bismarck, November 1984.

Description of Farm Records Data

Location, Size, and Type of Farms

The data used in this study came from annual farm business summaries compiled under the North Dakota Vocational Agriculture Farm Business Management Education Program (Gullickson and Holkup, 1981 to 1983 annual reports). Additional data were obtained to have better representation in the Red River Valley. Ten farm records were obtained through the North Dakota Farm Bureau and 27 farm records were obtained from the Farm Management Program at the Moorhead Area Vocational Technical School (northwestern Minnesota annual reports, 1981 to 1983). North Dakota tax rates were used for farms located in Minnesota.² Records from 231 farms were used for 1981, 1982, and 1983. All farms had records for 1981 and 1982, however, 33 farms did not have records for 1983.

Farm records were screened to assure accuracy by comparing cash receipts with cash outlays. Cash not accounted for (cash in not equal to cash out) had to be less than 10 percent of cash receipts for the farm to be included in the analysis. Since production from one year is often sold in subsequent years, a large change in farm size would distort sales for a given farm size.

²North Dakota sales, fuel and income tax rates were used for farms in Minnesota (for details, refer to section on North Dakota sales, fuel, and income tax). Real estate taxes calculated were based on county average agricultural land value and mill rate. County Average land value was the true and full value certified to the county by The North Dakota State Tax Department. The average land value and mill rate for Cass and Richland counties were used for farms located in Clay and Wilkin counties (Minnesota). Accordingly, the total operating expenses were adjusted using the assessed real estate tax for the operator.

Farms with more than a 40 percent change in total acres (from one year to another) were eliminated from the study to minimize the effect of dramatic changes in farm size. A few other farm records were eliminated due to a variety of data inconsistencies.

North Dakota was divided into four areas to represent areas with different yield levels, cropping patterns, and livestock numbers. Those areas are: Northwest (NW), Southwest (SW), East Central (EC), and Red River Valley (Valley) as shown in Figure 1. The predominant type of farming in each area is: wheat-fallow in the Northwest, ranching with crops in the Southwest, mixed crop-livestock in the East Central, and grain and specialty crops in the Valley (1982 Census of Agriculture, 1984).

The number of farm records used by areas for 1981, 1982, and 1983 totaled 660 (Table 3). The number of farms with either two or three years of records are shown in Tables 4, 5, and 6 by farming area, farm type, total sales, and total acres. Type of farming classification was based on the Census of Agriculture definition. For a farm to be classified as cash grain, specialty crop, dairy, or beef, at least 50 percent of total agricultural sales must come from that activity. The mixed farm classification included operations in which no single enterprise accounted for more than 50 percent of total sales.

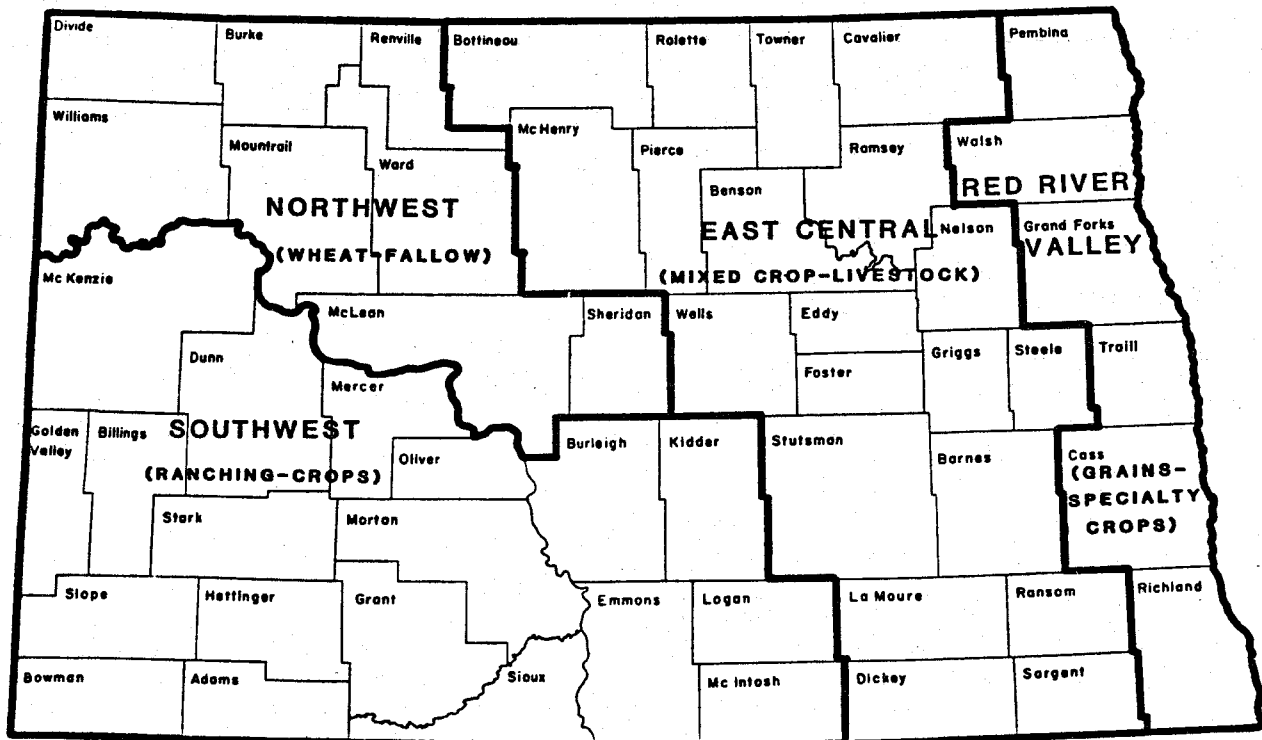


Figure 1. Type of Farming Areas in North Dakota

TABLE 3. NUMBER OF FARM RECORDS BY AREA, 1981-1983

Area	1981	1982	1983	Total
Northwest	21	21	16	58
Southwest	62	62	49	173
East Central	91	91	77	259
Valley	<u>57</u>	<u>57</u>	<u>56</u>	<u>170</u>
TOTAL	231	231	198	660

Cash grain is the principal type of farming in all areas (Table 4). Dairy and beef production is most important in the Southwest. Production of specialty crops (potatoes and sugarbeets) is confined to the Red River Valley.

TABLE 4. NUMBER OF FARMS BY TYPE AND AREA

Area	Cash Grain	Specialty Crop	Mixed	Dairy	Beef	Total
Northwest	14	0	6	0	1	21
Southwest	16	0	7	19	20	62
East Central	60	0	8	13	10	91
Valley	<u>45</u>	<u>10</u>	<u>1</u>	<u>1</u>	<u>0</u>	<u>57</u>
TOTAL	135	10	22	33	31	231

Farms were grouped according to sales of all agricultural products. About 50 percent of all farms were in the medium sale group, \$40,000 to \$99,999 (Table 5). The largest proportion of farms with sales greater than \$100,000 were found in the Valley, and farms with sales less than \$100,000 were most frequently located in the Northwest area.

TABLE 5. NUMBER OF FARMS BY AGRICULTURAL SALES AND AREA^a

Area	Total Agricultural Sales ^a				Total
	\$10,000- 39,999	\$40,000- 99,999	\$100,000- 249,999	Greater than \$250,000	
Northwest	6	11	4	0	21
Southwest	8	26	24	4	62
East Central	2	60	25	4	91
Valley	<u>4</u>	<u>19</u>	<u>26</u>	<u>8</u>	<u>57</u>
TOTAL	20	116	79	16	231

^aTotal sales of crops, livestock, and livestock products. Income from government payments, custom work, etc. is not included.

About 44 percent of the farms were in the 1,000 to 1,999 acre range and only 5 percent had less than 500 acres (Table 6). A majority of Valley farms had 500 to 999 acres, and a majority of the Southwest farms operated more than 2,000 acres.

TABLE 6. NUMBER OF FARMS BY TOTAL ACRES AND AREA

Area	Total Acres				Total
	180-499	500-999	1,000-1,999	Greater than 2,000	
Northwest	0	3	11	7	21
Southwest	2	9	22	29	62
East Central	4	28	49	10	91
Valley	6	29	19	3	57
TOTAL	12	69	101	49	231

Table 7 presents the number of farms by sales of all agricultural products and farm type. The medium sale group (\$40,000 to \$99,999 annual sales) was most common for all farm types except specialty crop farms. All specialty crop farms recorded total sales greater than \$100,000.

TABLE 7. NUMBER OF FARMS BY AGRICULTURAL SALES AND FARM TYPE

Type of Farming	Total Sales of All Agricultural Products				Total
	\$10,000-39,999	\$40,000-99,999	\$100,000-249,999	Greater than \$250,000	
Cash Grains	13	71	47	4	135
Specialty Crops	0	0	5	5	10
Mixed	1	13	7	1	22
Dairy	1	17	14	1	33
Beef	5	15	6	5	31
TOTAL	20	116	79	16	231

Some farm operators derive a substantial proportion of their total income from off-farm sources. The number of farms by nonfarm income group is presented in Table 8. Nonfarm income includes outside investment income, nonfarm employment earnings, personal income, and income tax refunds and is expressed as a percent of gross receipts. Gross receipts refer to total sales of crops, livestock, capital assets, custom work, miscellaneous farm income, and all nonfarm income. Nonfarm income was less than 5 percent of gross receipts for most farms in all areas. Only 11 percent of the farms had nonfarm income which exceeded 20 percent of gross receipts. High farm income was most common in the Southwest area.

TABLE 8. NUMBER OF FARMS BY NONFARM INCOME AS A PERCENTAGE OF GROSS RECEIPTS

Area	Nonfarm Income as a Percent of Gross Receipts		
	Less than 5%	5-20%	Greater than 20%
Northwest	11	9	1
Southwest	32	19	11
East Central	52	34	5
Valley	<u>29</u>	<u>20</u>	<u>8</u>
TOTAL	124	82	25

Farm Characteristics

Descriptive characteristics of the farms in the study are summarized in this section. Nine characteristics were chosen based on data which were either available from individual farm records or could be estimated from the available information. Summary statistics show money flows into and out of the farm business and household. Additionally, statistics are reported on the acreages of land operated and owned. The following characteristics are examined:

Gross farm income (includes sale of all agricultural products, government payments, patronage and gas tax refunds, custom work, and miscellaneous farm income)

Capital gains (includes capital gain on machinery, building, land, and breeding livestock)

Nonfarm income (includes outside investment income, nonfarm employment earnings, other personal income, and income tax refund)

Operating expenses (includes cash farm expenses and purchase of livestock for resale but excludes capital purchases)

Capital purchases (includes purchases of machinery, equipment, buildings and improvements and land)

Net farm profit (loss), (equals gross farm income minus operating expenses and depreciation)

Acres farmed

Tillable acres farmed

Acres owned

Descriptive statistics are reported for each farm characteristic at the median (50th percentile), the 25th, and the 75th percentile. The median represents the value above and below which half the observations fall.

One-fourth of the total farms fall below the 25th percentile and one-fourth of the farms fall above the 75th percentile. Values at the 25th and 75th percentiles give an indication of variability in the data.³

Data were tabulated by farm type, farm size (total sales), and nonfarm income groups. Summary statistics were not reported when farms in a group totaled less than ten. There were sufficient cash grain farms to summarize by area of the state. The other types of farming were summarized statewide. All specialty crop farms were located in the Valley.

Characteristics by Farm Type

Characteristics of cash grain farms in the four areas are presented in Table 9. Valley farms generated the most gross farm income and net farm profit. Nonfarm income, capital purchases, and capital gains income were highest in the Southwest area. Farm acreage was largest in the Southwest in contrast to the smallest acreages in the Valley. Tillable acres farmed were lowest in the East Central area.

Specialty crop farms generated the highest gross farm income and net profit of any farm type (Table 10). Also, a large proportion of land in specialty crop farms was tillable.

Characteristics of mixed farms, dairy farms, and beef operations are presented as statewide summaries in Tables 11, 12, and 13. The dairy farms had an average of 60 dairy cows per farm and the beef farms had an average of 168 beef cows per farm. Dairy farms generated higher gross income than either beef or mixed farms. Net farm losses were reported for the dairy and beef farms. However, the losses were offset by high capital gains primarily due to sale of mature breeding stock.

Characteristics by Sales Group

Farms were divided into four gross sale groups: small (\$10,000-39,999), medium (\$40,000-99,999), large (\$100,000-249,999), and very large (greater than \$250,000). Sales groups were based on crop and livestock sales and did not include other sources of gross farm income. Characteristics by sales group are presented in Table 14.

The majority of small farms had net losses. Small farms showed higher nonfarm income than any other sale group, and all other characteristics tended to increase with higher sales of agricultural products. The percentage of land owned was the lowest for small operations. The percentage of tillable acreage was highest for the very large group.

³Median and percentile statistics are presented rather than the mean (average) and range (high and low values) because the data often have a few very high values which distort the mean. Under these circumstances the median is a better measure of central tendency than the mean and the 25th and 75th percentile are better measures of dispersion than the range.

TABLE 9. CHARACTERISTICS OF CASH GRAIN FARMS BY AREA, 1981-1983

Item	Median	Percentile	
		25th	75th
Northwest Area (14 farms)			
Gross Farm Income	\$ 64,564	\$ 39,983	\$105,098
Capital Gains	\$ 613	\$ 0	\$ 2,840
Nonfarm Income	\$ 4,680	\$ 1,459	\$ 12,525
Operating Expenses	\$ 50,009	\$ 29,920	\$ 74,521
Capital Purchases	\$ 15,543	\$ 6,872	\$ 39,482
Net Farm Profit (Loss)	\$ 4,245	\$ (991)	\$ 10,801
Acres Farmed	1,362	1,050	1,786
Tillable Acres Farmed	1,084	882	1,149
Acres Owned	589	96	719
Southwest Area (16 farms)			
Gross Farm Income	\$128,100	\$ 49,890	\$206,701
Capital Gains	\$ 1,141	\$ 115	\$ 4,813
Nonfarm Income	\$ 14,109	\$ 7,767	\$ 29,670
Operating Expenses	\$ 97,899	\$ 44,611	\$148,909
Capital Purchases	\$ 30,725	\$ 18,467	\$ 76,504
Net Farm Profit (Loss)	\$ 4,282	\$(11,391)	\$ 14,376
Acres Farmed	2,032	1,392	3,375
Tillable Acres Farmed	1,514	950	2,284
Acres Owned	757	541	1,252
East Central Area (60 farms)			
Gross Farm Income	\$ 91,935	\$ 62,402	\$130,269
Capital Gains	\$ 831	\$ 67	\$ 2,972
Nonfarm Income	\$ 4,900	\$ 2,987	\$ 8,713
Operating Expenses	\$ 71,782	\$ 46,283	\$101,985
Capital Purchases	\$ 19,443	\$ 7,512	\$ 31,087
Net Farm Profit (Loss)	\$ 8,485	\$ (6,877)	\$ 17,797
Acres Farmed	1,224	965	1,649
Tillable Acres Farmed	970	739	1,387
Acres Owned	637	316	934
Valley Area (45 farms)			
Gross Farm Income	\$150,792	\$ 83,423	\$201,896
Capital Gains	\$ 78	\$ 0	\$ 1,469
Nonfarm Income	\$ 7,422	\$ 1,919	\$ 11,977
Operating Expenses	\$113,094	\$ 70,143	\$148,544
Capital Purchases	\$ 25,783	\$ 11,118	\$ 55,682
Net Farm Profit (Loss)	\$ 10,982	\$ (651)	\$ 25,746
Acres Farmed	880	682	1,220
Tillable Acres Farmed	877	637	1,127
Acres Owned	320	80	580

TABLE 10. CHARACTERISTICS OF SPECIALTY CROP FARMS, RED RIVER VALLEY, 1981-1983

Item	Median (10 farms)	Percentile	
		25th	75th
Gross Farm Income	\$250,562	\$211,289	\$375,874
Capital Gains	\$ 168	\$ 0	\$ 6,501
Nonfarm Income	\$ 4,567	\$ 2,502	\$ 12,852
Operating Expenses	\$213,670	\$128,763	\$314,603
Capital Purchases	\$ 66,049	\$ 18,802	\$ 93,263
Net Farm Profit (Loss)	\$ 26,963	\$ 4,372	\$ 38,224
Acres Farmed	1,011	781	1,291
Tillable Acres Farmed	952	774	1,291
Acres Owned	358	221	534

TABLE 11. CHARACTERISTICS OF MIXED FARMS, STATEWIDE, 1981-1983

Item	Median (22 farms)	Percentile	
		25th	75th
Gross Farm Income	\$ 81,784	\$ 58,036	\$119,017
Capital Gains	\$ 3,542	\$ 2,094	\$ 5,063
Nonfarm Income	\$ 5,114	\$ 2,227	\$ 10,615
Operating Expenses	\$ 80,765	\$ 53,318	\$114,852
Capital Purchases	\$ 17,467	\$ 7,971	\$ 36,298
Net Farm Profit (Loss)	\$ 685	\$(12,501)	\$ 11,417
Acres Farmed	1,295	833	2,146
Tillable Acres Farmed	944	597	1,211
Acres Owned	593	424	1,491

TABLE 12. CHARACTERISTICS OF DAIRY FARMS, STATEWIDE, 1981-1983

Item	Median (33 farms)	Percentile	
		25th	75th
Gross Farm Income	\$100,941	\$ 74,445	\$145,551
Capital Gains	\$ 7,663	\$ 4,223	\$ 12,910
Nonfarm Income	\$ 1,931	\$ 253	\$ 3,038
Operating Expenses	\$ 85,946	\$ 59,837	\$130,180
Capital Purchases	\$ 14,468	\$ 5,789	\$ 32,338
Net Farm Profit (Loss)	\$ (958)	\$(12,128)	\$ 11,600
Acres Farmed	1,120	767	1,756
Tillable Acres Farmed	652	437	935
Acres Owned	820	458	1,121

TABLE 13. CHARACTERISTICS OF BEEF FARMS, STATEWIDE, 1981-1983

Item	Median (31 farms)	Percentile	
		25th	75th
Gross Farm Income	\$ 86,278	\$ 54,678	\$173,731
Capital Gains	\$ 8,543	\$ 5,225	\$ 12,176
Nonfarm Income	\$ 6,783	\$ 1,347	\$ 14,499
Operating Expenses	\$ 90,895	\$ 52,509	\$178,413
Capital Purchases	\$ 18,326	\$ 7,021	\$ 27,855
Net Farm Profit (Loss)	\$ (8,973)	\$(30,504)	\$ 198
Acres Farmed	2,131	1,608	2,930
Tillable Acres Farmed	851	482	1,018
Acres Owned	1,510	797	1,991

TABLE 14. CHARACTERISTICS OF FARMS ACCORDING TO SALES OF AGRICULTURAL PRODUCTS, 1983-1983

Item	Median	Percentile	
		25th	75th
Small Farms with Sales of \$10,000 to \$39,999 (20 farms)			
Gross Farm Income	\$ 31,994	\$ 23,991	\$ 38,664
Capital Gains	\$ 778	\$ 0	\$ 2,521
Nonfarm Income	\$ 7,592	\$ 1,279	\$ 13,714
Operating Expenses	\$ 28,372	\$ 20,858	\$ 36,264
Capital Purchases	\$ 9,615	\$ 5,489	\$ 29,035
Net Farm Profit (Loss)	\$ (316)	\$ (9,666)	\$ 4,063
Acres Farmed	958	619	1,501
Tillable Acres Farmed	518	420	836
Acres Owned	138	0	510
Medium Farms with Sales of \$40,000 to \$99,999 (116 farms)			
Gross Farm Income	\$ 76,442	\$ 60,774	\$ 94,442
Capital Gains	\$ 2,416	\$ 293	\$ 5,172
Nonfarm Income	\$ 3,993	\$ 1,847	\$ 8,816
Operating Expenses	\$ 62,208	\$ 46,738	\$ 80,346
Capital Purchases	\$ 12,386	\$ 6,094	\$ 26,839
Net Farm Profit (Loss)	\$ 2,985	\$ (7,891)	\$ 11,720
Acres Farmed	1,051	783	1,501
Tillable Acres Farmed	791	563	978
Acres Owned	530	300	960
Large Farms with Sales of \$100,000 to \$249,999 (79 farms)			
Gross Farm Income	\$166,602	\$134,793	\$198,157
Capital Gains	\$ 2,017	\$ 102	\$ 6,109
Nonfarm Income	\$ 5,287	\$ 2,211	\$ 13,135
Operating Expenses	\$128,788	\$112,709	\$163,636
Capital Purchases	\$ 27,626	\$ 16,604	\$ 54,372
Net Farm Profit (Loss)	\$ 9,143	\$(12,049)	\$ 22,397
Acres Farmed	1,645	1,121	2,073
Tillable Acres Farmed	1,175	916	1,594
Acres Owned	790	430	1,132
Very Large Farms with Sales Greater than \$250,000 (16 farms)			
Gross Farm Income	\$357,667	\$290,872	\$418,239
Capital Gains	\$ 5,991	\$ 363	\$ 19,792
Nonfarm Income	\$ 5,885	\$ 3,070	\$ 14,495
Operating Expenses	\$290,840	\$240,558	\$388,909
Capital Purchases	\$ 74,841	\$ 35,896	\$ 95,520
Net Farm Profit (Loss)	\$ 23,182	\$ 21,060	\$ 31,889
Acres Farmed	1,685	1,227	3,054
Tillable Acres Farmed	1,363	965	2,175
Acres Owned	777	417	1,494

Characteristics by Percent of Nonfarm Income Earned

Three farm groups were identified based on the proportion which nonfarm income represented of gross receipts. Characteristics of those groups are reported in Table 15. Most of farms in the study had some nonfarm income. The high nonfarm income group (more than 20 percent) had less gross farm income and showed net farming losses. However, capital purchases of this group were higher than those with less nonfarm income.

TABLE 15. CHARACTERISTICS OF FARMS ACCORDING TO THE PERCENTAGE WHICH NONFARM INCOME COMPRISED OF GROSS RECEIPTS, STATEWIDE, 1981-1983

Item	Median	Percentile	
		25th	75th
Nonfarm Income Less than 5 Percent (124 farms)			
Gross Farm Income	\$117,982	\$ 78,684	\$182,999
Capital Gains	\$ 3,331	\$ 628	\$ 7,778
Nonfarm Income	\$ 2,390	\$ 1,043	\$ 3,942
Operating Expenses	\$ 97,780	\$ 64,453	\$140,250
Capital Purchases	\$ 23,543	\$ 9,177	\$ 40,250
Net Farm Profit (Loss)	\$ 4,719	\$ (6,687)	\$ 19,437
Acres Farmed	1,233	896	1,893
Tillable Acres Farmed	929	658	1,225
Acres Owned	681	320	1,121
Nonfarm Income Between 5 and 20 Percent (82 farms)			
Gross Farm Income	\$ 87,353	\$ 61,967	\$149,919
Capital Gains	\$ 1,555	\$ 0	\$ 4,383
Nonfarm Income	\$ 10,018	\$ 6,760	\$ 14,700
Operating Expenses	\$ 74,762	\$ 48,659	\$115,975
Capital Purchases	\$ 17,460	\$ 7,672	\$ 30,568
Net Farm Profit (Loss)	\$ 3,155	\$ (9,925)	\$ 12,388
Acres Farmed	1,243	874	1,962
Tillable Acres Farmed	966	631	1,216
Acres Owned	573	312	968
Nonfarm Income Greater than 20 Percent (25 farms)			
Gross Farm Income	\$ 49,457	\$ 28,801	\$100,831
Capital Gains	\$ 338	\$ 0	\$ 2,977
Nonfarm Income	\$ 17,581	\$ 11,623	\$ 33,574
Operating Expenses	\$ 49,642	\$ 28,372	\$ 87,400
Capital Purchases	\$ 26,216	\$ 7,601	\$ 41,211
Net Farm Profit (Loss)	\$ (6,394)	\$ (12,891)	\$ 4,295
Acres Farmed	1,007	842	1,693
Tillable Acres Farmed	774	482	1,004
Acres Owned	480	112	849

Comparison of Farm Records and Census of Agriculture Data

The farm records and the 1982 Census of Agriculture data were compared to determine if farms in the farm record systems were representative of all North Dakota farms. Farm records data were averaged over the 1981-1983 period, while Census data were for 1982. Comparisons of the percentage of total farms by farm type, total sales, and total acres were made and analyzed.

Farm Type and Area

The records data and the 1982 Census data each indicated that cash grain was the principal farm type (Table 16). However, there were fewer cash grain farms in all farming areas in the farm records data than in the agricultural census. The farm records data had a higher proportion of dairy farms than the Census (14 percent versus 5 percent). Specialty crops and mixed farm types also were more highly represented in the records data while beef farms had a similar presence in both.

TABLE 16. COMPARISON OF PERCENTAGE OF TOTAL FARMS BY FARM TYPE AND AREA, 1982 AGRICULTURAL CENSUS^a AND FARM RECORDS DATA, 1981-1983

Area	Farm Type					Total ^b
	Cash Grain	Specialty Crop	Mixed	Dairy	Beef	
Northwest						
Census	14.8	0.2	0.3	0.5	1.5	17.3
Records	6.1		2.6		0.4	9.1
Southwest						
Census	13.0	0.6	1.5	2.9	8.8	26.6
Records	6.9		3.0	8.3	8.7	26.8
East Central						
Census	32.2	0.2	0.7	1.6	2.8	37.5
Records	26.0		3.5	5.6	4.3	39.4
Valley						
Census	16.0	1.6	0.3	0.3	0.5	18.6
Records	19.5	4.3	0.4	0.4		24.7
TOTAL ^b						
Census	76.0	2.5	2.7	5.2	13.6	100.0
Records	58.4	4.3	9.5	14.3	13.4	100.0

^aIncludes farms with total agricultural sales of \$10,000 or more (28,488 farms).

^bPercentages are rounded to the nearest tenth of a percent and may not sum to 100 percent due to rounding.

Sales and Area

Farm distribution by sales and area in the records data and Census are presented in Table 17. Both data sources indicated a large proportion of farms in the medium sale group (\$40,000-99,999). The farm records data contained a higher proportion of farms in the large group compared to the Census. Small farms (\$10,000-39,999) had much less presence in the farm records data set than in the Census. Many Census farms in the \$10,000 to \$39,999 sale group were part-time farms or rural residences, rather than commercial farms.

TABLE 17. COMPARISON OF PERCENTAGE OF TOTAL FARMS BY SALES AND AREA, 1982 AGRICULTURAL CENSUS^a AND FARM RECORDS DATA, 1981-1983

Area	Total Agricultural Sales				Total ^b
	\$10,000- 39,999	\$40,000- 99,999	\$100,000- 249,999	Greater than \$250,000	
Northwest					
Census	8.3	6.4	2.0	0.2	16.9
Records	2.6	4.8	1.7		9.1
Southwest					
Census	13.6	10.2	3.1	0.4	27.3
Records	3.5	11.3	10.4	1.7	26.8
East Central					
Census	13.9	15.8	8.0	1.4	38.5
Records	0.9	26.0	10.8	1.7	39.4
Valley					
Census	5.1	6.1	4.4	1.7	17.4
Records	1.7	8.2	11.3	3.5	24.7
TOTAL ^b					
Census	41.0	37.9	17.5	3.7	100.0
Records	8.7	50.2	34.2	7.0	100.0

^aIncludes all farms (29,911 farms).

^bPercentages are rounded to the nearest tenth of a percent and may not sum to 100 percent due to rounding.

Sales and Farm Type

Comparison of percent of farms by agricultural product sales and farm type reported in the Census and the farm records is presented in Table 18. Generally, the representation of farms by total sale and farm type groups were similar in both data sources with the exception of farms in the small sale group. The farm records had a low representation of farms in the small group (9 percent versus 41 percent).

TABLE 18. COMPARISON OF PERCENTAGE OF TOTAL FARMS BY SALES AND FARM TYPE, 1982 AGRICULTURAL CENSUS AND FARM RECORDS DATA, 1981-1983

Area	Total Sales of all Agricultural Products				Total ^b
	\$10,000- 39,999	\$40,000- 99,999	\$100,000- 249,999	Greater than \$250,000	
Cash Grains					
Census	29.7	29.6	14.1	2.6	75.9
Records	5.6	30.7	20.4	1.7	58.4
Specialty Crops					
Census	0.7	0.5	0.6	0.6	2.5
Records	0.0	0.0	2.2	2.2	4.3
Mixed					
Census	0.9	1.3	0.5	0.1	2.7
Records	0.4	5.6	3.0	0.4	9.5
Dairy					
Census	1.2	2.9	1.1	0.1	5.2
Records	0.4	7.4	6.1	0.4	14.3
Beef					
Census	8.0	4.1	1.3	0.2	13.7
Records	2.2	6.5	2.6	2.2	13.4
TOTAL ^b					
Census	40.6	38.2	17.5	3.6	100.0
Records	8.7	50.2	34.2	7.0	100.0

^aExcludes abnormal farms (28,438 farms).

^bPercentages are rounded to the nearest tenth of a percent and may not sum to 100 percent due to rounding.

Total Acres

Farms were classified into four size groups based on total acreage operated using both farm records and Census data. The percent of farms in each category is given in Table 19. Both data sources indicated that the

TABLE 19. COMPARISON OF PERCENTAGE OF FARMS BY TOTAL ACRES FARMED AND AREA, 1982 AGRICULTURAL CENSUS AND FARM RECORDS DATA, 1981-1983

Area	Total Acres				Total ^b
	180-499	500-999	1,000-1,999	Over 2,000	
Northwest					
Census	2.2	5.3	6.9	2.9	17.2
Records	0.0	1.2	4.8	3.0	9.1
Southwest					
Census	3.0	7.4	10.4	6.4	27.5
Records	0.9	3.9	9.5	12.6	26.8
East Central					
Census	6.9	13.4	13.2	5.1	38.6
Records	1.7	12.1	21.2	4.3	39.4
Valley					
Census	4.9	6.1	4.3	1.4	16.7
Records	2.6	12.6	8.2	1.2	24.7
TOTAL^b					
Census	17.0	32.2	34.8	16.1	100.0
Records	5.2	29.9	43.7	21.2	100.0

^aIncludes farms with agricultural sales of \$10,000 or more.

^bPercentages are rounded to the nearest tenth of a percent and may not sum to 100 percent due to rounding.

largest proportion of farms were in the 1,000 to 1,999 acres size group. Small-sized farms (less than 500 acres) showed less representation while farms with 1,000 acres and over showed a higher representation in the farm records data than the Census of Agriculture.

Farm Tax Model

A computer model (TAXSIM) was developed to estimate the major taxes paid by farm and ranch operators based on farm business record summaries. Seven tax categories were identified: federal income tax, federal self-employment tax, federal fuel tax, North Dakota income tax, North Dakota sales tax, North Dakota fuel tax, and the local real estate tax. Tax categories were estimated separately and then combined for the total tax liability of each farm operator. Figure 2 provides an overview of the tax model and its components. The following material sequentially reviews assumptions used in developing the tax model and procedures used in tax estimation.

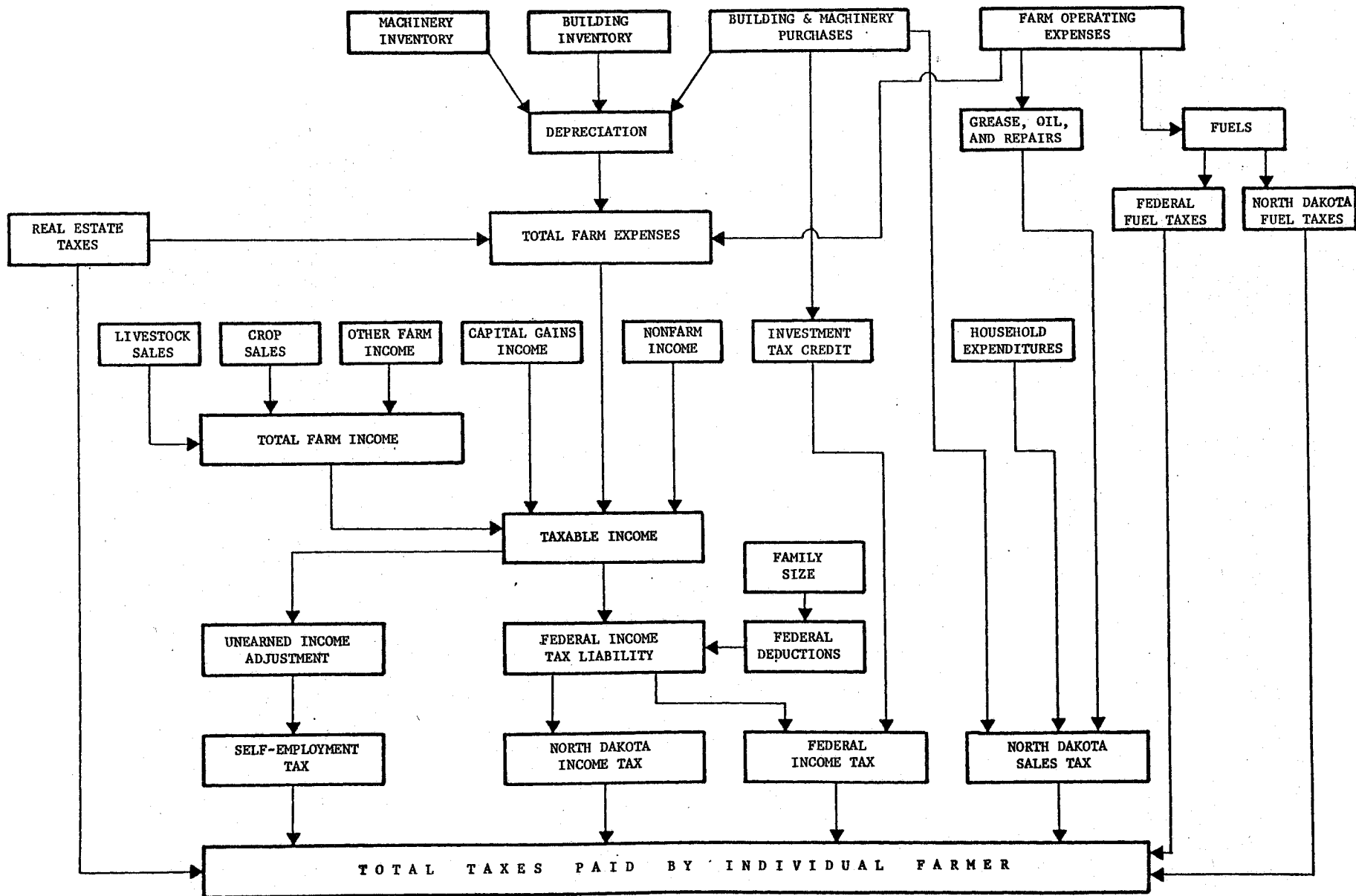


FIGURE 2. TAXSIM SCHEMATIC DIAGRAM

Taxable Income

Determining taxable income was central to the estimation of federal and state income taxes and the federal self-employment tax. Taxable income was defined as the sum of total farm, capital gains, and nonfarm income less total farm expenses. Total farm income equaled the sum of reported livestock and crop sales and other farm income during the calendar year. Nonfarm income included outside investment income, nonfarm employment earnings, and other nonfarm sources. Capital gains income was generated through sales of beef-breeding livestock, dairy livestock, machinery, buildings, and land. Unearned income in the form of mineral income (oil royalties, etc.) was considered as capital gains income. Actual capital gains information on machinery, buildings, and land sales was not available in the farm business records, therefore, additional assumptions were needed. The capital gain was assumed to qualify for long term capital gains treatment. Thus, 60 percent of the gain was exempted and the remaining 40 percent was subject to tax at the appropriate ordinary income tax rate.

Capital gains estimates on farm machinery and equipment sales assumed that the machinery was eight years old at the time of sale. Machinery was assumed to have an average depreciable life of 10 years. Residual (sale) price of machinery was assumed to be one-fourth of new machinery costs, or new machinery cost was four times the sale price of used machinery. Average basis in used machinery (as a percentage) was assumed to equal the ratio of the machinery price index for 1973-1975 to the machinery price index for 1981-1983. By combining these assumptions the ordinary income part of taxable long term capital gains on farm machinery equaled 0.66 times the market value of machinery sold in each year.

Capital gains income estimates for sale of farm buildings assumed a 40-year economic life and a 20-year depreciable life. Buildings were assumed to average 12 years old at the time of sale. Therefore, 70 percent of the economic life remained at the time of sale. Average value of new buildings was computed as the sale price of buildings divided by 0.70. Average basis in buildings (as a percentage) was assumed to equal the ratio of the building price index in 1970 to the 1982 price index. After combining the ordinary income and the ordinary income component of long term capital gain, the taxable income on farm building sales equaled 0.47 times the value of farm buildings sold in each year.

Capital gains income generated through sale of land was estimated by assuming land "turned over" on average after 12.5 years. The average basis in land was computed separately for 1981, 1982, and 1983. For example, the basis percentage for land sold in 1981 was equal to the state average value of land in 1969-1970 divided by the state average value of land in 1981. The resulting percentages were 0.2186 (1981), 0.2167 (1982), and 0.2331 (1983). The ordinary income component of taxable capital gains on land sold in each year was equal to (1.0 minus the basis percentage in that year) times the value of land sold in that year, all multiplied times 0.40.

Capital gains income from sale of beef-breeding and dairy livestock was estimated directly from reported sales. The simplifying assumption was that livestock sold had a zero basis (were raised on the farm). This assumption may tend to overstate capital gains and understate ordinary

income on livestock operations where a significant amount of the herd is purchased. Thus, the tax liability may be underestimated on some farms. The ordinary income component of each capital gains estimate was added to total farm and nonfarm income to determine gross taxable income of the farm operator.

Total farm expenses were subtracted from the gross taxable income estimate to determine taxable income. Farm expenses included farm operating expenses, real estate taxes paid, and estimated depreciation on machinery and building inventories and purchases during the year. Annual depreciation on livestock was assumed to be zero, since all beef and dairy cows were assumed to be raised on the farm. Farm operating expenses and real estate taxes paid were reported in the individual farm business summaries. Depreciation was calculated assuming an average remaining depreciable life of five years (10-year actual depreciable life) for machinery and equipment, and a 7.5-year remaining depreciable life on buildings (15-year actual life). Machinery purchases were added to beginning annual value of machinery inventories to estimate average annual machinery value. Average value of buildings was computed in an identical manner. Annual machinery depreciation equaled average machinery value multiplied by 0.20. Annual building depreciation equaled average building value multiplied by 0.133.

Federal Income Tax

The farm operator's federal income tax liability was estimated by subtracting the standard federal deduction per dependent from the taxable income estimate. Farm records indicated the number of dependents which could be claimed each year. Federal income tax liability was computed on a cash receipts and disbursements basis throughout the analysis. The federal tax liability for each year was calculated using the federal tax tables for married individuals filing a joint return. Investment tax credit (ITC) was computed at 10 percent of new machinery and equipment purchases during the year (assuming 100 percent of the purchase qualified for the tax credit).

The investment tax credit was subtracted from the estimated federal income tax liability to determine the federal income tax due. Adjustments to federal income tax liability captured the tax-reduction benefits of loss carry-forward, income averaging, investment tax credit carry-forward/carry-back, and tax sheltering which prudent farm operators would use as tax management strategies. Income averaging requires that five years of taxable income be used as the base of the average. Since only three years of farm records were available, the full effect of averaging high and low income years could not be shown. Nonetheless, loss carry-forward and income averaging were found to play a role in some farm income situations. In years where excess investment tax credit was generated through the purchase of capital items the farm operator was assumed to carry-back the excess ITC to recover taxes paid in prior years (up to three years carry-back is allowed) and/or reduce taxes paid in subsequent years.

Farm operator contributions to individual retirement accounts (IRA) also were assumed to occur when the operator's federal income tax approached or exceeded \$10,000. The maximum \$4,000 IRA contribution was assumed when the federal income tax exceeded \$10,000. A \$2,000

contribution was assumed when the federal income tax fell between \$8,000 and \$10,000. Federal income taxes were reduced by the amount of the IRA contribution for operators who qualified.

North Dakota Income Tax

The state income tax was estimated from the federal income tax liability each year (prior to deduction of the investment tax credit) assuming the operator filed the "short-form" return. A \$100 state energy credit deduction was allowed as a deduction from the federal tax liability in 1981 and 1982, but not in 1983. The state tax rate, as a percentage of the federal tax liability, was 7.5 percent in 1981 and 1982, but 10.5 percent in 1983.

Self-Employment Tax

Federal self-employment (social security) taxes were estimated based on farm and nonfarm earnings excluding capital gains income and other unearned (outside investment) income. The self-employment tax rate was a flat rate of 9.3 percent in 1981 for earnings less than \$29,700. The rate was 9.35 percent in 1982 and 1983 for earnings less than \$32,400 (1982) and \$35,700 (1983). The self-employment tax rate was zero above those earned income limits.

North Dakota Sales Tax

The state general sales tax has two rates--one for farm machinery, equipment and buildings purchased, and another (higher rate) for all other taxable items. The general sales tax rate on farm machinery, equipment, and building purchases was 2 percent in 1981 and 1982. The rate on these farm purchases was raised to 3 percent in 1983. Other purchases were subject to a general state sales tax of 3 percent in 1981 and 1982, and a 4 percent rate in 1983.

Farm business summaries included several items which were subject to the higher sales tax rate, including; meals purchased away from home, various household expenses, repairs, and grease and oil purchases. Twenty-five percent of the food and meals purchased was assumed to be purchased away from home and, therefore, was subject to the general sales tax. In addition, farm business and family monthly telephone service is a state sales tax item. A combined monthly business-personal rate was assumed and the resulting annual state sales tax was estimated.

Farm repair expenditures were divided into (1) machinery and equipment repairs, and (2) real estate repairs. Machinery and equipment repairs included; machinery, tractor, livestock equipment, irrigation equipment, and custom-work equipment repair expenses. Repair parts are subject to the sales tax, but not repair labor. Therefore, repair expenditures were separated into parts and labor categories. A survey of North Dakota implement dealers indicated that parts comprise approximately 75 percent of the total cost of repairs (including parts sold for repair on the farm). The general sales tax rate was applied to 75 percent of total

repair expenditures. Real estate repairs were assumed to be done using farm labor, therefore, 100 percent of those expenditures were assumed to be materials and subject to the sales tax.

Expenditures for fuel, oil, and grease were reported as a single amount in the annual farm business summary. This expenditure was allocated to four accounts: (1) oil and grease, (2) diesel fuel, (3) gasoline for farm use, and (4) gasoline for road use. Expenditures for oil and grease were assumed to equal 15 percent of total fuel expenditures. Therefore, oil and grease expenditures represented 13 percent of combined oil, grease, and fuel expenditures. Fuel expenditures, therefore, represent 87 percent of the total. Total fuel expenditure was separated into: diesel fuel (64 percent of total fuel cost), farm-use gasoline (5.6 percent), and road-use gasoline (30.4 percent) based on a recent study of farm fuel and energy use (Tsigas 1981). Personal road-use of gasoline was assumed to average 625 gallons per year. Average gasoline and diesel fuel prices were obtained from published sources (North Dakota Crop and Livestock Reporting Service).

Fuel Taxes

Gasoline and diesel fuel are subject to state and federal fuel taxes. Diesel fuel is taxed on a value basis, (percent of the price per gallon) while gasoline is taxed on a volume (per gallon) basis. Diesel fuel was subject to the state fuel tax at 2 percent of the dollar purchase amount in 1981, 1982, and 1983. Diesel fuel was not subject to the federal fuel tax. Farm-use gasoline was subject to the state fuel tax at \$0.01125/gallon in all three years. No federal fuel tax was imposed on farm-use of gasoline. Road-use gasoline was subject to a state fuel tax of \$0.08/gallon in 1981 and 1982. The state fuel tax on road-use gasoline increased to \$0.13/gallon in July, 1983. The federal fuel tax on road-use gasoline was \$0.04/gallon in 1981 and 1982, and increased to \$0.09/gallon in April, 1983. Road-use gasoline purchases were assumed to be equally distributed throughout the year.

Real Estate Tax

The farm real estate tax was estimated in two categories--tax paid by the operator and tax assessed to the landlord. This breakdown was used because real estate taxes paid by the landlord were not reported and it was not clear what proportion of the tax assessed to the landlord is in effect paid by the tenant-operator through the rental arrangement. Real estate taxes paid by the operator were reported in the farm business summary. However, the farm real estate taxes paid does not reflect the real estate tax liability of the farm operator when the operator is delinquent in payment of the tax.⁴ Therefore, the operator's reported real estate tax paid understates the operator's tax liability.

⁴Since real estate taxes are deductions from income, one tax management strategy is to delay payment of real estate taxes in low income years and pay more than one year's tax in years of high income.

Real estate taxes assessed to the whole farm and the amount assessed to the landlord also were estimated. Taxes assessed were estimated using county-average agricultural land value estimates and the county average mill rates applicable for farm real estate in 1981, 1982, and 1983. County-average agricultural land values were the true and full values certified to the counties by the state Tax Department. Real estate taxes paid by the operator, taxes assessed to the landlord (on rented land), and taxes assessed on the whole farm (owned and rented) were reported.

Results

The farm business record summaries and the tax model provide a wealth of statistics for analysis. Most significant are the estimated taxes paid by tax category (federal, state, local) according to type, size, area, and related farm designations. This section examines estimated taxes paid by farm group designation and relates tax statistics to farm income and acreage characteristics. Two tax totals are presented--all state taxes and all taxes. All taxes include federal and state income taxes, federal and state fuel taxes, state sales taxes, and real estate tax paid by the operator on owned land. All state taxes include state income, fuel, and sales taxes.

Taxes and Characteristics Over the Three-Year Period

The mean, the median, and the 25th and 75th percentile tax estimates and selected farm characteristics are presented for the three-year period in Table 20. Estimates indicate that no federal income tax would have been paid by most farms studied. The small amount of federal income taxes paid were due to use of investment credit and the capital gains treatment of some sales as well as low farm earnings over the period. In spite of this a fourth of the farmers paid \$1,008 and higher federal income taxes over the three-year period. The median farmer did pay some state income taxes over the three years mainly because investment tax credits do not apply to state income taxes. Mean tax estimates indicate that the average federal income taxes paid by farmers was \$1,495. The corresponding mean state income tax was \$216 per farm operator during 1981-83.

State sales taxes and federal self-employment taxes are about equal at the median. The 25th and 75th percentile numbers indicate, however, that the sales tax has less variability among farmers than the self-employment tax. All state taxes represented about one-third of the total taxes paid by the farmers and ranchers studied. Real estate taxes paid by farm operators represent the single largest tax category. Median real estate taxes comprised about one-third of the median total tax bill for the three years analyzed. By comparison, slightly more than one-third went for the three state taxes and slightly less than one-third went for all federal taxes. Considering both the real estate tax paid by the operator and the tax assessed to the landlord, the total real estate tax approximated 60 percent of all taxes. Real estate taxes go for local school and government support.

TABLE 20. ESTIMATED TAXES AND FARM CHARACTERISTICS OVER THREE-YEAR PERIOD, 1981-1983

Item	Mean (231 Farms)	Median	Percentile	
			25th	75th
<u>Taxes</u>				
Federal				
Income	\$ 1,495	\$ 0	\$ 0	\$ 1,008
Self Employment	1,105	985	317	1,756
Fuel	139	121	92	163
State				
Income	\$ 216	\$ 53	\$ 0	\$ 243
Sales	1,046	848	610	1,275
Fuel	356	313	227	414
Real Estate				
Paid by Operator	\$ 1,461	\$ 1,154	\$ 511	\$ 1,901
Assessed to Landlord	1,587	1,386	548	2,301
Assessed to Farm	3,182	2,790	1,911	3,910
All Taxes Paid by Operator ^a	\$ 5,818	\$ 4,131	\$ 2,436	\$ 6,292
All State Taxes ^a	1,618	1,330	963	2,003
<u>Farm Characteristics</u>				
Gross Farm Income	\$127,999	\$98,085	\$ 63,837	\$166,307
Capital Gains	\$ 5,122	\$ 2,210	\$ 179	\$ 5,661
Nonfarm Income	\$ 8,207	\$ 4,987	\$ 1,956	\$ 11,637
Operating Expenses	\$106,232	\$83,116	\$ 51,819	\$126,264
Capital Purchases	\$ 30,538	\$20,597	\$ 8,099	\$ 38,989
Net Farm Profit (Loss)	\$ 2,179	\$ 3,401	\$ (9,197)	\$ 16,050
Acres Farmed	1,485	1,232	876	1,880
Tillable Acres Farmed	1,024	923	637	1,209
Acres Owned	792	606	312	1,059

^aAll taxes do not equal the sum of the individual tax estimates for the median and percentiles, since the all tax estimate was computed separately. Those paying the median amount of all taxes do not necessarily pay the median amount for each individual tax.

Taxes and Characteristics by Year

Median estimates of farm taxes and characteristics are reported by individual year in Table 21 (for mean estimates, refer to appendix Table 1). The primary reasons for no federal income tax even with improved income in 1983 was the use of investment credit carry over from previous years. The self-employment tax was the most important federal tax and increased each year as rates and farm earnings subject to the tax increased.

TABLE 21. ESTIMATED MEDIAN TAXES AND FARM CHARACTERISTICS FOR THE YEARS 1981-1983

Item	1981	1982	1983
Number of Farms	231	231	198
<u>Taxes</u>			
Federal			
Income	\$ 0	\$ 0	\$ 0
Self Employment	462	808	1,171
Fuel	94	98	184
State			
Income	\$ 0	\$ 5	\$ 46
Sales	811	715	908
Fuel	285	296	347
Real Estate			
Paid by Operator	\$ 1,081	\$ 1,086	\$ 1,284
Assessed to Landlord	1,318	1,251	1,437
Assessed to Farm	2,771	2,618	2,903
All Taxes ^a	\$ 3,368	\$ 3,700	\$ 4,467
All State Taxes ^a	1,248	1,124	1,398
<u>Farm Characteristics</u>			
Gross Farm Income	\$ 92,734	\$101,962	\$111,408
Capital Gains	\$ 1,870	\$ 1,943	\$ 1,350
Nonfarm Income	\$ 4,447	\$ 4,381	\$ 4,239
Capital Purchases	\$ 19,683	\$ 12,664	\$ 8,514
Net Farm Profit (Loss)	\$ 2,425	\$ 4,349	\$ 7,309
Acres Farmed	1,170	1,220	1,214
Tillable Acres Farmed	895	930	928
Acres Owned	606	640	635

^aAll taxes do not equal the sum of the individual tax estimates for the median and percentiles, since the all tax estimate was computed separately. Those paying the median amount of all taxes do not necessarily pay the median amount for each individual tax.

Although the estimated median sales tax per farm was quite stable in the years analyzed, it was lower in 1981 and 1982 than in 1983 in part due to a rate increase. The state sales tax was clearly the largest single state tax category for farmers. The state tax on fuel was less important than the state sales tax, but also showed stability during the 3-year period. The estimated median state income tax paid by farmers and ranchers in the state was zero in 1981, only \$5 in 1982, and somewhat higher (\$46) in 1983. The median real estate tax increased to \$1,284 in 1983, but was quite stable in both 1981 and 1982.

Median gross farm income and net farm profit increased in 1982 and again in 1983. Nonfarm income, total acres farmed, and acres owned were stable. Total capital purchases declined in 1982 and 1983. The decline in total capital purchases from 1981 to 1983 was 57 percent.

Taxes by Farm Type

Estimated median taxes by type of farming are summarized in Table 22 (for mean estimates, refer to Appendix Table 2). The characteristics of these farms were shown in Tables 9 through 13. Specialty crop farm operators in the Red River Valley paid more total taxes and taxes of all types than other types of farms. Among the cash grain farms, Valley farm operators paid more taxes than those in other areas. Livestock farm operators (dairy and beef) generally paid less federal and state taxes than cash grain and specialty crop farmers. Beef farm operators paid more real estate tax than dairy operations as expected, primarily due to the larger land requirement for grazing. Generally, mixed farm operators paid federal and local taxes similar to that of beef ranches. The exception was the self-employment tax which claimed a greater amount from earnings on mixed farming operations.

Taxes by Sales Group

Farm operators were classified into four groups based on total agricultural sales. Median taxes by sales group are given in Table 23 (for mean estimates, refer to Appendix Table 3). Generally, farmers in the larger sales groups paid more federal, state, and local taxes than those with less agricultural product sales. These farm operators also had higher farm profits, and farmed more land (see Table 14 for farm characteristics).

Taxes by Percent of Nonfarm Income Earned

Median taxes were calculated for three groups of farm operators based on the proportion which nonfarm income comprised of gross farm receipts (Table 24) (for mean estimates, refer to Appendix Table 4). Median statistics indicated that the farmers in the high nonfarm income group paid more income and self-employment taxes than lower nonfarm income groups, but less fuel and real estate taxes. Characteristics of farms by percent of nonfarm income were presented in Table 15.

Taxes and Characteristics by Percent of Land Owned

Farms were divided into three groups based on proportion of land owned: low (0 to 25%), medium (25 to 75%), and high ownership (75 to 100%). Median taxes and farm characteristics by ownership group are reported in Table 25 (for mean estimates, refer to Appendix Table 5). Farms in the medium ownership group were generally larger and more profitable and paid more state and federal taxes. Real estate tax paid by medium ownership operators was less than that paid by the high ownership group. Farms with land ownership less than 25 percent had the most nonfarm income and the lowest capital gains income. The lower capital gains income indicated fewer livestock were being raised.

TABLE 22. ESTIMATED MEDIAN TAXES BY FARM TYPE, 1981-1983

	Type of Farm							
	Cash Grains				Specialty Crops	Dairy	Beef	Mixed
	NW	SW	EC	Valley				
Number of Farms	14	16	60	45	10	33	31	22
<u>Taxes</u>								
Federal								
Income	\$ 0	\$ 455	\$ 0	\$ 243	\$2,884	\$ 0	\$ 0	\$ 0
Self Employment	942	1,472	1,260	1,286	2,156	207	115	864
Fuel	100	140	125	138	220	105	117	131
State								
Income	65	239	102	176	560	0	0	27
Sales	644	1,241	783	992	1,827	807	776	757
Fuel	262	343	331	346	562	257	278	332
Real Estate								
Paid by Operator	546	1,564	1,105	1,457	1,573	918	1,431	1,214
Assessed to Landlord	1,567	1,562	1,396	2,434	2,710	436	865	952
Assessed to Farm	2,228	3,703	2,615	3,926	4,175	1,597	2,783	2,353
All Taxes Paid by Operator ^a	\$2,433	\$6,768	\$4,381	\$5,810	\$10,296	\$2,545	\$2,602	\$3,368
All State Taxes ^a	983	1,808	1,326	1,652	2,805	1,029	1,141	1,093

^aAll taxes do not equal the sum of the individual tax estimates for the median and percentiles, since the all tax estimate was computed separately. Those paying the median amount of all taxes do not necessarily pay the median amount for each individual tax.

TABLE 23. ESTIMATED MEDIAN TAXES BASED ON SALES OF AGRICULTURAL PRODUCTS
1981-1983

Item	Total Sales of all Agricultural Products			
	Small \$10,000- 39,999	Medium \$40,000- 99,999	Large \$100,000- 249,999	Very Large Greater than \$250,000
Number of Farms	20	116	79	16
<u>Taxes</u>				
Federal				
Income	\$ 0	\$ 0	\$ 0	\$ 20
Self Employment	454	807	1,282	1,589
Fuel	78	108	152	259
State				
Income	\$ 18	\$ 33	\$ 160	\$ 405
Sales	449	718	1,187	2,067
Fuel	185	270	410	699
Real Estate				
Paid by Operator	\$ 218	\$ 1,048	\$ 1,631	\$ 2,727
Assessed to Landlord	1,576	1,159	1,843	2,603
Assessed to Farm	1,907	2,318	3,905	5,724
All Taxes Paid by Operator ^a	\$ 1,839	\$ 3,194	\$ 5,484	\$10,772
All State Taxes ^a	629	1,087	1,884	3,331

^aAll taxes do not equal the sum of the individual tax estimates for the median and percentiles, since the all tax estimate was computed separately. Those paying the median amount of all taxes do not necessarily pay the median amount for each individual tax.

TABLE 24. ESTIMATED MEDIAN TAXES GROUPED BY PERCENT OF NONFARM INCOME, 1981-1983

Item	Nonfarm Income as a Percent of Gross Receipts		
	Low (Less than 5%)	Medium (5-20%)	High (Greater than 20%)
Number of Farms	124	82	25
<u>Taxes</u>			
Federal			
Income	\$ 0	\$ 0	\$ 742
Self Employment	934	1,002	1,324
Fuel	123	126	95
State			
Income	\$ 36	\$ 64	\$ 141
Sales	875	780	848
Fuel	324	313	227
Real Estate			
Paid by Operator	\$ 1,212	\$ 1,128	\$ 962
Assessed to Landlord	1,332	1,543	1,272
Assessed to Farm	2,939	2,711	2,374
All Taxes Paid by Operator ^a	\$ 3,861	\$ 4,426	\$ 4,290
All State Taxes ^a	1,331	1,339	1,245

^aAll taxes do not equal the sum of the individual tax estimates for the median and percentiles, since the all tax estimate was computed separately. Those paying the median amount of all taxes do not necessarily pay the median amount for each individual tax.

TABLE 25. ESTIMATED MEDIAN TAXES AND FARM CHARACTERISTICS GROUPED BY PERCENT LAND OWNED, 1981-1983

Item	Land Owned as a Percent of Total Land		
	Low (0-25%)	Medium (25-75%)	High (75-100%)
Number of Farms	60	106	65
<u>Taxes</u>			
Federal			
Income	\$ 0	\$ 0	\$ 0
Self Employment	1,009	1,276	555
Fuel	113	137	107
State			
Income	\$ 79	\$ 132	\$ 11
Sales	841	989	690
Fuel	282	341	275
Real Estate			
Paid by Operator	\$ 338	\$ 1,391	\$ 1,605
Assessed to Landlord	2,605	1,531	239
Assessed to Farm	2,906	3,221	2,086
All Taxes Paid by Operator ^a	\$ 3,042	\$ 5,029	\$ 3,898
All State Taxes ^a	1,242	1,633	1,063
<u>Farm Characteristics</u>			
Gross Farm Income	\$ 85,310	\$124,002	\$88,446
Capital Gains	\$ 1,313	\$ 2,070	\$ 3,863
Nonfarm Income	\$ 7,168	\$ 5,065	\$ 3,445
Operating Expenses	\$ 71,430	\$ 96,032	\$74,248
Capital Purchases	\$ 19,889	\$ 26,412	\$ 9,525
Net Farm Profit (Loss)	\$ 4,713	\$ 7,988	\$ (955)
Acres Farmed	1,033	1,378	1,225
Tillable Acres Farmed	909	972	767
Acres Owned	80	682	1,020

^aAll taxes do not equal the sum of the individual tax estimates for the median and percentiles, since the all tax estimate was computed separately. Those paying the median amount of all taxes do not necessarily pay the median amount for each individual tax.

Taxes and Characteristics by Tax Group

Estimated median taxes and farm characteristics were averaged over the period and sorted into low and high tax groups according to all state taxes. All state taxes were used to sort farms into groups because a major focus of the study was to relate state taxes paid to selected farm characteristics. Farm operators were arrayed from low to high in total dollars

TABLE 26. ESTIMATED MEDIAN TAXES AND FARM CHARACTERISTICS CLASSIFIED BY AMOUNT OF STATE TAXES PAID, 1981-1983

Item	Level of State Taxes Paid		
	Low	Medium	High
Number of Farms	58	115	58
<u>Taxes</u>			
Federal	\$ 0	\$ 0	\$ 460
Income	398	979	1,982
Self Employment	89	124	186
Fuel			
State			
Income	\$ 5	\$ 52	\$ 371
Sales	446	865	1,784
Fuel	214	316	482
Real Estate			
Paid by Operator	\$ 603	\$ 1,133	\$ 1,984
Assessed to Landlord	680	1,397	2,213
Assessed to Farm	1,711	2,745	4,232
All Taxes Paid by Operator ^a	1,906	3,937	8,586
All State Taxes ^a	739	1,330	2,627
<u>Farm Characteristics</u>			
Gross Farm Income	\$54,457	\$96,977	\$194,755
Capital Gains	\$ 2,934	\$ 2,501	\$ 620
Nonfarm Income	\$ 3,116	\$ 4,474	\$ 8,296
Operating Expenses	\$47,173	\$82,779	\$141,892
Capital Purchases	\$ 7,222	\$20,597	\$ 57,371
Net Farm Profit (Loss)	\$ 118	\$ 1,162	\$ 20,852
Acres Farmed	869	1,232	1,625
Tillable Acres Farmed	577	935	1,387
Acres Owned	479	604	709

^aAll taxes do not equal the sum of the individual tax estimates for the median and percentiles, since the all tax estimate was computed separately. Those paying the median amount of all taxes do not necessarily pay the median amount for each individual tax.

of state taxes paid. They were separated into three groups consisting of the 25 percent paying the least taxes, the half paying medium taxes, and the 25 percent paying the most state taxes. The high state tax group had more gross farm income, more nonfarm income, and higher capital purchases than lower taxpaying groups. These farm operators also paid significantly more self-employment, state sales, and real estate taxes. Capital gains income was less in the high tax group as compared with the low or medium tax groups. This is chiefly because livestock farmers tended to be in the low state tax paying group.

Tax Model Validation

Accuracy of the tax estimates by farm size, type, and location reflect the accuracy of the farm records data and validity of the assumptions used in model development. Limited information is available at the state level on state income taxes paid by individuals reporting farming as their primary occupation. An aggregate tax estimate was derived from the model and compared with actual tax collection data provided by the North Dakota Tax Department.

A comparison of state income tax totals indicated that the model under-estimated total taxes by 13.9 percent for 1981-82, and by 18.6 percent for 1981-83 (Appendix Table 7). The model estimate of total taxes paid was developed by multiplying the 1982 census distribution of farms (by sales class) times the median state income tax estimate for each sales class, then summing the class estimates. Actual collections in 1981-82 were \$4,622,150 compared with \$3,980,910 estimated using the model. Actual collections in 1981-83 were \$5,940,767 compared with \$4,834,800 from the model.

Several factors may be contributing to model underestimation. Model assumptions may slightly understate taxable income or overstate how effectively farm operators manage their tax liability. Another possible source of the underestimate is that farm records used represent younger farmers (on average) who typically carry higher debt levels than the typical farm operator. Younger, higher-leveraged operators have additional business expenses (viz., interest) and lower average taxable incomes. Correspondingly, state income tax collections from farmers may be overstated since some who report farming as their primary occupation may be farm owners and not farm operators. There were 38,890 state tax returns from people indicating farming as their occupation while the 1982 Census indicated only 36,400 farm operators including those with less than \$10,000 gross sales.

Tax Impacts

Several difficult issues arise in assessing the impacts of various federal, state, and local taxes. Restricting the analysis to the direct impacts simplifies the problem greatly but leaves many questions unanswered. One question is, what is the relevant basis for comparing the tax burden of different farmers? Tax analysts often use "ability to pay" as a criterion, and measure that ability according to income generated after various deductions and credits have been allowed. This section reviews the direct tax impact on farm and ranch operators of federal, state, and local tax estimates on the basis of combined farm and nonfarm income. Combined income is the sum of (1) net farm profit (loss), (2) capital gains income (before adjustment for exclusion), and (3) nonfarm income.

Direct tax impact was measured as the ratio of estimated taxes paid by major tax category (federal, state, local) to combined income. The tax ratio which resulted should be interpreted as a gross, average tax level, not as an effective tax rate. The reason for this interpretation is that real estate taxes and business-related sales taxes are deductible expenses of the farm business. Since these deductions reduce taxable income and

income tax liability the corresponding tax impact ratios will slightly overstate the effective tax impacts. The reader is also cautioned against comparing the calculated tax ratios with federal and state marginal tax rates, since the income base used in computing the ratio has not been adjusted downward for capital gains treatment, personal exemptions, or tax credits.

Only estimated taxes paid directly by the farm operator were included in the analysis. Indirect taxes (e.g., through land rental arrangements) were not considered, but could be computed if certain assumptions were made. No attempt was made to evaluate the equity of the tax impacts.

Impacts by Year

Computation of the ratio of total federal taxes paid to combined income indicated that farm and ranch operators paid out an average 10.4 percent of their income in the form of federal taxes over the three years (Table 27). The corresponding yearly percentages were somewhat lower in 1981 and 1982 reflecting lower farm earnings. Due to higher farm income and corresponding higher self-employment earnings subject to taxes, the federal tax ratio was up to 10.5 percent in 1983. Federal taxes represented 31 percent of all direct taxes paid during the 1981-1983 period.

TABLE 27. ESTIMATED TAXES PAID BY MAJOR TAX CATEGORY AND YEAR AS A PERCENT OF COMBINED INCOME

Year	Federal	State	Local	Combined Income
	- - - - percent - - - -			
1981	6.4	14.3	12.4	\$ 8,742
1982	8.5	10.5	10.2	10,673
1983	10.5	10.8	10.0	12,898
1981-83	10.4	12.5	10.9	10,598

The ratio of total state taxes paid to incomes during those three years averaged 12.5 percent. The individual year, state tax ratios fluctuated around that level in 1981, 1982, and 1983. Combined state (income, sales and fuel) taxes comprised 37 percent of the total taxes paid by farm operators in those three years. The reasons for the state tax ratio remaining relatively stable while the federal tax ratio was low in 1981 and 1982 was the low farm incomes generated in those years and deductibility of investment credit from the federal tax due. Also, a substantial part of the state tax was state sales tax, which remained relatively stable in all three years. The state sales tax was relatively stable even though farm capital purchases declined in 1982 and again in 1983. This was in part due to the offsetting nature of the 1 percent increase in the state sales tax rate which occurred in 1983.

Estimated local farm real estate taxes comprised the remaining 32 percent of taxes paid by farm and ranch operators during 1981-1983. The ratio of real estate taxes to combined income averaged 10.9 percent over the 3-year period. The individual-year ratios for real estate taxes paid was higher in 1981, but fell slightly in 1982 and 1983. Since real estate taxes were quite stable during this period, variability in the ratio is due primarily to fluctuations in net farm profits. Real estate tax to income ratios overstate the tax impact for this category, since real estate tax payments are a deductible farm expense and effectively reduce the net farm profit estimate.

Impacts by Farm Type

Federal, state, and local tax impacts varied considerably by farm type, and in the case of cash grain farmers by location in the state (Table 28). The average federal tax to income ratio for cash grain farmers varied from 10.9 percent in the Northwest to 9.0 percent in the Valley. Southwest and East Central cash grain farm ratios were 10.6 and 9.7 percent, respectively. Specialty crop farmers in the Valley paid the highest proportionate federal taxes. The federal tax ratio for specialty crop farmers was 16.6 percent. Dairy and beef operations had the lowest federal tax ratios during the 1981-1983 period at 3.6 percent and 3.7 percent, respectively. Mixed farm operations were approximately the same as cash grain operations. Dairy, beef, and mixed farmers all had a significant amount of livestock and received capital gains earnings which offset low farm profits or farm losses during the three years analyzed.

TABLE 28. ESTIMATED TAXES PAID BY MAJOR TAX CATEGORY AND FARM TYPE AS A PERCENT OF COMBINED INCOME

Farm Type	Federal	State	Local	Combined Income
	- - - - percent - - - -			
Cash Grain:				
Northwest	10.9	10.3	4.8	\$ 9,538
Southwest	10.6	9.3	8.0	19,532
East Central	9.7	9.3	7.8	14,216
Valley	9.0	8.9	7.9	18,482
Specialty Crop	16.6	8.8	5.0	31,698
Dairy	3.6	11.9	10.6	8,636
Beef	3.7	17.9	22.5	6,356
Mixed	10.7	11.7	13.0	9,341

The combined state tax to income ratio for cash grain farmers was more uniform across areas of the state than was the case of the federal ratio. Estimated ratios varied from a high of 17.9 percent for beef to a low of 8.8 percent for specialty crop farm operators.

Local real estate tax to income ratios were highest for beef and mixed farming operations. Those ratios were 22.5 percent for beef farms and 13.0 percent for mixed farm operations. Those higher percentages were associated with relatively high proportions of owned land and relatively low farm earnings. Specialty crop farmers in the Valley had a low ratio due to their high income. Cash grain farm real estate tax ratios varied from 7.9 percent in the Valley to 4.8 percent in the Northwest area.

Impacts by Farm Sales Group

Federal taxes as a percent of combined income varied slightly by farm size category (Table 29). Farm sale groups were defined as: small (\$10,000 to \$39,999 sales), medium (\$40,000 to \$99,999 sales), large (\$100,000 to \$249,999 sales), and very large (over \$250,000 sales). The small-farm, federal tax ratio averaged 6.6 percent during 1981-1983. The corresponding average federal ratios for other farm sizes were: 9.7 percent for medium, 8.7 percent for large, and 5.3 percent for very large farms. The reason for the lower federal tax ratio of very large farms was the relatively higher percentage of beef operations in that size category. Beef farms showed significant operating losses in the 1981-1983 period. The median loss on beef farms was \$8,973. As a result, self-employment taxes were zero since they are based on farm earnings.

TABLE 29. ESTIMATED TAXES PAID BY MAJOR TAX CATEGORY AND FARM SALES GROUP AS A PERCENT OF COMBINED INCOME

Sales Group	Federal	State	Local	Combined Income
	- - - - percent - - - -			
Small	6.6	7.8	2.7	\$ 8,054
Medium	9.7	11.6	11.2	9,394
Large	8.7	11.5	9.9	16,447
Very Large	5.3	9.5	7.8	35,058

The combined state tax ratios varied in a similar pattern. The medium farm average state tax ratio was the highest at 11.6 percent. Ratios for other farm sizes were: 7.8 percent (small), 11.5 percent (large), and 9.5 percent (very large).

The local real estate tax ratio varied from 2.7 percent for small to 11.2 percent for medium farms. The large differences were primarily attributable to differences in the total acres owned. Small farms owned 138 acres and farmed 958 acres, while medium farms owned 530 acres and farmed 1,051 acres.

Impacts of Tax Rate Increase

A potential use of the tax simulation model is to estimate the gross tax impacts of legislative changes in tax rates by size and type of farm. For instance, the gross tax increase associated with a percent increase in

the state sales tax was estimated. These tax increases represent the gross increase. A significant tax increase might induce a farmer to buy less of the higher taxed item, thereby reducing the tax impact below the gross level reported here.

Sales Tax Increase

A one percent sales tax increase was simulated for 1983. Results of that estimation are shown in Tables 30 and 31. The median sales tax increase for specialty crop operators was the largest at \$435. The lowest increase was among dairy operators. The median increase among cash grain operations varied between \$200-\$350. As expected, those operations which are more heavily crop-oriented would experience the largest sales tax increase due to the relatively larger purchases of machinery, equipment, buildings, and parts. The one percent sales tax rate increase translates into a relatively uniform 25 percent increase in sales taxes paid across farm types.

TABLE 30. POTENTIAL IMPACTS OF A ONE-PERCENT INCREASE IN THE STATE SALES TAX IN 1983 BY FARM TYPE

Farm Type	Median Sales Tax ^a		Change
	Before	After	
Cash Grain:			
Northwest	\$ 787	\$1,007	\$220
Southwest	1,285	1,635	350
East Central	815	1,015	200
Valley	1,121	1,428	307
Specialty Crops	1,728	2,163	435
Dairy	694	876	182
Beef	857	1,069	212
Mixed	776	969	193

^a189 Farms

TABLE 31. POTENTIAL IMPACTS OF A ONE-PERCENT INCREASE IN THE STATE SALES TAX IN 1983 BY FARM SALES GROUP

Sales Group	Median Sales Tax ^a		Change
	Before	After	
Small	\$ 571	\$ 705	\$134
Medium	680	847	167
Large	1,161	1,478	317
Very Large	1,805	2,265	460

^a189 Farms

Sales tax increases were also reviewed by farm sales group. Tax estimates contained in Table 31 indicate that the largest potential dollar increase would be among the very large farms. Median sales tax increases varied from \$460 for very large farms to \$134 for small farms. The percentage increase in the sales tax was 23.5 percent for small farms, 24.6 percent for medium farms, 27.3 percent for large farms, and 25.5 percent for very large farms. The slightly lower percentage increase for very large farms when compared with large farms is due to the changing composition of farms. The very large farm group contained a relatively higher percentage of beef operators.

Income Tax Increase

Impacts of a one percent increase (an increase in the percent of the Federal tax due before certain adjustments) in the 1983 state income tax produced minor increases in the median state income tax estimate. The largest increase was \$52 for specialty crop operators. Valley cash grain operators would experience a \$16 increase. Other farms would have less than a \$10 increase in state income tax. Large and very large farm operators would pay an \$18 increase in median state income taxes. Other sizes of farm would not be affected by the income tax increase.

Conclusions

The objective of this study was to estimate the level and distribution of income, sales, and real estate taxes paid by farm and ranch operators in North Dakota. That objective has been realized in this study through the estimation of those major tax categories from individual farm and ranch business summaries for 1981 to 1983. A secondary objective was to measure the direct impacts of those taxes on farm and ranch operators. That objective has been attained in part through an analysis of the ratio of taxes paid to combined farm and nonfarm income of those farms and ranches.

The three years analyzed were not typical for the state's farm sector, however, certain general conclusions can be drawn from the analysis. First, the major farm taxes are concentrated in the local real estate tax, state sales tax, and the federal self-employment tax. A comparison of those taxes in the three years analyzed indicated that on average the state sales tax accounted for 21 percent, the self-employment tax accounted for 24 percent, and real estate taxes 28 percent of all taxes paid by farm operators in the state. Sales and real estate taxes represented 36 and 48 percent, respectively, of combined state and local taxes paid during 1981-1983.

The federal self-employment tax was considerably lower for livestock farms due to the exclusion of capital gains from breeding livestock sales from income subject to this tax. Farms with large off farm incomes also tended to pay more self-employment tax.

A second general conclusion of this study is that taxes and their impacts vary considerably by type and size of farm. Since the state sales tax and the local real estate tax are primary farm taxes, those two taxes can be used as examples. Sales taxes are paid in proportion to the

purchase of farm capital (machinery, equipment, buildings, parts, etc.). Farms which are capital intensive (e.g., cash grain and specialty crop farms) pay relatively more state sales taxes than other types of farms. This study indicated that predominantly cash crop farms paid about 20 percent more state sales tax than did farms which had livestock as the major farm enterprise. No attempt was made to compare these two general classes of farms holding size constant.

Real estate taxes paid by the operator varies by size of farm, and the proportion and quality of land owned. Farm real estate taxes varied considerably across the state. Cash grain operators, beef, and mixed enterprise farm operators all paid higher real estate taxes than other operations on average due to a combination of size, and land quality or location differences.

Some limitations of this study need to be considered. A comparison of the farm operators in the study with those reported in the agricultural census indicated that the farm operators in this study formed slightly larger farms and ranches. Secondly, additional years of farm records would have improved the estimates of taxes paid by farmers and ranchers. Since few years in agriculture are "typical," additional years of farm records information would be useful in the estimation process. Third, several assumptions were necessary in developing components of the tax model. Actual taxes paid were not available to compare with the model estimates, therefore, the accuracy of the tax estimates could only be determined by comparing total state income tax collections with the model estimate of total taxes paid. The correspondence between the two aggregate numbers was reasonably good. In lieu of using actual individual-farm tax data, tax specialists, farm management specialists, farmers and ranchers, and other knowledgeable professionals were consulted. The resulting model incorporates assumptions which are considered to be representative of farm business and tax management practices in the state. Should actual tax data become available, that information can be used to test the model more fully. The model now appears to be a useful tool for analyzing farm-level impacts of changes in various federal, state, and local taxes.

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APPENDIX TABLE 1. ESTIMATED MEAN TAXES AND FARM CHARACTERISTICS FOR THE YEARS 1981-1983

Item	1981	1982	1983
Number of Farms	231	231	198
<u>Taxes</u>			
Federal			
Income	\$ 1,459	\$ 1,276	\$ 1,606
Self-Employment	865	1,100	1,413
Fuel	110	112	207
State			
Income	187	173	303
Sales	1,074	932	1,169
Fuel	339	343	393
Real Estate			
Paid by Operator	1,396	1,406	1,659
Assessed to Landlord	1,594	1,512	1,701
Assessed to Farm	3,193	3,056	3,355
All Taxes Paid by Operator	\$ 5,570	\$ 5,341	\$ 6,750
All State Taxes	1,600	1,448	1,865
<u>Farm Characteristics</u>			
Gross Farm Income	\$119,395	\$125,837	\$145,419
Capital Gains	4,713	5,542	4,600
Nonfarm Income	7,542	8,332	8,617
Operating Expenses	100,575	107,352	113,435
Capital Purchases	36,786	28,054	24,026
Net Farm Profit (Loss)	(495)	(1,313)	11,999
Acres Farmed	1,463	1,481	1,474
Tillable Acres Farmed	1,014	1,032	1,017
Acres Owned	781	782	797

APPENDIX TABLE 2. ESTIMATED MEAN TAXES AND FARM CHARACTERISTICS BY FARM TYPE, 1981-1983

	Type of Farm							
	Cash Grains				Specialty Crops	Dairy	Beef	Mixed
	NW	SW	EC	Valley				
Number of Farms	14	16	60	45	10	33	31	22
<u>Taxes</u>								
Federal								
Income	\$ 966	\$ 1,896	\$ 1,259	\$ 2,721	\$ 6,778	\$ 91	\$ 524	\$ 269
Self Employment	1,021	1,513	1,267	1,552	1,957	496	531	836
Fuel	104	167	131	154	227	115	129	137
State								
Income	155	325	188	386	756	55	93	77
Sales	789	1,476	899	1,213	1,921	930	920	914
Fuel	263	431	339	389	582	293	326	370
Real Estate								
Paid by Operator	626	2,055	1,230	1,785	2,274	1,026	1,851	1,259
Assessed to Landlord	1,573	2,130	1,469	2,489	2,863	790	1,078	1,003
Assessed to Farm	2,351	4,366	2,757	4,271	4,454	2,013	3,433	2,602
All Taxes Paid by Operator	\$ 3,924	\$ 7,863	\$ 5,313	\$ 8,200	\$ 14,495	\$ 3,006	\$ 4,374	\$ 3,862
All State Taxes	1,207	2,232	1,426	1,988	3,259	1,278	1,339	1,361
Gross Farm Income	\$ 69,589	\$135,342	\$101,124	\$159,604	\$291,290	\$118,484	\$133,415	\$100,893
Capital Gains	\$ 1,509	\$ 7,737	\$ 1,739	\$ 3,087	\$ 3,986	\$ 8,856	\$ 11,365	\$ 5,028
Nonfarm Income	\$ 8,140	\$ 17,465	\$ 7,475	\$ 7,589	\$ 8,879	\$ 2,590	\$ 10,462	\$ 9,721
Operating Expenses	\$ 52,389	\$110,630	\$ 78,472	\$123,261	\$234,907	\$ 99,375	\$130,435	\$ 95,869
Capital Purchases	\$ 28,816	\$ 47,817	\$ 27,477	\$ 35,705	\$ 60,739	\$ 25,550	\$ 19,759	\$ 25,787
Net Farm Profit (Loss)	\$ 5,510	(\$3,664)	\$ 5,995	\$ 14,726	\$ 25,472	(\$1,390)	(\$17,344)	(\$9,482)
Acres Farmed	1,477	2,249	1,297	995	1,058	1,264	2,457	1,607
Tillable Acres Farmed	1,071	1,775	1,049	966	1,008	726	975	1,018
Acres Owned	479	1,131	624	416	378	778	1,639	986

APPENDIX TABLE 3. ESTIMATED MEAN TAXES AND FARM CHARACTERISTICS BASED ON SALES OF AGRICULTURAL PRODUCTS, 1981-1983

Item	Total Sales of all Agricultural Products			
	Small \$10,000- 39,999	Medium \$40,000- 99,999	Large \$100,000- 249,999	Very Large Greater than \$250,000
Number of Farms	20	116	79	16
<u>Taxes</u>				
Federal				
Income	\$ 213	\$ 848	\$ 2,472	\$ 2,305
Self Employment	668	930	1,377	1,569
Fuel	79	110	169	271
State				
Income	\$ 51	\$ 123	\$ 348	\$ 451
Sales	520	772	1,315	2,369
Fuel	190	277	442	708
Real Estate				
Paid by Operator	\$ 419	\$ 1,079	\$ 1,845	\$ 3,631
Assessed to Landlord	1,460	1,192	1,940	2,860
Assessed to Farm	2,012	2,362	4,095	6,078
All Taxes Paid by Operator	\$ 2,140	\$ 4,139	\$ 7,968	\$ 11,304
All State Taxes	760	1,172	2,105	3,528
<u>Farm Characteristics</u>				
Gross Farm Income	\$32,021	\$78,726	\$174,692	\$374,649
Capital Gains	\$ 1,977	\$ 4,864	\$ 5,147	\$ 10,798
Nonfarm Income	\$11,662	\$ 7,081	\$ 8,653	\$ 9,848
Operating Expenses	\$30,346	\$64,814	\$143,088	\$319,396
Capital Purchases	\$16,012	\$23,381	\$ 37,358	\$ 66,902
Net Farm Profit (Loss)	(\$6,041)	\$ 1,008	\$ 5,122	\$ 6,419
Acres Farmed	1,199	1,237	1,746	2,356
Tillable Acres Farmed	614	791	1,324	1,742
Acres Owned	336	675	947	1,445

APPENDIX TABLE 4. ESTIMATED MEAN TAXES AND FARM CHARACTERISTICS GROUPED BY PERCENT OF NONFARM INCOME, 1981-1983

Item	Nonfarm Income as a Percent of Gross Receipts		
	Low Less than 5%	Medium 5-20%	High Greater than 20%
Number of Farms	124	82	25
<u>Taxes</u>			
Federal			
Income	\$ 1,317	\$ 1,284	\$ 2,648
Self-Employment	1,023	1,171	1,290
Fuel	143	137	125
State			
Income	\$ 200	\$ 190	\$ 384
Sales	1,068	998	1,096
Fuel	366	350	323
Real Estate			
Paid by Operator	\$ 1,501	\$ 1,383	\$ 1,516
Assessed to Landlord	1,543	1,691	1,458
Assessed to Farm	3,200	3,167	3,141
All Taxes Paid by Operator	\$ 5,618	\$ 5,513	\$ 7,382
All State Taxes	1,634	1,538	1,803
<u>Farm Characteristics</u>			
Gross Farm Income	\$147,622	\$109,015	\$92,934
Capital Gains	\$ 5,776	\$ 4,978	\$ 2,352
Nonfarm Income	\$ 2,967	\$ 11,392	\$23,751
Operating Expenses	\$120,633	\$ 91,927	\$81,728
Capital Purchases	\$ 31,048	\$ 30,116	\$29,393
Net Farm Profit (Loss)	\$ 5,724	\$ 164	(\$8,791)
Acres Farmed	1,476	1,516	1,427
Tillable Acres Farmed	1,021	1,066	900
Acres Owned	828	751	747

APPENDIX TABLE 5. ESTIMATED MEAN TAXES AND FARM CHARACTERISTICS GROUPED BY PERCENT LAND OWNED, 1981-1983

Item	Land Owned as a Percent of Total Land		
	Low (0-25%)	Medium (25-75%)	High (75-100%)
Number of Farms	60	106	65
<u>Taxes</u>			
Federal			
Income	\$ 682	\$ 2,081	\$ 1,127
Self-Employment	1,117	1,309	760
Fuel	125	151	131
State			
Income	\$ 147	\$ 289	\$ 161
Sales	995	1,165	900
Fuel	317	391	334
Real Estate			
Paid by Operator	\$ 489	\$ 1,608	\$ 2,117
Assessed to Landlord	2,720	1,736	297
Assessed to Farm	3,042	3,475	2,833
All Taxes Paid by Operator	\$ 3,872	\$ 6,994	\$ 5,531
All State Taxes	1,459	1,845	1,395
<u>Farm Characteristics</u>			
Gross Farm Income	\$107,444	\$148,922	\$112,851
Capital Gains	\$ 3,018	\$ 5,727	\$ 6,078
Nonfarm Income	\$ 8,090	\$ 9,094	\$ 6,869
Operating Expenses	\$ 88,944	\$120,419	\$ 99,056
Capital Purchases	\$ 30,335	\$ 36,181	\$ 21,521
Net Farm Profit (Loss)	\$ 2,836	\$ 5,881	(\$4,463)
Acres Farmed	1,226	1,585	1,561
Tillable Acres Farmed	942	1,105	966
Acres Owned	129	802	1,387

APPENDIX TABLE 6. ESTIMATED MEAN TAXES AND FARM CHARACTERISTICS CLASSIFIED BY AMOUNT OF STATE TAXES PAID, 1981-1983

Item	Level of State Taxes Paid		
	Low	Medium	High
Number of Farms	58	115	58
<u>Taxes</u>			
Federal	\$ 127	\$ 823	\$ 4,013
Income	499	1,023	1,872
Self-Employment	93	128	205
Fuel			
State			
Income	\$ 27	\$ 125	\$ 587
Sales	455	909	1,911
Fuel	225	332	534
Real Estate			
Paid by Operator	\$ 678	\$ 1,270	\$ 2,806
Assessed to Landlord	976	1,496	2,378
Assessed to Farm	1,866	2,961	4,936
All Taxes Paid by Operator	2,104	4,609	11,928
All State Taxes	707	1,366	3,032
<u>Farm Characteristics</u>			
Gross Farm Income	\$59,182	\$110,040	\$232,422
Capital Gains	\$ 4,168	\$ 5,518	\$ 5,291
Nonfarm Income	\$ 4,533	\$ 8,540	\$ 11,222
Operating Expenses	\$52,742	\$ 95,890	\$180,228
Capital Purchases	\$10,051	\$ 26,524	\$ 58,983
Net Farm Profit (Loss)	(\$2,268)	(\$2,722)	\$ 16,345
Acres Farmed	1,083	1,466	1,927
Tillable Acres Farmed	612	974	1,535
Acres Owned	546	775	1,071

APPENDIX TABLE 7. ESTIMATED NORTH DAKOTA INCOME TAX PAYMENTS MADE BY FARM AND RANCH OPERATORS COMPARED WITH STATE TAX DEPARTMENT REPORTED COLLECTIONS

Item	Total Sales of All Agricultural Products					Total
	Very Small (less than \$10,000)	Small (\$10,000- 39,999)	Medium (\$40,000- 99,999)	Large (\$100,000- 249,999)	Very Large (Greater than \$250,000)	
Number of Farms: ^a						
Census	6,515	12,258	11,317	5,215	1,100	36,400
Tax Returns	n.a.	n.a.	n.a.	n.a.	n.a.	38,890
Income Tax (1981-82): ^b						
Estimated	--	413,736	1,408,754	1,589,879	496,541	3,980,910
Actual Collections	n.a.	n.a.	n.a.	n.a.	n.a.	4,622,150
Income Tax (1981-83): ^b						
Estimated	--	633,266	1,628,479	2,054,610	518,445	4,834,800
Actual Collections	n.a.	n.a.	n.a.	n.a.	n.a.	5,940,767

^aNumber of farms from the census was for 1982 and number of farms as indicated on North Dakota tax returns was for 1980.

^bIncome tax estimates were determined by multiplying the average income tax for each farm size and type by the census number of farms for each respective category, and summing.

