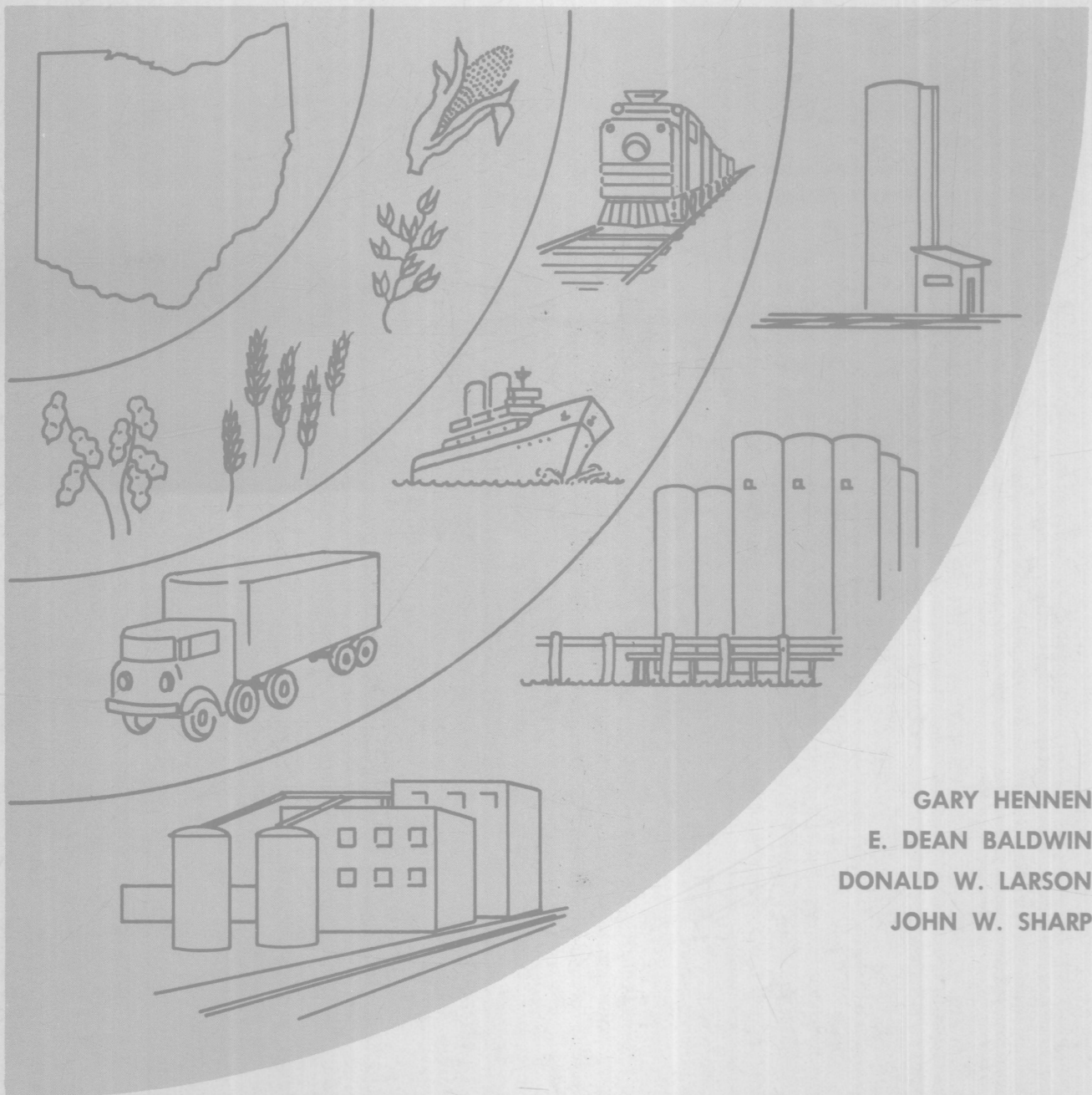


Ohio Grain Flows by Mode of Transportation and Type of Grain Firms for 1970 and 1977: A Comparison



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INTRODUCTION

Because Ohio's farmers dramatically increased the production of grain and used a relatively stable amount for feed, the volume of grain moving through the marketing channels nearly doubled during the decade of the 1970's. Many economic reports and indicators suggest that these trends will continue into the decade of the 1980's.³ Thus, many of the issues confronting the grain industry in the 1970's will also be of concern to participants in the grain trade during the next decade. These issues include the amount and location of storage space, difficulties of grain movement during peak transportation periods, increases in transportation costs, and increased proportion of the grain production moving to export markets.

To efficiently move the increasing supply of grain through the marketing channel, grain farmers, grain elevators, and processors will need to change the type and location of facilities in the 1980's to assure an orderly movement of grain through the marketing system. The investment plans will hinge in part on the availability and cost of transportation facilities, the availability and cost of existing and new storage facilities, and the anticipated change in foreign and domestic demand for grain.

To help facilitate the investment plans for commercial firms and grain farms, accurate information is needed on intrastate and interstate grain flows. In addition, information is needed on the movement of grain by transport mode. The purpose of the present study is to compare grain flows and the movement by transport mode and by types of firm for the years 1970 and 1977 and to note any significant changes which may have occurred. The importance of the domestic and export markets is identified. The quantity of grain moved by water, truck, or rail is

¹The work reported in this publication is part of the contribution of OARDC to S-115, Alternative Structures for Increasing Efficiency in Intra- and Inter-Regional Grain Marketing, and NC-137, Evaluation of Alternative Rural Freight Transportation, Storage and Distribution Systems.

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³Independent research reports by Henderson, Barr, and Stout indicate that specialization in grain production on Ohio farms will likely continue at the expense of livestock production.

specified and the general implications for the 1980's are noted.⁴

In the first section of this report, changes in grain production and consumption trends are documented. The methodology and survey procedures are described in the second section. The 1977 total grain supply and disappearance are reported in the third section. Intrastate and interstate grain flows by period are compared and contrasted for 1970 and 1977 in the fourth section, and the implications for the 1980's follow.

PRODUCTION AND CONSUMPTION OF FEEDGRAINS AND OILSEEDS: THE 1970'S TREND

The production of grains and oilseeds has increased substantially during the decade of the 1970's. Not only has grain and oilseed output increased but farms have also become more specialized in production of these products at the expense of livestock production. This change in the output mix can be illustrated by the increased share of cash receipts from marketings of crop products as compared to livestock and livestock products and by data on grain production and consumption.

Income earned from the sale of grain and oilseeds increased from 43% of the total cash receipts from farm marketings in 1970 to 59% in 1977, which represents nearly a 50% increase in relative importance of crop products. Even though the cash receipts from marketings of livestock and livestock products increased in absolute value, they decreased relative to crop products from 56% to 41% of total cash receipts from farm marketings in this same period. Dairy products which were the leading source of cash receipts in the late 1960's were replaced by soybeans in 1977 (5). In fact, three crops (corn, soybeans, and wheat) accounted for 46% of all cash receipts received from farm marketings in 1977.

The increase in income generated from grain sales in the 1970's is due in part to the dramatic increase in grain production. Total production of the four major grains increased 63% between 1970 and

⁴In this study, grains include corn, oats, and wheat; oilseeds are synonymous with soybeans.

1977 (Table 1). Corn for grain increased 64%, soybean production increased 73%, and wheat increased 102%, while oat production in 1977 declined to 83% of the 1970 production level.

In contrast to the increasing production trend, consumption of grains and oilseeds by livestock for the same period remained nearly constant; 144.9 million

bushels of grain were consumed in 1970 and 149.6 million bushels were consumed in 1977 (Table 2). Grains and oilseeds consumed as a percent of total production fell dramatically during the period. In 1970 farmers fed 39% of the total grain and oilseed production to livestock on Ohio farms and in 1977 they fed only 25% of the total production.

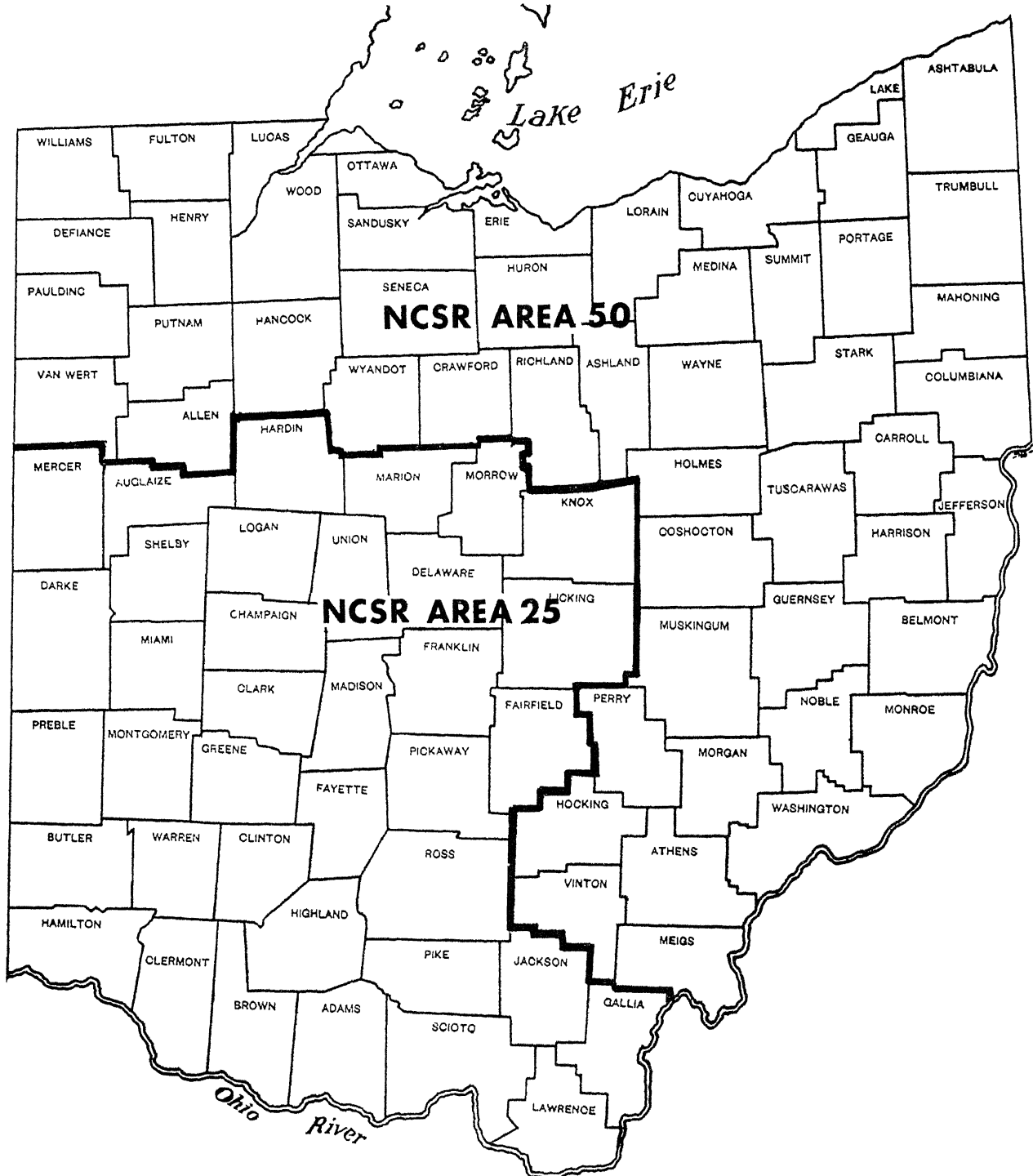


FIG. 1.—North Central-Southern Regional Grain Marketing Areas as Defined for Ohio.

TABLE 1.—Changes in Production of Selected Crops in Ohio, 1970 and 1977.

Commodity	Production		
	1970	1977	Production Index
	Millions of Bushels		1970 = 100
Corn for Grain	232.1	380.1	164
Soybeans	69.5	119.9	173
Wheat	35.9	72.4	202
Oats	29.9	24.8	83
Total	367.4	597.2	163

Since raw soybeans are not fed to livestock, part of the decrease in grain fed to livestock as a percent of total production is a result of the dramatic increase in soybean production. In addition, corn fed to livestock as a percent of corn production decreased substantially, falling from 56% of total production in 1970 to 34% of total production in 1977. Wheat consumption remained nearly constant, while oat consumption as a percent of production increased dramatically, reflecting the decrease in oat production within the state of Ohio.

METHODOLOGY AND SURVEYS

To ascertain and compare the movement of grain through the marketing channels in 1970 and 1977, two separate but similar surveys were completed. The first study was undertaken in 1971 as a part of the Southern Regional Grain Marketing Project, SM-42. The methodology, survey procedures, and results were published in OARDC Research Bulletin 1087 (2). In the first study, a stratified random sample of country elevators, terminal elevators, export elevators, and grain processors was surveyed in 1971 for two marketing areas of Ohio which were defined by SM-42 researchers along Crop Reporting District (CRD) lines (Fig. 1). Area 50 was composed of CRD's 1, 2, 3, 6, and 9 while area 25 constituted CRD's 4, 5, 7, and 8. To be consistent with that effort, data for 1977 were collected for the same CRD's and marketing areas and were defined as the

TABLE 3.—Number, Type, and Sample of Firms in Ohio NCSR Grain Survey, 1977.

Type of Firm	Population	Sample
River and Export Elevators	8	8
Elevators More Than 1 Million Bu	31	31
Elevators from 500,000 to 1 Million Bu	69	9
Elevators Less Than 500,000 Bu	455	46
Flour Mills	13	8
Soybean Processors	4	4
Corn Processors	1	1
Feed Grinders	217	22
Feed Manufacturers	12	10
Total	811	140

North Central-Southern Regional (NCSR) areas in the present study to represent the cooperative effort of NC-137 and S-115.

Since all grain elevators and processing firms are licensed by the Grain Warehouse Division of the Ohio Dept. of Agriculture, the elevator and processing plant populations were obtained from the list compiled by this agency. In 1977, this list included 811 elevator and processing plants; 140 questionnaires were completed (Table 3). The plants on the agency's list were divided into groups based upon existing storage capacity and operational characteristics. These include export elevators, river elevators, terminal and country elevators, feed manufacturers and feed grinders, soybean processors, corn processors, flour millers and blenders, and others.⁵ Definitions for these plant types are presented in Appendix A.

All river and export elevator operators were interviewed, as were operators of all elevators with 1 million or more bushels of storage capacity. All other elevators with less than 1 million bushels of storage capacity were sampled on a CRD basis. The sampling rate varied by size of firm and number of firms in each CRD. For firms with 500,000 to

⁵The other category was applied to firms which were on the list as either elevators or feed grinders but earned most of their income from retail sales to urban consumers. The final classification was completed after the enumeration.

TABLE 2.—Bushels of Grain Consumed by Livestock in Ohio and Consumption as a Percent of Total Production, 1970 and 1977.

Commodity	Consumption			
	1970		1977	
	Millions of Bushels	Consumption as a Percent of Production	Millions of Bushels	Consumption as a Percent of Production
Corn for Grain	130,059	56	130,221	34
Soybeans	0	0	0	0
Wheat	1,469	4	2,406	3
Oats	13,362	45	17,010	69
Total	144,890	39	149,637	25

TABLE 4.—Supply and Disappearance of Raw Grains in Ohio, 1977.

Commodity	Supply			Disappearance			Net Shipments = Shipments — Receipts (g) = (e) — (b)
	Grain Supply* Ohio (a)	Grain Receipts from Other States (b)	Total (c)	Grain Consumed in Ohio (d)	Grain Shipments to Other States and for Export (e)	Total (f)	
	(000 bu)						
Corn	374,196	69,536	443,732	148,271	288,279	436,550	218,743
Soybeans	103,965	24,089	128,054	26,507	101,428	127,935	77,339
Wheat	64,255	18,757	83,012	38,426	44,584	83,010	25,827
Oats	25,301	2,062	27,363	18,428	9,049	27,477	6,987
Total	567,717	114,444	682,161	231,632	443,340	674,972	328,896

*The total grain supply is equal to 1977 production plus Jan. 1, 1977, inventory minus Jan. 1, 1978, inventory.

999,999 bushels of storage capacity, the sampling rate varied from 10% to 100% of the total population for each CRD. For firms with less than 500,000 bushels of storage capacity, the sampling rate varied from 10% to 35% of the total population for each CRD.

Because feed manufacturers, soybean and corn processors, and flour millers and blenders receive and ship grain, the activity of these processing firms is also analyzed in this study. Feed manufacturers were defined as those firms which produce and market a brand name feed through a wholesale outlet. In 1977, 12 of these firms were in operation in Ohio and 10 were sampled. Feed grinders, those who earn more than 50% of their income by mixing feed rather than by selling a brand name feed, were also enumerated. In 1977, 217 of these firms were in operation and 22 of these firms were enumerated on a CRD basis.

Four soybean processing plants were in operation in Ohio in 1977 and all four of these were enumerated. Thirteen flour millers were also operating and eight of these were enumerated. The data collected from each firm in the sample were obtained through personal interviews with the general manager or accountant of each grain merchandising plant. Copies of the questionnaires are presented in Appendix B.

TOTAL GRAIN SUPPLY AND DISAPPEARANCE, 1977

After enumeration was completed, each questionnaire was edited and the flow data were summarized by type of plant and mode of transportation for the state of Ohio. To ascertain the accuracy of the flow data, grain shipments from Ohio to other locations and Ohio's reported grain receipts from other locations were compared and contrasted with similar reports prepared by researchers who were representatives on the two regional committees. Differences in the data were reconciled by introducing secondary

data on the supply and disappearance of grain for each state, which ensured that the total grain supply within the state would balance with the state's total demand (Table 4).

The grain supply includes 1977 production plus inventory change for the 1977 calendar year. Grain consumed in Ohio includes grain fed to livestock where rations were multiplied by numbers of head for each class of livestock, grain used as seed, and grain processed by processing firms as reported in the 1977 survey (1, 5).

Based on the above methodology, it is estimated that all elevators and processors in Ohio received 69.5 million bushels of corn from origins located in other states, 24.1 million bushels of soybeans, 18.8 million bushels of wheat, and 2.1 million bushels of oats for a total of 114.4 million bushels of grain and oilseeds (Table 4). During the same period, plants in Ohio shipped 288.3 million bushels of corn to domestic destinations in other states and to export points, 101.4 million bushels of soybeans, 44.6 million bushels of wheat, and 9 million bushels of oats for total grain and oilseed shipments constituting 443.4 million bushels. As in 1970, Ohio in 1977 had a net out shipment of grain to other destinations which equaled 328.9 million bushels. The remainder of this report delineates the grain and oilseed movement into and out of Ohio.

GRAIN RECEIPTS BY GRAIN ELEVATORS AND PROCESSORS

Total Grain Receipts

Grain firms in Ohio reported receiving a total of 735 million bushels of grain and oilseeds from all sources in 1977 (Table 5). Of the 735 million bushels, 252.1 million bushels were moved from Ohio elevators to Ohio grain firms, and therefore represent a double-sale figure. The remaining 482.8 million bushels were first handler movements (those moving directly from farms or firms located in Ohio and in

TABLE 5.—Ohio Grain Receipts from All Origins by Type of Grain Firms, 1977.

Origins	Type of Grain Firm							Total
	Country Elevator	Terminal and Export Elevator	Feed Manufacturer	Wheat Processor	Soybean Processor	Feed Grinder	Other	
	000,000 bu							
Ohio:								
(A) From Farms	252.8	43.9	5.0	13.2	9.8	21.0	22.7	368.4
(B) From Elevators	11.4	159.0	11.9	11.4	56.3	0.9	1.2	252.1
(C) Total (A+B)	264.2	202.9	16.9	24.6	66.1	21.9	23.9	620.5
Out-of-State Sources:								
(D) From Farms	2.1	33.3	0.8	4.3	0.0	0.0	0.3	40.8
(E) From Elevators	2.0	70.0	0.4	0.3	0.0	0.0	0.9	73.6
(F) Total (D+E)	4.1	103.3	1.2	4.6	0.0	0.0	1.2	114.4
Total First Handler (A+D+E)	256.9	147.2	6.2	17.8	9.8	21.0	23.9	482.8
Grand Total (C+F)	268.3	306.2	18.1	29.2	66.1	21.9	25.1	734.9

surrounding states to grain firms in Ohio), with 368.4 million bushels delivered from Ohio's farms and 114.4 million bushels delivered from farms and firms in surrounding states.

The 114.4 million bushels equal a relative share of 23.7% of the first handler receipts in 1977. This compares to 58.6 million bushels (16.9% of the first handler receipts) of grain coming into Ohio market places from farms and firms in surrounding states in 1970. This means that the proportion of first handler grain from out of state has increased and the total volume of out-of-state grain has roughly doubled during the 7-year period (2). Of the 114.4 million bushels of grain coming from other states, 40.8 million bushels or 36.8% came directly from farms and the remaining 73.6 million bushels came from non-farm firms (Table 5).

In 1977, country elevators in Ohio received a total of 268.3 million bushels of grain or 36.5% of the total annual receipts for all firms; terminal elevators received 306.2 million bushels or 41.7% of all grain receipts; and processors, manufacturers, and other types of firms received the remaining 160.4 million bushels or 21.8% of the total annual receipts.

First handler receipts equaled 482.8 million bushels in 1977. Country elevators acquired 256.9 million bushels of grain or 53.2% of all first handler receipts; terminal and export elevators received 147.2 million bushels or 30.5% of the total; feed grinders and other firms, categories not included in the 1970 study, received 44.9 million bushels or 9.3% of the total in 1977; and other processors received the remaining 33.8 million bushels or 7% of the total. This contrasts markedly both in volume and proportions to the 1970 receipts from first handlers when 230.6 million bushels of grain or 66.5% of the annual re-

ceipts from first handlers moved to country elevators, 90.6 million bushels or 26.0% moved to terminal and export elevators, and 25.6 million bushels or 7.4% moved to processing firms (2). Only the relative share moving to processors did not change during the 7-year period, while terminal and export elevators increased receipts at the expense of country elevators.

In 1977, country elevators received 252.8 million bushels and 11.4 million bushels or 94.2% and 4.2% of the total country elevator receipts, respectively, from Ohio farms and grain firms. Country elevators further received 4.1 million bushels or less than 2% of total country elevator receipts from out-of-state farms and firms. In 1977, terminal elevators received 43.9 million bushels and 159.0 million bushels or 14.3 and 51.9% of total terminal elevator receipts, respectively, from Ohio farms and Ohio firms, and 33.3 million bushels and 70 million bushels or 10.9% and 22.8% of the grain total receipts, respectively, from out-of-state farms and firms. Processors and other firms received 71.8 million bushels and 81.7 million bushels or 44.8 and 50.9%, respectively, from Ohio farms and grain firms, and 5.4 million bushels and 1.6 million bushels or 3.4% and 0.9%, respectively, from out-of-state farms and firms in 1977.

Total Grain and Oilseed Receipts from Other States by Mode of Transportation and Origin

Table 6 shows that most out-of-state receipts (95.2%) moved to Ohio firms by truck. Small to minute quantities of grain and oilseeds moved to their respective destinations by rail and water. In 1977, out-of-state truck receipts were more than double the 1970 levels, rail receipts were less than one-third the 1970 level, and water receipts had increased by nearly 50% [(2) and Table 6]. During the 1970's, eco-

TABLE 6.—Grain and Oilseed Receipts from Out-of-State Origins by Mode of Transportation as Reported by Elevator and Grain Processing Firms in Ohio, 1977.

Commodity	Mode of Transportation			Total
	Truck*	Rail	Water	
	(000 bu)			
Corn	69,209	0	0	69,536
Soybeans	23,739	327	0	24,089
Wheat	14,951	350	3,188	18,757
Oats	1,045	618	150	2,062
Total Grain	108,944	2,162	3,338	114,444

*Includes farm truck and commercial truck shipments.

conomic considerations allowed the trucking industry to capture nearly all out-of-state movements of grain and oilseed receipts to Ohio firms. Like 1970, nearly all receipts originating in Ohio moved by truck because most movements were short distance hauls favoring the economics of truck movements.

Grain receipts from out-of-state points originated in Indiana, Michigan, Illinois, Kentucky, Pennsylvania, Minnesota, Kansas, and Wisconsin (Table 7). Corn receipts exceeded by 50% the aggregated receipts for all other commodities. Corn originated primarily in Indiana and Michigan, with minute quantities from Illinois and Kentucky. These findings are consistent with those reported for 1970 ex-

cept for the Illinois movement which represented a one-trainload shipment and appears to be the exception rather than common movement.

Soybean and wheat receipts equaled 24.1 million bushels and 18.8 million bushels, respectively. Like corn receipts, soybeans and wheat were primarily received from firms located in Indiana and Michigan. Small amounts of wheat were also received from Minnesota, which is a shipper of spring wheat, a necessary ingredient for the bread-flour industry. Oat receipts accounted for only 2.1 billion bushels, with minute amounts originating in Indiana, Michigan, Illinois, Kentucky, Minnesota, and Wisconsin. The origin areas for out-of-state grain in 1977 were equivalent to origin areas reported for 1970 [(2) and Table 7].

Total Corn Receipts

Grain elevators and processing firms reported receiving a grand total of 391.9 million bushels of corn. Of this, 233.4 million bushels came directly from farms located in Ohio and in other states in 1977 (Table 8). This is a 37.6% increase over the 169.7 million bushels of corn which elevators and processors received directly from farmers in 1970 (2). In addition, elevators and processors reported receiving 158.5 million bushels of corn from non-farm sources in 1977; 111.1 million bushels of that came from Ohio elevators and firms and ordinarily this

TABLE 7.—Grain and Oilseed Receipts from Other States and by Mode of Transportation as Reported by Elevator and Grain Processing Firms in Ohio, 1977.

Origins	IN	MI	IL	KY	PA	MN	KS	WI	Total
	(000 bu)								
Corn Receipts									
All Modes	32,817	35,645	327	747					69,536
Commercial Truck	19,342	27,757	0	0					47,099
Farm Truck	13,475	7,888	0	747					22,110
Rail	0	0	327	0					327
Soybean Receipts									
All Modes	10,269	13,302	0	518					24,089
Commercial Truck	5,701	11,510	0	0					17,220
Farm Truck	4,209	1,792	0	518					6,519
Rail	350	0	0	0					350
Wheat Receipts									
All Modes	6,187	9,168	0	153	38	3,188	23	0	18,757
Commercial Truck	3,323	5,087	0	153	38	0	0	0	8,601
Farm Truck	2,619	3,731	0	0	0	0	0	0	6,350
Rail	245	350	0	0	0	0	23	0	595
Water	0	0	0	0	0	3,188	0	0	3,188
Oat Receipts									
All Modes	199	780	128	150	0	505	0	300	2,062
Commercial Truck	165	500	61	0	0	5	0	0	731
Farm Truck	34	280	0	0	0	0	0	0	314
Rail	0	0	67	0	0	500	0	300	867
Water	0	0	0	150	0	0	0	0	150

TABLE 8.—Monthly Corn Receipts by Firm Types from Farms and Elevators in Ohio and from Out-of-State Origins, Ohio, 1977.

Firm Type	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
	(000 bu)												
From Farms to:													
Country Elevators	5,308	5,340	6,938	5,230	4,279	7,379	4,154	6,084	9,604	35,248	45,654	15,726	150,944
Terminal and Export Elevators	3,374	3,911	4,206	2,358	2,085	3,149	2,263	4,328	4,128	3,912	7,743	4,646	46,103
Feed Manufacturers	266	332	336	291	289	311	296	334	376	397	667	262	4,157
Other	510	526	579	526	302	210	564	252	554	1,030	4,954	1,127	11,134
Feed Grinders	1,042	1,058	1,041	963	956	944	935	972	998	1,783	3,872	1,781	16,345
Bean Processors	438	397	813	503	303	174	75	317	258	243	814	423	4,758
Total	10,938	11,564	13,913	9,871	8,214	12,167	8,287	12,287	15,918	42,613	63,704	23,965	233,441
From Elevators to:													
Country Elevators	371	372	478	305	177	349	196	338	414	1,240	2,294	739	7,273
Terminal and Export Elevators	6,233	6,743	7,395	6,645	6,778	12,153	7,307	14,389	13,827	14,491	30,839	11,758	138,558
Feed Manufacturers	669	672	678	687	669	706	680	692	700	694	1,086	555	8,488
Feed Grinders	42	74	73	75	73	73	73	76	81	73	82	38	833
Bean Processors	236	214	438	271	157	94	40	171	192	131	438	228	2,610
Other	38	79	74	53	56	74	67	77	75	65	66	38	762
Total	7,589	8,154	9,136	8,036	7,910	13,449	8,363	15,743	15,289	16,694	34,805	13,356	158,524
Grand Total	18,527	19,718	23,049	17,907	16,124	25,616	16,650	28,030	31,207	59,307	98,509	37,321	391,965

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TABLE 9.—Monthly Corn Receipts by Firm Types from Farms and Elevators in Ohio, 1977.

Firm Type	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
	(000 bu)												
From Farms to:													
Country Elevators	5,252	5,247	6,780	5,151	4,250	7,270	4,082	6,054	9,533	35,028	45,046	15,384	149,077
Terminal and Export Elevators	1,916	2,137	2,399	1,276	1,131	1,704	1,348	2,477	2,377	2,319	5,016	2,683	26,783
Feed Manufacturers	228	253	262	238	233	237	229	257	301	332	601	232	3,403
Other	507	519	573	520	286	197	539	252	529	1,000	4,942	1,119	10,983
Feed Grinders	1,042	1,058	1,041	963	956	944	935	972	998	1,783	3,872	1,781	16,345
Bean Processors	438	397	813	503	303	174	75	317	258	243	814	423	4,758
Total	9,383	9,611	11,868	8,651	7,159	10,526	7,208	10,329	13,996	40,705	60,291	21,622	211,349
From Elevators to:													
Country Elevators	352	341	425	279	168	313	172	327	390	1,167	2,091	625	6,650
Terminal and Export Elevators	4,087	4,376	5,023	4,505	4,467	7,834	4,838	9,338	9,032	10,133	22,076	7,175	92,884
Feed Manufacturers	637	640	646	655	637	674	648	660	667	662	1,054	523	8,103
Feed Grinders	42	74	73	75	73	73	73	76	81	73	82	38	833
Bean Processors	236	214	438	271	157	94	40	171	192	131	438	228	2,610
Total	5,354	5,645	6,605	5,785	5,502	8,988	5,771	10,572	10,362	12,166	25,741	8,589	111,080
Grand Total	14,737	15,256	18,473	14,436	12,661	19,514	12,979	20,901	24,358	52,871	86,032	30,211	322,429

TABLE 10.—Monthly Corn Receipts by Firm Types from Out-of-State Origins, Ohio, 1977.

Firm Type	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
(000 bu)													
From Farms to:													
Country Elevators	56	93	158	79	29	109	72	30	71	220	608	842	1,867
Terminal and Export Elevators	1,458	1,774	1,807	1,082	954	1,445	915	1,851	1,751	1,593	2,727	1,963	19,320
Other	3	7	6	6	16	13	25	77	25	30	12	8	151
Feed Manufacturers	38	79	74	53	56	74	67	77	75	65	66	30	754
Total	1,555	1,953	2,045	1,220	1,055	1,641	1,079	1,958	1,922	1,908	3,413	2,343	22,092
From Elevators to:													
Country Elevators	19	31	53	26	9	36	24	11	24	73	203	114	623
Terminal and Export Elevators	2,146	2,367	2,372	2,140	2,311	4,319	2,469	5,051	4,795	4,358	8,763	4,583	45,674
Feed Manufacturers	32	32	32	32	32	32	32	32	33	32	32	32	385
Other	38	79	74	53	56	74	67	77	75	65	66	38	762
Total	2,235	2,509	2,531	2,251	2,408	4,461	2,592	5,171	4,927	4,528	9,064	4,767	47,444
Grand Total	3,790	4,462	4,576	3,471	3,463	6,102	3,671	7,129	6,849	6,436	12,477	7,110	69,536

quantity represents a double sale in which the farmer sells to an elevator which in turn sells to another elevator or processing plant (Table 9). An additional 47.4 million bushels came from elevators and firms outside of Ohio (Table 10).

In 1977, Ohio and out-of-state farmers sent 130.3 million bushels of corn (or 55.8% of the annual farm marketings) to elevators and processors during the months of October, November, and December (Table 8). This represents a slight absolute increase over the 113.9 million bushels of corn received by firms from farms during the same months of 1970 (2). However, 1977 sales in these months represent a significant decrease from the proportion (67.1%) of the crop sold in this period by farmers in 1970.

Farmers retained 55.9 million bushels of corn to sell during the remainder of the year in 1970, which constituted only 32.9% of the 1970 farm sales (2). In 1977, farmers in Ohio and neighboring states retained 103.1 million bushels of corn or 44.2% of the annual farm sales. This indicates a trend towards increased on-farm storage that permits holding of grain to sell during the rest of the year (Table 8).

Terminal elevators received 46.1 million bushels or 19.7% of corn receipts directly from farmers in Ohio and bordering states in 1977 (Tables 9 and 10). In 1970, terminal elevators controlled 23% of that market. Country elevators received 64.7% of all farm-originated corn or 150.9 million bushels directly from farmers in Ohio and neighboring states in 1977 compared to 76% of all farm-originated corn in 1970. Most of the corn (70.5%) from Ohio farms went to country elevators (149.1 million bushels out of 211.3) in 1977 (Table 9). Most of the corn (87.5%) coming into Ohio from farms in neighboring states (mainly Michigan and Indiana) went directly to terminal elevators (19.3 out of 22.1 million bushels) in 1977 (Table 10).

During 1977, Ohio elevators and processors received a total of 69.5 million bushels of corn from out of state, a dramatic increase from the 20.1 million bushels in 1970 (Table 10). About 32% of that amount came directly from farms and 68% came from elevators and other firms in 1977. Nearly half of the imported corn came from Indiana and slightly more than half came from Michigan in 1977. About 7% of the corn from nearby states moved into Ohio by rail in 1970, whereas virtually all imported corn came by truck in 1977. Nearly all of the imported corn went to firms specializing in out-of-state shipments and foreign export. This illustrates the increasing importance of the export markets and the role played by Ohio firms in marketing grain produced in Ohio, Indiana, and Michigan.

TABLE 11.—Monthly Corn Receipts by Firm Types from Farms and Elevators in Sub-state Area 25 of Ohio, 1977.

Firm Type	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
	(000 bu)												
From Farms to:													
Country Elevators	3,072	3,091	4,342	2,954	2,442	3,785	2,120	3,832	6,539	20,021	23,454	11,196	86,848
Terminal and Export Elevators	1,629	1,857	2,080	968	839	1,165	1,063	1,919	1,807	1,671	3,786	2,181	20,965
Feed Manufacturers	218	237	233	212	199	204	210	221	246	291	432	193	2,896
Other	409	407	438	405	176	104	91	141	116	721	1,634	705	5,347
Feed Grinders	510	518	480	447	438	400	402	411	440	647	1,013	748	6,454
Bean Processors	438	397	813	503	303	174	75	317	258	243	814	423	4,758
Total	6,276	6,507	8,386	5,489	4,397	5,832	3,961	6,841	9,406	23,594	31,133	15,446	127,268
From Elevators to:													
Country Elevators	310	285	357	260	154	284	145	288	354	897	1,513	552	5,399
Terminal and Export Elevators	1,273	1,410	1,386	679	569	811	834	1,393	1,469	1,371	3,464	1,671	16,330
Feed Manufacturers	481	481	480	477	461	483	492	465	470	484	743	317	5,834
Feed Grinders	3	33	34	30	30	30	30	30	30	30	30	30	310
Bean Processors	236	214	438	271	157	94	40	171	192	131	438	228	2,610
Total	2,303	2,423	2,695	1,717	1,371	1,702	1,541	2,347	2,515	2,913	6,188	2,768	30,483
Grand Total	8,579	8,930	11,081	7,206	5,768	7,534	5,502	9,188	11,921	26,507	37,321	18,214	157,751

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TABLE 12.—Monthly Corn Receipts by Firm Types from Farms and Elevators in Sub-state Area 50 of Ohio, 1977.

Firm Type	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
	(000 bu)												
From Farms to:													
Country Elevators	2,180	2,156	2,438	2,197	1,808	3,485	1,962	2,222	2,994	15,007	21,592	4,188	62,229
Terminal and Export Elevators	287	280	319	308	292	539	285	558	570	648	1,229	502	5,817
Feed Manufacturers	10	16	29	26	34	33	19	36	55	41	169	39	507
Others	98	112	135	115	110	93	448	111	413	279	3,208	414	5,636
Feed Grinders	532	540	561	516	518	544	533	561	558	1,136	2,859	1,033	9,891
Total	3,107	3,104	3,482	3,162	2,762	4,694	3,247	3,488	4,590	17,111	29,157	6,176	84,080
From Elevators to:													
Country Elevators	42	56	68	19	14	29	27	39	36	270	578	73	1,251
Terminal and Export Elevators	2,814	2,966	3,637	3,826	3,898	7,023	4,004	7,945	7,563	8,762	18,612	5,504	76,554
Feed Manufacturers	156	159	166	178	176	191	156	195	197	178	311	206	2,269
Feed Grinders	39	41	39	45	43	43	43	46	51	43	52	38	523
Total	3,051	3,222	3,910	4,068	4,131	7,286	4,230	8,225	7,847	9,253	19,553	5,821	80,597
Grand Total	6,158	6,326	7,392	7,230	6,893	11,980	7,477	11,713	12,437	26,364	48,710	11,997	164,677

TABLE 13.—Monthly Corn Receipts by Firm Types from Out-of-State Origins to Sub-state Area 25 of Ohio, 1977.

Firm Type	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
	(000 bu)												
From Farms to:													
Terminal and Export Elevators	1,122	1,429	1,417	657	533	679	590	1,124	1,059	852	1,490	1,352	12,304
Other	3	7	6	6	16	13	25		25	30	12	8	151
Feed Manufacturers	38	79	74	53	56	74	67	77	75	65	66	38	762
Total	1,163	1,515	1,497	716	605	766	682	1,201	1,159	947	1,568	1,398	13,217
From Elevators to:													
Terminal and Export Elevators	838	1,045	932	419	370	510	467	681	854	659	1,358	1,108	9,241
Feed Manufacturers	32	32	32	32	32	32	32	32	33	32	32	32	385
Other	38	79	74	53	56	74	67	77	75	65	66	38	762
Total	908	1,156	1,038	504	458	616	566	790	962	756	1,456	1,178	10,388
Grand Total	2,071	2,671	2,535	1,220	1,063	1,382	1,248	1,991	2,121	1,703	3,024	2,576	23,605

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TABLE 14.—Monthly Corn Receipts by Firm Types from Out-of-State Origins to Sub-state Area 50 of Ohio, 1977.

Firm Type	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
	(000 bu)												
From Farms to:													
Country Elevators	56	93	158	79	29	109	72	30	71	220	608	342	1,867
Terminal and Export Elevators	336	345	390	425	421	766	325	727	692	741	1,237	611	7,016
Total	392	438	548	504	450	875	397	757	763	961	1,845	953	8,883
From Elevators to:													
Country Elevators	19	31	53	26	9	36	24	11	24	73	203	114	623
Terminal and Export Elevators	1,308	1,322	1,440	1,721	1,941	3,809	2,002	4,360	3,941	3,699	7,745	3,137	36,425
Total	1,327	1,353	1,493	1,747	1,950	3,845	2,026	4,371	3,965	3,772	7,948	3,251	37,048
Grand Total	1,719	1,791	2,041	2,251	2,400	4,720	2,423	5,128	4,728	4,733	9,793	4,204	45,931

NCSR Area Corn Receipts

Because the NCSR regions are sub-areas of the state, findings and economic relationships reported for the state are equally relevant for the NCSR regions. Differences which exist between the two regions are highlighted and explanations for the differences are provided. NCSR area 50 is a northern and eastern area of the state, while area 25 represents the western and central area of the state (Fig. 1).

NCSR area 50 received a grand total of 210.5 million bushels of corn while NCSR area 25 received a grand total of 181.4 million bushels in 1977 (Tables 11 to 14). In area 50, 84.1 million bushels or 40.0% of the total receipts were acquired from farms located in Ohio; 80.6 million bushels or 38.8% originated at elevators in Ohio and 45.9 million bushels or 21.7% originated at firms located in surrounding states (Tables 12 and 14).

In 1977, terminal elevators captured most of the total receipts in area 50, acquiring 125.5 million bushels or 59.9% of the total receipts, while country elevators received 31.3% of the total receipts. As in 1970, country elevators in area 50 received most of their corn shipments from Ohio farms, constituting 62.2 million bushels or 74% of all farm shipments. Terminal and export elevators, on the other hand, acquired 95% of all non-farm origin grain in Ohio and 94.5% of all corn originating in surrounding states. Feed manufacturers and other firms acquired small amounts of corn from alternative origins [(2) and Tables 12 and 14].

Elevator and processing firms which were located in NCSR area 25 reported receiving 181.4 million bushels of corn in 1977; 127.3 million bushels or 70.2% of the total receipts originated on Ohio's farms, 30.5 million bushels or 16.8% of the total receipts originated at Ohio elevators, and 23.6 million bushels or 13% of the total receipts originated at firms located in other states (Tables 11 and 13). Unlike area 50, nearly all receipts in area 25 moved to country elevators; they received 92.2 million bushels or 50.8% of the total. Terminal elevators received the next largest share, 58.8 million bushels or 32.4% of the total receipts. The share of total receipts received by country elevators declined from the 1970 level of 76% to 50.8% in 1977, while the relative share received by the terminal and export elevators increased from the 1970 level of 24% to 32.4% in 1977 [(2) and Tables 11 and 13].

Country and terminal elevators in area 25 also received substantially different quantities of grain from different sources than did similar firms in area 50. For example, firms in area 25 acquired more corn from Ohio farms, less total bushels from Ohio elevators, and less total bushels from out-of-state

TABLE 15.—Monthly Soybean Receipts by Firm Types from Farms and Elevators in Ohio and from Out-of-State Origins, Ohio, 1977.

Firm Type	[000 bu]												Total
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
From Farms to:													
Country Elevators	2,207	2,091	2,450	1,650	636	674	238	447	5,694	32,250	8,269	2,349	58,955
Terminal and Export Elevators	981	1,149	1,816	1,273	478	341	129	280	656	5,959	2,583	1,191	16,836
Feed Manufacturers	31	42	60	28	35	33	28	28	62	266	57	30	700
Other	145	185	336	314	286	69	147	54	297	2,050	1,008	357	5,248
Feed Grinders	6	11	7	76	8	40			8	1,915	442	100	2,613
Bean Processors	340	539	862	160	36	96	71	139	652	1,379	668	34	4,976
Total	3,710	4,017	5,531	3,501	1,479	1,253	613	948	7,369	43,819	13,027	4,061	89,328
From Elevators to:													
Country Elevators	130	101	150	70	49	23	9	12	44	1,050	413	93	2,144
Terminal and Export Elevators	3,433	3,839	4,246	4,107	3,250	1,362	1,931	703	1,641	25,912	7,073	3,182	60,679
Other	26	26	26	26					234	234	234	234	1,040
Bean Processors	1,141	1,053	1,056	971	601	526	173	737	1,087	7,670	1,177	508	16,700
Total	4,730	5,019	5,478	5,174	3,900	1,911	2,113	1,452	3,006	34,866	8,897	4,017	80,563
Grand Total	8,440	9,036	11,009	8,675	5,379	3,164	2,726	2,400	10,375	78,685	21,924	8,078	169,891

TABLE 16.—Monthly Soybean Receipts by Firm Types from Farms and Elevators in Ohio, 1977.

Firm Type	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
	(000 bu)												
From Farms to:													
Country Elevators	2,207	2,091	2,450	1,650	636	694	238	447	5,694	32,250	8,269	2,349	58,975
Terminal and Export Elevators	622	686	1,102	731	286	222	88	174	416	3,827	1,512	717	10,383
Feed Manufacturers	31	42	60	28	35	33	28	28	62	266	57	30	700
Other	142	183	334	302	271	68	147	42	289	2,044	1,004	356	5,182
Feed Grinders	6	11	7	76	8	40			8	1,915	442	100	2,613
Bean Processors	340	539	862	160	36	96	71	139	652	1,379	668	34	4,976
Total	3,348	3,552	4,815	2,947	1,272	1,153	572	830	7,121	41,681	11,952	3,586	82,829
From Elevators to:													
Country Elevators	130	101	150	70	49	23	9	12	44	1,050	413	93	2,144
Terminal and Export Elevators	2,525	2,614	2,865	2,796	2,281	904	1,153	455	1,181	19,740	4,556	2,019	43,089
Other	26	26	26	26					234	234	234	234	1,040
Bean Processors	1,141	1,053	1,056	971	601	526	173	737	1,087	7,670	1,177	508	16,700
Total	3,822	3,794	4,097	3,863	2,931	1,453	1,335	1,204	2,546	28,694	6,380	2,854	62,973
Grand Total	7,170	7,346	8,912	6,810	4,203	2,606	1,907	2,034	9,667	70,375	18,332	6,440	145,802

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TABLE 17.—Monthly Soybean Receipts by Firm Types from Out-of-State Origins, Ohio, 1977.

Firm Type	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
	(000 bu)												
From Farms to:													
Terminal and Export Elevators	359	463	714	542	192	119	41	106	240	2,132	1,071	474	6,453
Other	3	2	2	12	15	1		12	8	6	4	1	66
Total	362	465	716	554	207	120	41	118	248	2,138	1,075	475	6,519
From Elevators to:													
Terminal and Export Elevators	908	1,225	1,381	1,311	969	458	778	248	460	6,152	2,517	1,163	17,570
Total	908	1,225	1,381	1,311	969	458	778	248	460	6,152	2,517	1,163	17,570
Grand Total	1,270	1,690	2,097	1,865	1,176	578	819	366	708	8,290	3,592	1,638	24,089

origins (Tables 11 to 14). These observed differences exist because farms in NCSR area 25 produced more total bushels of corn than farms in area 50 and the export market in Toledo has historically acquired large quantities of grain from commercial firms in Ohio and surrounding states.

Total Soybean Receipts

In 1977, firms in Ohio received a grand total of 169.9 million bushels of soybeans, which represents a 73.3% increase over the reported soybean receipts of 98 million bushels in 1970 [Table 15 and (2)].

Of the 169.9 million bushels of soybeans received in Ohio marketplaces in 1977, 82.8 million bushels came directly from Ohio farms (Table 16). This was 18.6% higher than the 1970 figure of 69.8 million bushels (2). An additional 24.1 million bushels of soybeans arrived at Ohio marketplaces in 1977 from out-of-state origins (Table 17). Of that, 6.5 million bushels came directly from farms, primarily in Michigan and Indiana, and 17.6 million bushels of soybeans were shipped to Ohio by non-farm firms, again located primarily in Michigan and Indiana (Table 17). Michigan originated 55.2% of the out-of-state soybeans and Indiana 42.6%. The remainder came from Kentucky.

Of the 82.8 million bushels of soybeans originating from Ohio farms, 59 million bushels or 71.3% were first received by country elevators and 12.6% were received by terminal elevators (Table 16). This leaves 16.1% of the soybeans marketed directly by Ohio farmers to be absorbed by processors and other firms. This declining elevator share contrasts significantly with the 1970 marketing pattern when 99.5% of the soybeans marketed directly by Ohio farmers went either to country or terminal elevators. The shift toward direct marketings is a result of increased handling and transportation facilities which permit farmers to market soybeans in larger quantities, at greater distances, and to more alternative destinations.

Half of the soybeans originating on Ohio farms (50.3%) were shipped to markets during the month of October 1977, which shows little change from the harvest marketing patterns of 1970 when 52% of the soybeans were marketed by Ohio farmers in October. During the last 4 months of 1977, Ohio farmers marketed 77.7% of their soybeans, compared to the 85.6% which they marketed during the last 4 months of 1970. This again indicates a greater tendency to hold soybeans on farms in 1977 to market during the rest of the year, which represents a significant absolute change in the seasonal selling pattern over the 7-year period because soybean production has increased by 75%.

TABLE 18.—Monthly Soybean Receipts by Firm Types from Farms and Elevators in Sub-state Area 25 of Ohio, 1977.

Firm Type	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
(000 bu)													
From Farms to:													
Country Elevators	941	914	1,362	804	253	276	67	187	3,560	14,439	5,788	1,351	29,942
Terminal and Export Elevators	490	564	942	565	217	179	74	161	308	2,450	1,192	578	7,720
Feed Manufacturers	31	41	58	27	34	32	27	27	61	215	43	29	625
Other	42	29	39	41	29	3	65	12	242	249	255	253	1,259
Feed Grinders	6	11	7	6	8	5				540	140	15	738
Bean Processors	94	133	156	28	11	14	9	53	278	1,344	197	34	2,351
Total	1,604	1,692	2,564	1,471	552	509	242	440	4,449	19,237	7,615	2,260	42,635
From Elevators to:													
Country Elevators	97	84	117	67	46	20	6	9	41	819	413	93	1,812
Terminal and Export Elevators	487	546	727	518	316	285	184	295	316	2,735	1,387	475	8,271
Other	200	272	315	79	20	27	16	97	751	2,731	601	300	5,409
Total	784	902	1,159	664	382	332	206	401	1,108	6,285	2,401	868	15,492
Grand Total	2,388	2,594	3,723	2,135	934	841	448	841	5,557	25,522	10,016	3,128	58,127

TABLE 19.—Monthly Soybean Receipts by Firm Types from Farms and Elevators in Sub-state Area 50 of Ohio, 1977.

Firm Type	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
	(000 bu)												
From Farms to:													
Country Elevators	1,266	1,177	1,088	846	383	418	171	260	2,134	17,811	2,481	998	29,033
Terminal and Export Elevators	132	122	160	166	69	43	14	13	108	1,377	320	139	2,663
Feed Manufacturers		1	2	1	1	1	1	1	1	51	14	1	75
Other	100	154	295	261	242	65	82	30	47	1,795	749	103	3,923
Feed Grinders				70		35			8	1,375	302	85	1,875
Bean Processors	246	406	706	132	25	82	62	86	374	35	471	0	2,625
Total	1,744	1,860	2,251	1,476	720	644	330	390	2,672	22,444	4,337	1,326	40,194
From Elevators to:													
Country Elevators	33	17	33	3	3	3	3	3	3	231	0	0	332
Terminal and Export Elevators	2,038	2,068	2,138	2,278	1,965	619	969	160	865	17,005	3,169	1,544	34,818
Feed Manufacturers			1			1				51	13	1	67
Bean Processors	967	807	767	918	581	499	157	640	570	5,173	810	442	12,331
Total	3,038	2,892	2,939	3,199	2,549	1,122	1,129	803	1,438	22,460	3,992	1,987	47,548
Grand Total	4,782	4,752	5,190	4,675	3,269	1,766	1,459	1,193	4,110	44,904	8,329	3,313	87,742

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TABLE 20.—Monthly Soybean Receipts by Firm Types from Out-of-State Origins to Sub-state Area 25 of Ohio, 1977.

Firm Type	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
	(000 bu)												
From Farms to:													
Terminal and Export Elevators	252	358	580	367	101	57	21	89	183	1,188	860	309	4,365
Other	3	2	2	12	15	1		12	8	6	4	1	66
Total	255	360	582	379	116	58	21	101	191	1,194	864	310	4,431
From Elevators to:													
Terminal and Export Elevators	229	303	404	309	113	69	20	122	135	269	1,126	270	3,369
Total	229	303	404	309	113	69	20	122	135	269	1,126	270	3,369
Grand Total	484	663	986	688	229	127	41	223	326	1,463	1,990	580	7,800

NCSR Area Soybean Receipts

A comparison of the two marketing areas of Ohio for soybeans demonstrates that NCSR area 50 firms received substantially more soybeans from farms and firms in that area and from out-of-state origins than firms located in NCSR area 25. Firms located in NCSR area 50 received a grand total of 87.7 million bushels of soybeans from farms and elevators in that area and 16.3 million bushels from out-of-state origins compared to firm receipts of 58.1 million and 7.8 million bushels of soybeans, respectively, in NCSR area 25 (Tables 18 to 21).

The country elevator share of all receipts from farms was about 70% in each area, whereas the terminal and export elevator receipts from farms and non-farm firms were substantially higher in NCSR area 50 than in NCSR area 25 (Tables 18 to 21). Soybean processor receipts from farms and non-farm firms in NCSR area 50 were about 30% of all receipts in that area compared to soybean processor receipts of about 10% in NCSR area 25. The substantially higher soybean processor share of all firm receipts in NCSR area 50 can be largely explained by the fact that three of Ohio's four soybean processors are located in this area. The 1977 results for these two areas are similar to the receipt patterns found in the 1970 study (2).

Total Wheat Receipts

Elevators and processors reported receiving a grand total of 119.9 million bushels of wheat in 1977 (Table 22). Of that amount, 37.0 million bushels arrived from non-farm firms in Ohio and therefore represent a double counting, which leaves 82.9 million bushels of wheat received at Ohio markets from Ohio farms and from farms and firms in other states (Tables 22 and 23). Excluding the 4.5 million bushels of wheat received at Ohio markets from out-of-state non-farm firms, 78.5 million bushels of wheat were received at Ohio markets in 1977 directly from farms in Ohio and neighboring states (Table 22). This was 2.36 times more wheat received directly from farms at Ohio markets than in 1970. Most of those wheat receipts, 64.3 million bushels, came directly from Ohio farms (Table 23).

Ohio farmers marketed 64.9% of all wheat sales, or 41.7 million bushels, during the month of July 1977 compared with 75.7% of total wheat sales which moved from farms to the market in July 1970. During the months of July, August, and September 1977, 50.9 million bushels of wheat moved directly from Ohio farms to Ohio markets, or 79.3% of total wheat sales (Table 23). This is lower than the 89.5% of total wheat sales from Ohio farms during the third quarter of 1970. This change represents

TABLE 21.—Monthly Soybean Receipts by Firm Types from Out-of-State Origins to Sub-state Area 50 of Ohio, 1977.

Firm Type	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
	(000 bu)												
From Farms to:													
Terminal and Export Elevators	107	105	134	175	91	62	20	17	57	944	211	165	2,088
Total	107	105	134	175	91	62	20	17	57	944	211	165	2,088
From Elevators to:													
Terminal and Export Elevators	679	922	977	1,002	856	389	758	126	325	5,883	1,391	893	14,201
Total	679	922	977	1,002	856	389	758	126	325	5,883	1,391	893	14,201
Grand Total	786	1,027	1,111	1,177	947	451	778	143	382	6,827	1,602	1,058	16,289

TABLE 22.—Monthly Wheat Receipts by Firm Types from Farms and Elevators in Ohio and from Out-of-State Origins, Ohio, 1977

Firm Type	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
	(000 bu)												
From Farms to:													
Country Elevators	158	256	308	313	353	1,057	28,723	2,088	1,423	417	184	188	35,468
Terminal and Export Elevators	845	182	211	526	676	349	8,718	2,938	1,474	332	40	152	16,443
Feed Manufacturers	11	16	16	15	16	16	295	22	53	24	11	15	510
Flour Millers	1,494	1,584	1,333	1,057	261	871	4,355	1,967	1,569	1,201	1,062	686	17,440
Feed Grinders	17	19	5	4	3	4	1,646	144	30	57	14	7	1,950
Other	66	67	75	80	92	135	4,601	644	700	93	70	67	6,690
Total	2,591	2,124	1,948	1,995	1,401	2,432	48,338	7,803	5,249	2,124	1,381	1,115	78,501
From Elevators to:													
Country Elevators	11	16	25	62	54	34	1,392	240	229	164	20	16	2,263
Terminal and Export Elevators	636	339	492	993	517	583	14,404	4,621	2,755	653	70	278	26,341
Feed Manufacturers	12	16	14	15	14	16	125	22	43	16	11	13	317
Flour Millers	798	853	1,014	843	666	790	1,541	1,354	991	991	1,016	757	11,614
Bean Processors	0	0	0	0	24	3	621	87	114	11	21	17	898
Other	8	16	16	10	8								58
Total	1,465	1,240	1,561	1,923	1,283	1,426	18,083	6,324	4,132	1,835	1,138	1,081	41,491
Grand Total	4,056	3,364	3,509	3,918	2,684	3,858	67,107	13,441	9,381	3,959	2,519	2,196	119,992

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TABLE 23.—Monthly Wheat Receipts by Firm Types from Farms and Elevators in Ohio, 1977.

Firm Type	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
	(000 bu)												
From Farms to:													
Country Elevators	158	256	308	313	353	1,057	28,723	2,088	1,423	417	184	188	35,468
Terminal and Export Elevators	616	77	98	113	83	150	3,325	993	741	267	29	63	6,555
Feed Manufacturers	11	16	16	15	16	16	295	22	53	24	11	15	510
Flour Millers	1,119	1,204	1,043	817	261	721	3,195	1,167	1,194	991	842	596	13,150
Bean Processors	0	0	0	0	13	2	334	46	61	6	11	9	482
Feed Grinders	17	19	5	4	3	4	1,646	144	30	57	14	7	1,950
Other	64	67	75	74	89	135	4,565	643	692	81	70	67	6,622
Total	1,985	1,639	1,545	1,336	805	2,083	41,749	5,057	4,133	1,837	1,150	936	64,255
From Elevators to:													
Country Elevators	11	16	25	62	54	34	1,392	240	229	164	20	16	2,263
Terminal and Export Elevators	546	270	406	787	420	476	12,425	3,807	2,134	587	63	224	22,145
Feed Manufacturers	12	16	14	15	14	16	125	22	43	16	11	13	317
Flour Millers	780	833	993	824	646	771	1,522	1,329	968	966	991	734	11,357
Bean Processors	0	0	0	0	24	3	621	87	114	11	21	17	898
Total	1,349	1,135	1,438	1,688	1,158	1,300	16,085	5,485	3,488	1,744	1,106	1,004	36,980
Grand Total	3,334	2,774	2,983	3,024	1,963	3,383	57,834	10,542	7,621	3,581	2,256	1,940	101,235

a significant decrease in farmers' sales of wheat during the harvest season from 1970 to 1977 and re-emphasizes the importance of on-farm storage.

Country elevators reported receiving 35.4 million bushels or approximately 55.8% of the total annual sales directly from Ohio farmers in 1977, compared with the 90.7% of total annual sales that country elevators reported receiving in 1970. Flour mills reported receiving 13.2 million bushels of the 1977 crop or 19.6% directly from Ohio farmers (Table 23). This contrasts sharply with 1970 when flour mills did not report receiving wheat directly from farmers. Terminal elevators reported receiving 6.6 million bushels or 9.7% of their wheat directly from Ohio farmers in 1977. This proportion remained essentially the same as in 1970 when 9.3% of their receipts were directly from Ohio farmers. This leaves only 12.8% of Ohio farm sales in 1977 for receipt by other types of firms, an economic niche in wheat marketing that was not used at all in 1970. These changes in the receipt patterns by type of firm reinforce the observed trends in corn and soybean sales by farmers; more direct sales are occurring from farm storage to more alternative markets.

Of the 14.2 million bushels of wheat coming from farms in neighboring states, 62.3% went to terminal elevators in Ohio and 37.1% went to flour millers (Table 24).

NCSR Area Wheat Receipts

As in 1970, NCSR area 50 received the major share of all wheat receipts, 75.2 million bushels or 62.6%, while area 25 in contrast received 44.8 million or 37.4% of the state's total receipts. This finding is consistent with the findings reported for 1970 and reflects the importance and capacity of the wheat processing industry and the Toledo export market, both of which are located in NCSR area 50 [(2) and Tables 25 to 28].

Elevators and processing firms in both areas received equal amounts of wheat from Ohio farms; however, firms in area 50 received more than two times more wheat from Ohio elevators than did firms in area 25 and firms in area 50 received nearly 4.5 times more bushels of wheat from out-of-state origins than did firms in area 25 (Tables 27 and 28). These findings re-emphasize the importance and size of the wheat processing industry and the export markets and are comparable to findings reported for 1970.

Total Oat Receipts

Elevators and processors reported receiving a grand total of 14.8 million bushels of oats in 1977 (Table 29). Nearly 7 million bushels of oats came from Ohio farmers in 1977, which represents a decrease from the 15.3 million bushels of oats marketed

TABLE 24.—Monthly Wheat Receipts by Firm Types from Out-of-State Origins, Ohio, 1977.

Firm Type	(000 bu)												Total	
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.		
From Farms to:														
Terminal and Export Elevators	229	105	113	413	593	199	5,393	1,945	733	65	11	89	9,888	
Other	2			6	3		36	1	8	12			68	
Flour Millers	375	380	290	240	0	150	1,160	800	375	210	220	90	4,290	
Total	606	485	403	659	596	349	6,589	2,746	1,116	287	231	179	14,246	
From Elevators to:														
Terminal and Export Elevators	90	69	86	206	97	107	1,979	814	621	66	7	54	4,196	
Other	8	16	16	10	8								58	
Flour Millers	18	20	21	19	20	19	19	25	23	25	25	23	257	
Total	116	105	123	235	125	126	1,998	839	644	91	32	77	4,511	
Grand Total	722	590	526	894	721	475	8,587	3,585	1,760	378	263	256	18,757	

TABLE 25.—Monthly Wheat Receipts by Firm Types from Farms and Elevators in Sub-state Area 25 of Ohio, 1977.

Firm Type	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
	(000 bu)												
From Farms to:													
Country Elevators	31	118	144	97	217	559	15,383	777	795	134	78	81	18,414
Terminal and Export Elevators	567	23	47	67	33	72	1,502	651	270	86	19	46	3,383
Feed Manufacturers	10	12	12	11	13	11	181	12	21	18	11	13	325
Flour Millers	243	307	352	206	131	164	473	205	179	372	407	261	3,300
Other	8	11	19	17	35	8	2,050	569	614	24	12	10	3,377
Feed Grinders		16					493		24	1			534
Total	859	487	574	398	429	814	20,082	2,214	1,903	635	527	411	29,333
From Elevators to:													
Country Elevators	6	15	23	58	52	21	1,178	209	172	80	19	14	1,847
Terminal and Export Elevators	275	42	70	117	50	115	1,831	889	283	153	39	58	3,922
Feed Manufacturers	11	11	11	11	11	11	11	11	11	11	11	11	132
Flour Millers	369	437	493	340	261	297	601	369	332	536	568	416	5,019
Other	0	0	0	0	24	3	621	87	114	11	21	17	898
Total	661	505	597	526	398	447	4,242	1,565	912	791	658	516	11,818
Grand Total	1,520	992	1,171	924	827	1,261	23,964	3,779	2,815	1,426	1,185	927	41,151

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TABLE 26.—Monthly Wheat Receipts by Firm Types from Farms and Elevators in Sub-state Area 50 of Ohio, 1977.

Firm Type	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
	(000 bu)												
From Farms to:													
Country Elevators	127	138	164	216	149	500	13,192	1,357	689	289	117	116	17,054
Terminal and Export Elevators	49	54	51	46	50	78	1,823	342	471	181	10	17	3,172
Feed Manufacturers	1	4	4	4	3	5	114	10	32	6	0	2	185
Flour Millers	876	897	691	611	130	557	2,722	962	1,015	619	435	335	9,850
Other	56	56	56	57	54	127	2,515	74	78	57	58	57	3,245
Feed Grinders	17	3	5	4	3	4	1,153	144	6	56	14	7	1,416
Total	1,126	1,152	971	938	389	1,271	21,519	2,889	2,291	1,208	634	534	34,922
From Elevators to:													
Country Elevators	5	1	2	4	2	13	214	31	57	24	1	2	185
Terminal and Export Elevators	271	228	336	670	370	361	10,594	2,918	1,851	434	24	166	18,223
Feed Manufacturers	1	5	3	4	3	5	114	11	32	5	0	2	185
Flour Millers	411	396	500	484	385	474	921	960	636	430	423	318	6,338
Total	688	630	841	1,162	760	853	11,843	3,920	2,576	953	448	488	25,162
Grand Total	1,814	1,782	1,812	2,100	1,149	2,124	33,362	6,809	4,867	2,161	1,082	1,022	60,084

TABLE 27.—Monthly Wheat Receipts by Firm Types from Out-of-State Origins to Sub-state Area 25 of Ohio, 1977.

Firm Type	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
	(000 bu)												
From Farms to:													
Terminal and Export Elevators	138	3	26	39	17	18	1,295	271	16	34	2	17	1,876
Other	2			6	3		36	1	8	12			68
Total	140	3	26	45	20	18	1,331	272	24	46	2	17	1,944
From Elevators to:													
Terminal and Export Elevators	60	7	33	68	16	20	632	304	184	49	4	16	1,393
Flour Millers	18	20	21	19	20	19	19	25	23	25	25	23	257
Other	8	16	16	10	8								58
Total	86	43	70	97	44	39	651	329	207	74	29	39	1,708
Grand Total	226	46	96	142	64	57	1,296	601	231	120	31	56	3,652

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TABLE 28.—Monthly Wheat Receipts by Firm Types from Out-of-State Origins to Sub-state Area 50 of Ohio, 1977.

Firm Type	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
	(000 bu)												
From Farms to:													
Terminal and Export Elevators	91	102	87	374	576	181	3,784	988	717	31	9	72	7,012
Flour Millers	375	380	290	240	0	150	2,160	800	375	210	220	90	5,290
Total	466	482	377	614	576	331	5,944	1,788	1,092	241	229	162	12,302
From Elevators to:													
Terminal and Export Elevators	30	62	53	138	81	87	1,347	510	437	17	3	38	2,803
Total	30	62	53	138	81	87	1,347	510	437	17	3	38	2,803
Grand Total	496	544	430	752	657	418	7,291	2,298	1,529	258	232	200	15,105

TABLE 29.—Monthly Oat Receipts by Firm Types from Farms and Elevators in Ohio and from Out-of-State Origins, Ohio, 1977.

Firm Type	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
(000 bu)													
From Farms to:													
Country Elevators	306	354	262	266	163	139	2,615	1,300	390	73	31	50	5,949
Terminal and Export Elevators	33	23	26	23	30	6	31	71	29	5	8	0	285
Feed Manufacturers	21	31	44	25	23	23	57	40	39	21	26	26	376
Other	13	10	48	13	31	28	185	71	20	33	11	13	476
Feed Grinders	4	4	4	4	8	8	76	3	4	4	5	4	128
Total	377	422	384	331	255	204	2,964	1,485	482	136	81	93	7,214
From Elevators to:													
Country Elevators	128	166	244	77	117	101	233	826	560	63	21	14	2,550
Terminal and Export Elevators	56	94	72	54	52	28	291	517	136	11	8	0	1,319
Feed Manufacturers	317	280	308	304	283	288	303	278	286	286	279	279	3,491
Other	8	0	10	0	8	0	40	0	22	64	8	8	168
Feed Grinders	6	6	6	6	6	6	6	9	6	9	9	9	84
Total	515	546	640	441	466	423	873	1,630	1,010	433	325	310	7,612
Grand Total	892	968	1,024	772	721	627	3,837	3,115	1,492	569	406	403	14,826

by farmers in 1970 [Table 29 and (2)]. Farmers marketed 2.9 million bushels in the month of July 1977, or 43.3% of the marketed oat crop, which was down significantly from the 66.7% of all oats marketed in the month of July 1970 [Table 29 and (2)]. This constitutes 5.1 million bushels of oats stored on farms in 1970 and 3.8 million bushels stored on farms in 1977. The absolute decrease in the quantity stored is consistent with the declining trend in oat production.

Country elevators received 84.7% of the oats marketed by Ohio farmers in 1977 (Table 30). Terminal elevators received 1.3% of the annual harvest, processors received 5.6%, and other types of firms received 8.4% of the marketed oats in 1977. This shows some change from the marketing patterns of 1970 when 78.8% was received by country elevators, 16.3% by terminal elevators, and 4.9% by processors. The significant changes were the large reduction of receipts by terminal elevators and the increase of receipts by country elevators. The latter trend is foreign to that observed for corn, wheat, and soybeans and occurs because the declining oat production is mainly consumed locally by livestock.

In 1977, 2.1 million bushels of oats were received from other states, nearly double the 1.1 million bushels shipped into Ohio during 1970. This increase in oat receipts supplements the decreasing oat production level in Ohio and is used primarily by elevators and processors who are servicing the local feed industry. The trend to import more oats may continue in the decade of the 1980's. However, oat production, consumption, and marketing will continue to be insignificant relative to corn, wheat, and soybean production and marketings (Table 31).

NCSR Area Oat Receipts

Oat receipts from farms and elevators in NCSR area 25 were less than half the receipts from farms and elevators in NCSR area 50 during 1977 (Tables 32 and 33). This finding contrasts markedly with that of the 1970 study which found that NCSR area 25 received nearly 67% more oats than NCSR area 50. A principal reason for this change is that farms in NCSR area 25 have rapidly become specialized in cash grain production, whereas farms in NCSR area 50 continue to produce oats in order to raise feed for the dairy, sheep, and beef enterprises common in the eastern part of the state.

Country elevators handled more than 70% of all receipts from farms in NCSR area 25 compared to more than 90% in NCSR area 50. Feed manufacturers represent the other major buyer of oats in both NCSR areas, while terminal and export elevators are clearly not competing in the oat trade (Tables 32 and

TABLE 30.—Monthly Oat Receipts by Firm Types from Farms and Elevators in Ohio, 1977.

Firm Type	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
(000 bu)													
From Farms to:													
Country Elevators	294	303	247	261	145	135	2,594	1,269	315	64	29	49	5,705
Terminal and Export Elevators	3	11	4	3	2	2	16	29	12	2	4	0	88
Feed Manufacturers	21	31	44	25	23	23	57	40	39	21	26	26	376
Other	11	5	47	9	28	22	176	67	18	30	8	9	430
Feed Grinders	4	4	4	4	8	8	76	3	4	4	5	4	128
Total	333	354	346	302	206	190	2,919	1,408	388	121	72	88	6,727
From Elevators to:													
Country Elevators	25	31	29	15	27	14	75	90	88	13	4	5	416
Terminal and Export Elevators	17	53	32	24	15	15	248	373	90	8	5	0	880
Feed Manufacturers	317	280	308	304	283	288	303	278	286	286	279	279	3,491
Other	8		10		8		40		22	64	8	8	168
Feed Grinders	6	6	6	6	6	6	6	9	6	9	9	9	84
Total	373	370	385	349	339	323	672	750	492	380	305	301	5,039
Grand Total	706	724	731	651	545	513	3,591	2,158	880	510	377	389	11,775

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TABLE 31.—Monthly Oat Receipts by Firm Types from Out-of-State Origins, Ohio, 1977.

Firm Type	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
(000 bu)													
From Farms to:													
Country Elevators	8	34	10	3	12	3	14	21	51	6	1	1	164
Terminal and Export Elevators	20	8	15	13	19	3	10	28	11	2	3	0	132
Other	1	3	1	3	2	4	6	3	1	2	2	3	31
Total	29	45	26	19	33	10	30	52	63	10	6	4	327
From Elevators to:													
Country Elevators	69	91	145	42	61	59	106	497	318	34	11	6	1,439
Terminal and Export Elevators	26	28	27	20	25	9	29	97	31	2	2	0	296
Total	95	119	172	62	86	68	135	594	349	36	13	6	1,735
Grand Total	124	164	198	81	119	78	165	646	412	46	19	10	2,062

TABLE 32.—Monthly Oat Receipts by Firm Types from Farms and Elevators in Sub-state Area 25 of Ohio, 1977.

Firm Type	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
	(000 bu)												
From Farms to:													
Country Elevators	68	28	35	54	8	37	951	345	34	12	0	15	1,587
Terminal and Export Elevators		4					9	3	4	2	4		26
Feed Manufacturers	21	28	40	20	21	19	48	36	37	16	22	23	331
Other	7	2	7	7	7	2	45	2		2	7	7	95
Feed Grinders	4	4	4	4	8	8	76	3	4	4	5	4	128
Total	100	66	86	85	44	66	1,129	389	79	36	38	49	2,167
From Elevators to:													
Country Elevators	11	14	12	8	16	8	34	40	15	3	1	1	163
Terminal and Export Elevators		4					19	14	4	2	4		47
Feed Manufacturers	117	80	108	104	83	88	101	78	86	86	79	79	1,089
Other	8		8		8		39				8	8	79
Feed Grinders	6	6	6	6	6	6	6	9	6	9	9	9	84
Total	142	104	134	118	113	102	199	141	111	100	101	97	1,462
Grand Total	242	170	220	203	157	168	1,328	530	190	136	139	146	3,629

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TABLE 33.—Monthly Oat Receipts by Firm Types from Farms and Elevators in Sub-state Area 50 of Ohio, 1977.

Firm Type	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
	(000 bu)												
From Farms to:													
Country Elevators	226	275	212	207	137	98	1,643	924	281	52	29	34	4,118
Terminal and Export Elevators	3	7	4	3	2	2	7	26	8	0	0	0	62
Feed Manufacturers	0	3	4	5	2	4	9	4	2	5	4	3	45
Other	4	3	40	2	21	20	131	65	18	37	1	2	344
Total	233	288	260	217	162	124	1,790	1,019	309	94	34	39	4,569
From Elevators to:													
Country Elevators	14	17	17	7	11	6	41	50	73	10	3	4	253
Terminal and Export Elevators	17	49	32	24	15	15	229	359	86	6	1	0	833
Feed Manufacturers	200	200	200	200	200	200	202	200	200	200	200	200	2,402
Other			2				1		22	64			89
Total	231	266	251	231	226	221	473	609	381	280	204	204	3,577
Grand Total	464	554	511	448	388	345	2,263	1,628	690	374	238	243	8,146

TABLE 34.—Monthly Oat Receipts by Firm Types from Out-of-State Origins to Sub-state Area 25 of Ohio, 1977.

Firm Type	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
(000 bu)													
From Farms to:													
Country Elevators	0	24	0	0	5	0	0	0	5	0	0	0	34
Terminal and Export Elevators	17	0	10	10	16	0	3	0	3	2	3	0	64
Other	1	3	1	3	2	4	6	3	1	2	2	3	31
Total	18	27	11	13	23	4	9	3	9	4	5	3	129
From Elevators to:													
Terminal and Export Elevators	17	0	10	9	16	0	3	0	3	2	2	0	62
Feed Manufacturers	54	54	54	54	54	54	54	54	54	54	54	54	648
Total	71	54	64	63	70	54	57	54	57	56	56	54	710
Grand Total	89	81	75	76	93	58	66	57	66	60	61	57	839

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TABLE 35.—Monthly Oat Receipts by Firm Types from Out-of-State Origins to Sub-state Area 50 of Ohio, 1977.

Firm Type	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
(000 bu)													
From Farms to:													
Country Elevators	8	10	10	3	7	3	14	21	45	6	1	1	129
Terminal and Export Elevators	3	8	5	3	3	3	7	28	9	0	0	0	69
Total	11	18	15	6	10	6	21	49	54	6	1	1	198
From Elevators to:													
Country Elevators	69	91	145	42	61	59	106	496	318	34	11	6	1,438
Terminal and Export Elevators	9	28	17	11	9	9	26	97	28	0	0	0	234
Total	78	119	162	53	70	68	132	593	346	34	11	6	1,672
Grand Total	89	137	177	59	80	74	153	642	400	40	12	7	1,870

TABLE 36.—Grain and Oilseed Shipments to Out-of-State Destinations by Mode of Transportation as Reported by Elevator and Grain Processing Firms in Ohio, 1977.

Commodity	Mode of Transportation			Total
	Truck	Rail	Water	
	(000 bu)			
Corn	11,290	163,592	113,397	288,279
Soybeans	4,961	42,222	54,245	101,428
Wheat	5,662	21,720	17,201	44,583
Oats	3,079	5,970	0	9,049
Total Grain	24,992	233,504	184,843	443,339

33). Almost all oat receipts from out-of-state origins in NCSR area 25 were handled by feed manufacturers, in contrast to NCSR area 50 where almost all oat receipts were handled by country elevators (Tables 34 and 35). Oat receipts from neighboring states increased to more than 2 million bushels in 1977 compared to only 1.1 million bushels in 1970, which again indicates a trend toward less production in Ohio and more imports for feed use.

INTERSTATE GRAIN SHIPMENTS

Total Grain Shipments

Ohio firms reported shipping 443.3 million bushels of grain to deficit areas of the United States and to foreign export in 1977 (Table 36). This is nearly twice as much as the 227.1 million bushels of grains shipped from Ohio in 1970 (2). Terminal elevators were the biggest handlers in interstate grain shipments, sending 59.3% of all shipments. This was

TABLE 37.—Grain and Oilseed Shipments to Out-of-State Destinations by Mode of Transportation as Reported by Elevators and Grain Processing Firms in Ohio, 1977.

Destinations	ME	VT	CT	NY	PA	DE	MD	VA-WV
	(000 bu)							
Corn Shipments								
All Modes	1,934	1,022	2,962	5,818	10,495	105	917	1,899
Commercial Truck					2,191	105	360	1,899
Farm Truck*					688			
Rail	1,934	1,022	2,962	5,818	7,616		557	
Water†								
Soybean Shipments								
All Modes	0	0	0	590	0	0	278	1,344
Commercial Truck								
Farm Truck*								
Rail				590			278	1,344
Water†								
Wheat Shipments								
All Modes	0	0	0	4,147	9,478	0	1,260	948
Commercial Truck					4,808			90
Farm Truck*								
Rail				4,147	4,670		1,260	858
Water†								
Oat Shipments								
All Modes	0	27	0	0	5,669	0	0	1,942
Commercial Truck					1,899			199
Farm Truck*					31			
Rail		27			3,739			1,743
Water†								

*Reported on NCSR state survey.

†Includes shipments via the Ohio River and St. Lawrence Seaway.

TABLE 37 (Continued).—Grain and Oilseed Shipments to Out-of-State Destinations by Mode of Transportation as Reported by Elevators and Grain Processing Firms in Ohio, 1977.

Destinations	NC	SC	GA	IN	KY	TN	MS	AL
Corn Shipments								
All Modes	12,198	14,828	5,000	3,065	2,558	1,195	108	2,574
Commercial Truck	51			3,065	2,558	276	97	
Farm Truck*								
Rail	12,147	14,828	5,000			919	11	
Water†								2,574
Soybean Shipments								
All Modes	7,033	5,457	575	4,637	324	1,527	0	716
Commercial Truck				4,637	324			
Farm Truck*								
Rail	7,033	5,457	575			1,344		392
Water†						183		324
Wheat Shipments								
All Modes	0	119	0	71	64	0	0	0
Commercial Truck				71	64			
Farm Truck*								
Rail		119						
Water†								
Oat Shipments								
All Modes	151	305	82	188	504	100	0	0
Commercial Truck	77	81		188	504	100		
Farm Truck*								
Rail	74	224	82					
Water†								

Destinations	Exports							TOTAL
	FL	MI	IL	Toledo	East Coast	Gulf	Total	
(000 bu)								
Corn Shipments								
All Modes	0	0	0	82,593	110,778	28,230	221,601	288,279
Commercial Truck								10,602
Farm Truck*								688
Rail					110,778		110,778	163,592
Water†				82,593		28,230	110,823	113,397
Soybean Shipments								
All Modes	0	0	0	43,242	25,209	10,496	78,947	101,428
Commercial Truck								4,961
Farm Truck*								0
Rail					25,209		25,209	42,222
Water†				43,242		10,496	53,738	54,245
Wheat Shipments								
All Modes	0	1,351	2,444	14,031	7,500	3,170	24,701	44,583
Commercial Truck		629						5,662
Farm Truck*								0
Rail		722	2,444		7,500		7,500	21,720
Water†				14,031		3,170	17,201	17,201
Oat Shipments								
All Modes	81	0	0	0	0	0	0	9,049
Commercial Truck								3,048
Farm Truck*								31
Rail	81							5,970
Water†								

*Reported on NCSR state survey.

†Includes shipments via the Ohio River and St. Lawrence Seaway.

TABLE 38.—Monthly Corn Shipments to Out-of-State Destinations by Firm Type, Ohio, 1977.

Firm Type	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Country Elevators	9,888	8,198	8,370	6,706	7,131	7,047	5,655	9,188	9,172	10,233	18,176	12,526	112,290
Terminal and Export Elevators	6,297	9,735	11,845	7,776	12,273	10,927	11,167	13,015	13,017	15,169	29,716	19,250	160,187
Feed Manufacturers	72	72	89	124	72	60	61	60	60	60	32	32	794
Flour Millers	439	287	297	55	108	111	133	147	98	0	330	442	2,447
Soybean Processors	726	735	1,100	756	735	388	0	326	505	495	1,338	395	7,499
Other	418	419	594	769	539	452	461	190	69	380	556	206	5,053
Total	17,840	19,446	22,295	16,186	20,858	18,985	17,477	22,926	22,921	26,337	50,148	32,851	288,279

(000 bu)

followed by country elevators which shipped 34.6% of the grain. The remaining 6.1% of grain in interstate shipments was handled by other firms and processors. The relative importance of the different firms is nearly the same as that for 1970 when terminal elevators moved 60.6%, country elevators moved 38.3%, and other firms moved less than 1%. Other types of firms such as processors have increased their out-of-state shipments significantly from less than 1% of the shipments to 6.1%. This was primarily at the expense of country elevators. The processors' most important role as a shipper was for wheat in which they handled 13.4% of shipments to out-of-state destinations.

More than half (52.3%) of the out-of-state grain shipments moved by rail, 42.1% moved by water, and 5.6% moved by truck in 1977 (Table 36). This indicates a significant increase in water transportation compared to 1970 when 63%, 27.7%, and 9.3% moved by rail, water, and truck, respectively. Water transport has gained at the expense of other transportation modes. The increased water shipments reflect the growing export demand for Ohio grain, particularly corn shipments to the Gulf and through Toledo.

Ohio firms used the above transportation system to ship grain to the grain deficit areas in the southeastern and northeastern states or to export points. Slightly more than 73% of total out-of-state shipments (325.2 million bushels) went to overseas exports in 1977 compared to 36.8% of the 1970 out-of-state shipments that went to export. In contrast, domestic shipments decreased relatively from 63.2% of the total in 1970 to 24% in 1977 and absolutely from 143.5 million bushels in 1970 to 105.5 million in 1977 [(2) and Table 37].

In 1970, Baldwin and Sharp reported that all exported grain either moved by water through the Toledo port or was shipped by rail to the East Coast. Toledo, Philadelphia, Baltimore, and Norfolk served as rail destinations for Ohio grain which was then shipped abroad. However, by 1977 the pattern changed slightly so that New Orleans handled 41.9 million bushels or 12.9% of Ohio exported grain, all of which was corn and soybeans. Toledo handled 139.8 million bushels or 43% of Ohio's grain going to export, and the East Coast ports handled 143.5 million bushels or 44.1% of the grain going to export in 1977 (Table 37).

In 1977, November was the single busiest shipping month with 68.6 million bushels of grain leaving the state. October was the second busiest month with 63 million bushels of grain being shipped. This is similar to 1970 when the busiest month was also November with 28.2 million bushels of grain shipped.

Heavy grain shipments in October and November are reflective of the corn and soybean harvest. During 1970, corn took precedent as the single greatest shipped commodity except in October when more soybeans were shipped than corn. The overall seasonal grain flow is largely reflective of the movement of corn out of state. Of all Ohio grains, corn has the most volume fluctuation in seasonal shipments with a monthly average of 24 million bushels in 1977, ranging from a low of 16.2 million bushels in April to a high of 50.1 million bushels in November (Table 38). The monthly variation in soybean shipments ranges from a low of 1.9 million bushels in August to a high of 32 million bushels in October, with an annual monthly average of 8.5 million bushels (Table 39). During 1977, the monthly average wheat shipment to other states was 3.7 million bushels and varied from slightly less than 1 million bushels in November to 11.4 million bushels in August (Table 40). Oat shipments were very small and showed no discernible seasonal pattern (Table 41). The average monthly shipment was 0.75 million bushels, with a high of 1.2 million bushels in January and a low of 0.45 million bushels in May.

During the harvest months of July and August, and October and November, 198.6 million bushels of grain were shipped out of Ohio or 44.8% of the annual shipments in 1977.

NCSR Area Grain Shipments

Firms in NCSR area 50 shipped 262.9 million bushels of grain out of state in 1977, which represents 59.3% of Ohio's total out-of-state shipments. This compares to 131.8 million bushels of grain shipped from NCSR area 50 in 1970, which constituted 58.1% of the Ohio grain shipments that year. Terminal elevators in NCSR area 50, the primary handlers of grain, shipped 76.9% of the out-of-state grain in 1977. In NCSR area 25, terminal elevators moved 33.7% of the grain which went out of state, country elevators shipped 56.1%, and other firms shipped 10.2% in 1977. In 1970, country elevators in NCSR area 25 moved 51.1% of the grain shipments to out-of-state destinations and terminal elevators moved 48.5%, with other types of firms handling less than 0.5%.

Interstate Corn Shipments

In 1977, 288.3 million bushels or 77% of the total corn supply were shipped out of Ohio, which compares with 135.3 million bushels (53.8% of the total corn supply) transported in 1970 [(2) and Table 38]. In 1977, 221.6 million bushels of Ohio corn went to export or 76.8% of interstate corn shipments compared to exports of only 30.6 million bushels or 22.6% of interstate shipments in 1970 (Table

TABLE 39.—Monthly Soybean Shipments to Out-of-State Destinations by Firm Type, Ohio, 1977.

Firm Type	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Country Elevators	1,408	2,684	2,413	1,241	1,182	544	226	184	453	7,111	3,769	961	22,176
Terminal and Export Elevators	2,298	3,277	2,658	6,288	5,082	4,677	3,625	1,535	1,719	24,344	12,131	6,412	74,046
Feed Manufacturers	28	28	28	35	29	33			3				184
Flour Millers		164	8	29	364		24	8	29	39	99	203	967
Soybean Processors							47	47	105	343	379	323	323
Other	76	105	162	134	162	53	75	75	75	514	514	75	1,934
Feed Grinders	75	75	75	75	75	75	75	75	75	75	75	75	1,778
Total	3,885	6,333	5,344	7,802	6,894	5,382	3,997	1,849	2,384	32,351	16,892	8,295	101,428

(000 bu)

TABLE 40.—Monthly Wheat Shipments to Out-of-State Destinations by Firm Type, Ohio, 1977.

Firm Type	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
	(000 bu)												
Country Elevators	414	554	282	325	319	476	3,335	2,749	1,500	472	86	256	10,768
Terminal and Export Elevators	2,016	656	284	1,635	620	156	3,390	7,243	7,588	2,640	449	1,168	27,845
Feed Manufacturers	9	9	16	10	15	14				76			149
Flour Millers		180	227	241	206	195	205	316	345	280	260	259	2,714
Soybean Processors					276		563	47	180			13	1,079
Other	46	46	44	5	5	5	4	973	4	4	4	4	1,144
Feed Grinders	38	38	38	38	38	38	470	39	38	38	38	38	889
Total	2,523	1,483	891	2,254	1,479	884	7,967	11,367	9,655	3,510	837	1,738	44,584

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TABLE 41.—Monthly Oat Shipments to Out-of-State Destinations by Firm Type, Ohio, 1977

Firm Type	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
	(000 bu)												
Country Elevators	998	667	1,141	472	354	472	698	719	735	745	466	572	8,042
Terminal and Export Elevators	151	112	126		89			29	118		232	58	915
Feed Manufacturers	6	6	8										20
Other	6	6	6	6	6	6	6	6	6	6	6	6	72
Total	1,161	791	1,281	478	449	478	704	754	859	754	704	636	9,049

37).⁶ The magnitude of this change illustrates the importance of the export market to the Ohio grain industry.

In 1970, 29.7 million bushels of corn were shipped into six different southern states; this figure increased to 39.4 million bushels of corn going to eight different southern states by 1977 (Table 37). The Carolinas were the largest market in the southern states, absorbing 27 million bushels of corn in 1977 compared to 23.9 million bushels in 1970. Georgia was the second largest market in 1977, absorbing 5 million bushels compared to 1 million in 1970. The rest of the southern states purchased 7.3 million bushels of corn from Ohio in 1977. Overall, the domestic demand in the South for Ohio grain increased by about one-third between 1970 and 1977 and was fed to livestock. An additional 28.2 million bushels of corn were shipped to the Gulf ports, a movement that was not reported in 1970.

More than 60.5 million bushels of Ohio corn were reported shipped to the Northeast United States which includes Pennsylvania, New York, New England, the Virginias, and East Coast export points in 1970.⁷ More than 133.8 million bushels of corn were reported shipped to that same area in 1977, with 5.9 million going to New England, 10.5 million going to Pennsylvania, and 5.8 million going to New York, with the remaining 110.8 million bushels going to the ports of Philadelphia, Baltimore, and Norfolk (Table 37).

In 1970, 11.4 million bushels of corn went to other midwestern states (Indiana and Wisconsin); this dropped to 3.1 million bushels in 1977, all of which was shipped to Indiana. An additional 82.6 million bushels of corn were shipped to export via the Toledo port, representing a dramatic increase from the 17.8 million bushels shipped in 1970 [Table 37 and (2)].

About 39% of the corn shipped out of Ohio originated from country elevators and 55.6% from terminal elevators (Table 38). The remaining 5.4% originated from millers, manufacturers, processors, and other firm types.

All East Coast export corn moved by rail in 1977, while the Gulf Coast and Toledo movements were by water. For the same year, Ohio's elevators shipped nearly all of the corn (19.4 million bushels) to domestic points in the Northeast by rail. Most shipments into the South were also by rail, while the minute quantity shipped into Indiana moved by

⁶Exports in the 1970 study are slightly underestimated because firms in Pennsylvania were not enumerated and Ohio shippers could not explicitly delineate shipments among domestic and export points.

⁷For purposes of comparison between the 1970 and 1977 data, the data for the Virginias and the Norfolk port were included with the East Coast information.

TABLE 42.—Monthly Corn Shipments to Out-of-State Destinations by Firm Type of Sub-state Area 25, Ohio, 1977.

Firm Type	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Country Elevators	7,842	6,670	6,393	5,147	5,428	5,376	4,180	7,097	6,925	7,458	10,164	9,884	82,564
Terminal and Export Elevators	2,406	4,148	3,633	2,836	3,093	1,695	1,499	1,300	1,350	2,608	4,078	3,229	31,875
Feed Manufacturers	72	72	72	72	72	60	61	60	60	60	32	32	725
Flour Millers	439	287	297	55	108	111	133	147	98	442	330	442	2,447
Soybean Processors	726	735	1,100	756	735	388	198	326	505	495	1,338	395	7,499
Other	69	69	69	69	190	190	198	190	69	118	118	118	1,467
Total	11,554	11,981	11,564	8,935	9,626	7,820	6,071	9,120	9,007	10,739	16,060	14,100	126,577

TABLE 43.—Monthly Corn Shipments to Out-of-State Destinations by Firm Type of Sub-state Area 50, Ohio, 1977.

Firm Type	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
	(000 bu)												
Country Elevators	2,046	1,528	1,977	1,559	1,703	1,671	1,475	2,091	2,247	2,775	8,012	2,642	29,726
Terminal and Export Elevators	3,891	5,587	8,212	4,940	9,180	9,232	9,668	11,715	11,667	12,561	25,638	16,021	128,312
Feed Manufacturers			17	52									69
Other	349	350	525	700	349	262	263			262	438	88	3,586
Total	6,286	7,465	10,731	7,251	11,232	11,165	11,406	13,806	13,914	15,598	34,088	18,751	161,693

TABLE 44.—Monthly Soybean Shipments to Out-of-State Destinations by Firm Type of Sub-state Area 25, Ohio, 1977.

Firm Type	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
	(000 bu)												
Country Elevators	796	1,624	1,853	680	824	364	96	16	124	4,059	2,727	455	13,618
Terminal and Export Elevators	1,262	2,099	1,043	1,389	1,020	1,079	873	659	1,463	4,220	4,211	2,640	21,958
Feed Manufacturers	28	28	28	28	29	29							170
Flour Millers		164	8	29	364		24	8	29	39	99	203	967
Other	47	47	47	47	47	47	47	47	47	80	89	412	1,004
Total	2,133	3,962	2,979	2,173	2,284	1,519	1,040	730	1,663	8,398	7,126	3,710	37,717

TABLE 45.—Monthly Soybean Shipments to Out-of-State Destinations by Firm Type of Sub-state Area 50, Ohio, 1977.

Firm Type	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
	(000 bu)												
Country Elevators	612	1,060	560	561	358	180	130	168	329	3,052	1,042	506	8,558
Terminal and Export Elevators	1,036	1,178	1,615	4,899	4,062	3,598	2,752	876	256	20,124	7,920	3,772	52,088
Feed Manufacturers				7		4			3				14
Other	29	58	115	87	115	6			58	263	290	232	1,253
Feed Grinders	75	75	75	75	75	75	75	75	75	514	514	75	1,778
Total	1,752	2,371	2,365	5,629	4,610	3,863	2,957	1,119	721	23,953	9,766	4,585	63,691

truck (Table 37). The modal split reported in 1977 was similar to the one reported in 1970.

NCSR Area Corn Shipments

Since 126.6 million bushels or 43.9% of the corn sold outside Ohio originated in NCSR area 25 and the remaining 161.7 million bushels or 56.1% came from NCSR area 50 in 1977, the latter area has become more important in corn shipments than was true in 1970 when NCSR areas 25 and 50 each shipped about 50% of the 135.3 million bushels of corn to out-of-state destinations [Tables 42 and 43 and (2)]. Corn shipments by type of firm demonstrate that country elevators and terminal and export elevators shared about equally in these shipments from each NCSR area in 1970, but that country elevators increased their share to more than 65% of all corn shipments from NCSR area 25 in 1977 while the terminal and export elevator share dropped to 25% of all corn shipments to other states.

Processors located in NCSR area 25 increased their share of corn shipments from essentially zero in 1970 to more than 16% of all corn shipments to other states in 1977. On the other hand, terminal and export elevators in NCSR area 50 increased their share of corn shipments to other states from 56% in 1970 to more than 79% in 1977, while the country elevator share dropped from 44% in 1970 to 18% in 1977. Because of the strong export demand, terminal and export elevators in NCSR area 50 have been able to increase their share of corn shipments from that region while country elevators through the use of multiple car shipments to the East Coast have also been able to increase their share of corn shipments from NCSR area 25.

Interstate Soybean Shipments

In 1977, Ohio shipped 101.4 million bushels of soybeans to other areas of the United States and to export, which constituted 69.6% of the total supply (Table 39). In 1970, Ohio firms shipped 60.7 million bushels of beans to other states and abroad, which constituted 61.1% of the total supply at that time. Nearly 79 million bushels of beans or 78.6% of the total out-of-state shipments were exported in 1977 compared with 49.2 million bushels of beans exported in 1970 or 81% of that year's total shipments (Table 37). More than half the exports or 43.2 million bushels went through the Toledo port in 1977, with an additional 25.2 million or 31.9% of the total shipments going to East Coast ports and 10.5 million or 18.1% of the total shipments going to Gulf ports. As in 1970, only small quantities of soybeans were shipped to out-of-state domestic points; 5.7 million bushels moved to Pennsylvania, 1.9 million bushels to the Virginias, and 1.4 million bushels to all other loca-

tions. Just like in 1970, the Ohio 1977 soybean supply was mainly processed in Ohio or shipped to export.

In 1977, terminal elevators handled 74.0 million bushels of soybeans or 73.0% of the beans shipped out of Ohio as compared with 1970 when terminal elevators handled 70.7% of the beans shipped outside the state (Table 39). In 1977, country elevators handled 22.2 million bushels or 21.9% of all the beans shipped by the state. The remaining 5.1% of the beans were shipped by other types of Ohio firms.

NCSR Area Soybean Shipments

Because 63.7 million bushels or nearly 63 percent of the soybeans shipped to areas outside Ohio originated in NCSR area 50 and the remainder, 37.7 million bushels or 36.3%, came from NCSR area 25, firms in area 50 were the predominant shippers of grain to out-of-state destinations in 1977 as they were in 1970. However, firms in area 50 lost some of their relative advantage in that in 1970 area 50 shipped nearly 76% of the total state soybean shipments while area 25 shipped only 24% [(2) and Tables 44 and 45]. Firms in area 25 gained additional shipments at the expense of firms in area 50 because of the introduction of trainload rates and stations and the building of new elevators on the Ohio River. Substantial quantities of grain were moving down the Ohio River for export in 1977 which were not moving in 1970.

Soybean shipments by type of firm demonstrate that terminal and export elevators were the dominant shippers of grain in both areas. However, in area 50, terminal and export elevators captured nearly 81% of all shipments. Processors and other firms shipped only minute quantities of soybeans to out-of-state destinations, a fact that also existed in 1970. Thus, as in 1970 processors are in the manufacturing business rather than in the grain merchandising business and export markets are primarily receiving grain from terminals and export elevators rather than from country elevators. Country elevators are not located on appropriate lakes or rivers and many do not have the ability to load unit trains.

Interstate Wheat Shipments

More than 44.6 million bushels of wheat (53.7% of total supply) were shipped outside the state in 1977 compared with only 19.7 million bushels of wheat (50.8% of total supply) shipped in 1970 [Table 40 and (2)]. Approximately 24.7 million bushels of wheat or 55.4% of the total shipments were exported in 1977 compared with 3.6 million bushels of wheat (18.3% of total shipments) in 1970. Most of the wheat exports (14 million bushels or 56.7% of total export) moved through Toledo. Another 7.5 million

TABLE 46.— Monthly Wheat Shipments to Out-of-State Destinations by Firm Type of Sub-state Area 25, Ohio, 1977.

Firm Type	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
	(000 bu)												
Country Elevators	105	83	32	69	181	81	1,356	1,164	1,000	219	49	96	4,435
Terminal and Export Elevators	1,284	290	78	265	47	35	1,541	1,614	1,009	235	228	303	6,929
Feed Manufacturers	9	9	10	10	10	11							59
Flour Millers		180	227	241	206	195	205	316	345	280	260	259	2,714
Soybean Processors					276		563	47	180			13	1,079
Other	46	46	44	5	5	5	4	4	4	4	4	4	175
Total	1,444	608	391	590	725	327	3,669	3,145	2,538	738	541	675	15,391

TABLE 47.—Monthly Wheat Shipments to Out-of-State Destinations by Firm Type of Sub-state Area 50, Ohio, 1977.

Firm Type	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
	(000 bu)												
Country Elevators	309	471	250	256	138	395	1,979	1,585	500	253	37	160	6,333
Terminal and Export Elevators	732	366	206	1,370	573	121	1,849	5,629	6,579	2,405	221	865	20,916
Feed Manufacturers			6		5	3				76			90
Other								969					969
Feed Grinders	38	38	38	38	38	38	470	39	38	38	38	38	889
Total	1,079	875	500	1,664	754	557	4,298	8,222	7,117	2,772	296	1,063	29,197

TABLE 48.—Monthly Oat Shipments to Out-of-State Destinations by Firm Type of Sub-state Area 25, Ohio, 1977.

Firm Type	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
	(000 bu)												
Country Elevators	79	46	81	72	39	44	29	23	58	60	58	58	647
Other	6	6	6	6	6	6	6	6	6	6	6	6	72
Feed Manufacturers	6	6	8										20
Total	91	58	95	78	45	50	35	29	64	66	64	64	739

TABLE 49.—Monthly Oat Shipments to Out-of-State Destinations by Firm Type of Sub-state Area 50, Ohio, 1977.

Firm Type	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
	(000 bu)												
Country Elevators	919	621	1,060	400	315	427	669	696	677	689	408	514	7,395
Terminal and Export Elevators	151	112	126		89			29	118		232	58	915
Total	1,070	733	1,186	400	404	427	669	725	795	689	640	572	8,310

bushels or 30.4% of total exports were shipped to the East Coast and 3.2 million bushels or 12.9% were shipped by barge to the Gulf.

The dramatic increase in wheat exports emphasizes that Ohio farmers are producing for a world market. A major change from 1970 to 1977 is the decrease in wheat shipments to domestic destinations outside of Ohio which equaled 81.7% of total shipments in 1970 and only 44.6% in 1977. The only significant domestic destinations for out-of-state wheat shipments in 1977 were Pennsylvania and New York. As in the case of soybeans, Ohio farmers are producing wheat primarily for local processors and for export (Table 37).

Of the above shipments, terminal elevators handled the greatest share in 1977, moving 27.8 million bushels of wheat or 62.5% of the out-of-state shipments (Table 40). Country elevators were the next most important shippers, moving 10.8 million bushels of wheat or 24% of the year's surplus. Flour millers shipped 2.7 million bushels of wheat out of state for a 6% share of the market. Very small amounts of wheat were also shipped out of state in 1977 by manufacturers and processors (Table 40). The amount of wheat handled in 1970 by these firm types differed substantially from 1977. Country and terminal elevators merchandised about 50% of the wheat shipments, while processors reported no out-of-state shipments in 1970. This change from 1970 to 1977 occurred because of the increasing importance of the wheat export markets in which terminal, export, and river elevators played a major role [Table 40 and (2)].

Elevators and processing firms shipped wheat by rail, water, and truck in 1977; the percentages of total out-of-state shipments by mode were 48.6%, 38.6%, and 12.8%, respectively. These compare to 1970 rail, water, and truck modal shares of 82.8%, 11.1%, and 6.1%, respectively. The increased importance of the export market is a principal explanation of these changes in modal shares.

NCSR Area Wheat Shipments

Since 29.2 million bushels or approximately 63% of the wheat shipments sold outside of Ohio originated in NCSR area 50 and the remaining 15.4 million bushels or 37% came from NCSR area 25, the former area has become more important in interstate wheat shipments than was true in 1970 when the two areas shared equally in wheat interstate shipments [(2) and Tables 46 and 47]. Terminal and

export elevators in area 50 merchandised most (nearly 70%) of that area's shipments, while these firms in area 25 handled slightly less than 50% of their area's total interstate shipments. Processors and other firms shipped only minute quantities of wheat to out-of-state destinations. These findings were similar to those reported for 1970; however, in 1977 terminal elevators were capturing a larger relative share of all shipments. The trends which developed in the 1970's were a result of the growing wheat export market which captured grain at the expense of the domestic wheat market.

Interstate Oat Shipments

Nine million bushels of oats or 32.8% of total supply moved to domestic destinations in other states in 1977 compared to 11.3 million bushels (30% of total supply) in 1970. As in 1970, oats were not exported in 1977; Pennsylvania and the Virginias were the principal destinations for Ohio's oat shipments (Table 37).

Country elevators in Ohio were the predominant shippers of oats, with terminal elevators and other firms shipping very small amounts in 1977 (Table 41). Most (66.7% of all shipments) oat shipments moved by rail, while 33.3% moved by truck in 1977. These findings are similar to those reported in 1970.

NCSR Area Oat Shipments

More than 90% of all oat shipments to out-of-state destinations were made by firms located in NCSR area 50, while firms located in NCSR area 25 shipped less than 10% of all oat shipments to other states in 1977 (Tables 48 and 49). Since NCSR area 25 shipped more than 31% of all oat shipments to out-of-state destinations in 1970, this declining share of shipments from area 25 is another indication that this region has become more specialized in cash grain production and marketing while oat production has shifted to other areas of Ohio.

Country elevators and terminal and export elevators shared about equally in oat shipments from NCSR area 50, while country elevators shared about 58% of the oat shipments from NCSR area 25 in 1970. By 1977, the oat shipments by firm types had changed so that country elevators handled more than 90% of all oat shipments to out-of-state destinations from each NCSR area. Terminal and export elevators no longer played an important role in oat shipments because oats are mainly used in the local feed industry rather than being sold in the international market.

CONCLUSIONS AND IMPLICATIONS

Some important conditions which existed in the national economy in the 1970's have charted the direction of change of the U. S. grain marketing system and the changes described in this report for the Ohio grain marketing system. These conditions are that: 1) farms will continue to decrease in number and increase in size, 2) farms will continue to become more specialized in corn and soybean production, (3) grain firms will continue to decrease in number and increase in size, 4) Ohio will retain a transportation rate advantage which results in average farm prices for corn and soybeans that are 10-15% higher than those of other major producing states, and 5) export markets for grain will continue to be strong in the 1980's. The conclusions presented below and their implications for the future of the grain industry are valid only under this set of conditions.

Grain and oilseed production and flows have increased dramatically in the 1970's in response to favorable markets at home and abroad. Even though oat production actually declined 17%, Ohio's production of corn, soybeans, wheat, and oats increased 63% from 1970 to 1977 for a total production of nearly 600 million bushels; about 64% of this is corn for grain. Because of these rapid increases in production, Ohio farmers have become highly specialized in corn and soybean production and this has dramatically changed the volume of grain flow, the type of transportation used to move the grain, the direction of grain flow, the timing of those flows from farmers to the Ohio grain plants, and receipt and shipment patterns by type of grain plant.

Grain and oilseed flows were measured as receipts to and shipments from Ohio grain elevators and processing firms. These firms received a total of 735 million bushels of grain and oilseeds from farms and firms in Ohio and from neighboring states, principally Indiana and Michigan, in 1977. The receipts from the surrounding states have increased from 58.6 million bushels in 1970 to 114.4 million bushels in 1977; however, it is also interesting to note that the proportion of out-of-state grain receipts as a percentage of first handler receipts has increased from 17% to 25% over the 7-year period. Thus, a slightly larger share of grain from out-of-state origins was acquired by Ohio firms to meet processing and export demands. Although out-of-state receipts have increased, the principal source of total receipts was from Ohio firms which equaled 368 million bushels in 1977 or about 50% of total annual receipts by Ohio grain firms.

Interstate grain receipts by mode of transportation in 1977 changed significantly from those reported

for 1970. Grain receipts by rail transportation decreased by about 33% compared to increases of 100% for truck transport and 50% for water transport in this 7-year period. Even though water receipts show a large relative increase, the absolute amount of grain received by water is quite small. One explanation for this increase is that Ohio and surrounding Midwest states are becoming more deficit in oats which can be imported by water from the Lake States. Grain receipts by rail have decreased for all commodities and may reflect the increase of rail rates relative to other transport rates, the abandonment of many rail lines in rural areas, and the dissatisfaction of many shippers with rail service.

Comparison of the seasonal patterns of grain receipts in 1970 and 1977 demonstrates that farmers have reduced their sales of grain and oilseed crops during harvest and increased sales in the rest of the year. Ohio grain firms received 67% of all corn receipts from farmers in Ohio and neighboring states during the harvest period of October, November, and December 1970 compared to only 55% of all corn receipts in 1977. During the last 4 months of 1977, Ohio farmers marketed 78% of their soybeans compared to 86% which they marketed during the last 4 months of 1970. Ohio farmers marketed 67% of all wheat during the month of July 1977 compared with the 76% which was sold in July 1970.

Because farmers have assumed an increased role in commodity storage which has greatly increased the demand for and capacity of on-farm storage facilities, they have substantially reduced grain and oilseed marketing during the harvest period. This increased importance of on-farm storage enables today's farmer to evaluate a wider range of marketing alternatives before selling his output.

Because of worldwide grain shortages and the devaluations of the U. S. dollar in the early 1970's, the emergence of the export market as a major outlet for grain and oilseeds represents the most significant change in grain and oilseed flows from 1970 to 1977. Slightly more than 73% of total out-of-state shipments or 325.2 million bushels went to overseas exports in 1977 compared to 37% of the 1970 out-of-state shipments that went to export. In contrast, domestic shipments decreased relatively from 63% of total out-of-state shipments in 1970 to 24% in 1977 and absolutely from 143.5 million bushels in 1970 to 105.5 million in 1977. Of all grain and oilseed exports, Toledo, East Coast, and New Orleans handled 43%, 44%, and 13%, respectively, in 1977 compared to 75% and 25%, respectively, in 1970 with no exports reported through the Gulf. In addition, grain and oilseed consumption by livestock in Ohio remained nearly constant in absolute amount and de-

clined relatively from 39% of total grain and oilseed production in 1970 to 25% in 1977. Thus, favorable international markets caused major shifts in grain and oilseed movements in the 1970's away from local use for livestock and domestic shipments to export markets—a trend that could very well continue in the 1980's.

Because of changing markets, increased energy costs, and financial difficulties of the railroad industry, the movement of grain and oilseeds by type of transportation in 1977 differed in several ways from that of 1970. One-half (52%) of the out-of-state grain shipments moved by rail, 42% moved by water, and 6% moved by truck in 1977 compared to 63%, 28%, and 9%, respectively, in 1970. Water transport has gained at the expense of other transportation modes and reflects the growing export demand for Ohio grain, particularly corn shipments to the Gulf and through Toledo as well as the higher energy efficiency and lower freight rates of water transportation relative to rail or truck transport. If export markets remain strong in the 1980's and energy costs continue to escalate, water transportation can be expected to further increase its share of the grain transportation business.

Traditionally, country, terminal, and export elevators and processors functioned differently and earned revenues from different marketing and processing functions. Country elevators primarily bought grain from farmers and sold it to other elevators and processors, terminal and export elevators bought grain from country elevators and shipped grain to alternative markets, while processors acquired grain from elevators and earned revenue by processing grains.

Except for the processing activity, many of the differences among these firm types are disappearing, a trend that began in the late 1960's and was first reported in the 1970 study. In contrast to the 1970 study, more grain was purchased by terminal and export elevators and processors from farmers and most firms, including country elevators, were shipping to many alternative destinations in 1977.

In 1977, country elevators acquired slightly more than half of all first handler grain, 256.9 million bushels, which is a decline from the 1970 level of 66.5% of the total. Terminal and export elevators and processors acquired more grain both relatively and absolutely from first handlers in 1977. Terminal and export elevators were the biggest handlers of interstate grain, nearly 60% of the total shipments in 1970 and in 1977. Country elevator shipments declined slightly from the 1970 level of nearly 39% of total shipments to 35% while shipments by processors increased slightly.

The observed trends for receipts and shipments by firm type will likely continue into the 1980's. Terminal and export elevators will probably continue to acquire a growing percentage of first handler receipts. The continued importance of the export market and the decline in importance of the Ohio livestock feed industry will reinforce this trend. In addition, the growth of the number and size of commercial grain farms permits more grain to be stored on farms and to be shipped longer distances to various alternative markets. It is apparent as the 1980's begin that many of the drying, storing, transporting, and pricing functions of the grain market currently performed by many small country elevators are increasingly being performed by commercial grain farms. This trend may be reversed if country elevators improve the service options for the commercial farmers.

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APPENDIX A
Definitions of Firm Types
Enumerated in 1977 NCSR Survey

Country Elevator: A plant whose primary activity is collecting and merchandising raw grain. A plant was classified as a country elevator if it received more than 50% of its raw grain directly from farmers and more than 50% of the raw grain received went out of the facility as raw grain. The definition is not affected by the destination of grain or whether some manufacturing of feed or ingredients takes place at the plant.

Terminal Elevator: A plant whose primary activity is collecting and merchandising raw grain. A plant was classified as a terminal elevator if it received more than 50% of its raw grain from firms other than farms and was shipping grain to multiple destinations. More than 50% of the raw grain received must move out of the facility as raw grain to be classified as a terminal elevator.

Export Elevator: A plant whose primary activity is the collection of grain from other plants, although it could be directly from farmers, and exporting it to countries outside the U. S. The plant must export more than 50% of all grain received to be classified in this category.

River Elevator: A plant whose primary activity is the collection of grain from other plants, although it could be directly from farmers, and barging grain to export and domestic points. To be classified as a river elevator, the plant should barge more than 50% of all grain received.

Feed Manufacturer: A plant whose primary activity includes manufacturing a brand name of feed. To be classified as a feed manufacturing plant, more than 50% of its revenues must come from the sale of feed products.

Feed Mill: A plant whose primary activity is grinding grain into feed for farmers and the manufacturing of a brand name of feed is not a major economic activity. More than 50% of its revenue must come from grinding and sale of mixed feeds.

Soybean Processor: A plant whose primary activity is extracting oil and processing meal from soybeans as joint products of the operation. To be classified as a soybean processor, the plant must receive more than 50% of its revenue from processed products of soybeans.

Flour Mill: A plant whose primary activity is the milling of wheat flour(s) that result from complete milling of at least 50% of the wheat flour(s) received. The firm may also do blending of imported flour(s) but these cannot exceed the volume milled by the firm. This plant must earn at least 50% of its revenue from the sale of products produced from wheat.

Other: These are plants which merchandise grain but do not fit any of the above classifications. They are normally small firms which are located relatively close to urban centers. To be classified as other, the plant is merchandising grain but is earning more than 50% of its revenue from the sale of products to non-farm customers.

APPENDIX B
Copies of Questionnaires
Used in 1977 NCSR Survey

Four questionnaires were prepared by the NCSR Committee for the 1977 enumeration. The first questionnaire was used to enumerate all elevator plants, feed manufacturers, and feed mills which were chosen in the sample. The second questionnaire was used for the enumeration of soybean processing plants, the third for the enumeration of wheat flour processing plants, and the fourth for the enumeration of corn processors.

The loose leaf attachments were used to collect information on grain shipments and receipts for all plants. Although not reported in this publication, similar loose leaf attachments were used to collect data on the flow of processed grain such as soybean meal and oil, wheat flour, and corn miller products.

NCSR GRAIN FLOW SURVEY

CONFIDENTIAL

Questionnaire No. _____ Date _____

State _____ Enumerator _____

Crop Reporting District _____ Multiplier _____

County _____ NCSR Area Code _____

Firm Classification _____
 (Use questions 1, 22, and definition)

Firm Name _____

Address _____

Name of Parent Organization _____

Manager or Contact Name _____

Phone Number _____

Person giving information and his title _____

Name of station(s) included in this report _____

*1. In order to objectively classify your plant as to type, I need an estimate of the percent of gross revenue from each of the following sources:

	Percent of Gross
a) Grain merchandising, handling, storing, and drying	_____
b) Feed manufacturing for sale to others and/or selling complete feeds and/or feed ingredients (include grinding)	_____
c) Integrated poultry operations	_____
d) Integrated livestock operations including feedlots	_____
e) Processing (other than feed) any of the following grains:	
(1) Soybeans	_____
(2) Corn	_____
(3) Wheat	_____
(4) Grain sorghums	_____
(5) Other (list) _____	_____
f) Retailing and or wholesaling farm supplies, including pesticides, other chemicals, fertilizers, and seed including related services (custom application)	_____
g) Other sources of income (describe) _____ Examples are lumber, machinery, hardware, gas, oil, and coal sales.	_____

*Indicates questions or parts of question to be asked in all states. All other questions are recommended but not required.

*2. What were the total stocks of grain in your plant on the following dates:¹

	Jan. 1, 1977	April 1, 1977	June 1, 1977	Oct. 1, 1977	Jan. 1, 1978
Corn	_____	_____	_____	_____	_____
Grain sorghum	_____	_____	_____	_____	_____
Soybeans	_____	_____	_____	_____	_____
Wheat	_____	_____	_____	_____	_____
Oats	_____	_____	_____	_____	_____
Barley	_____	_____	_____	_____	_____
Rye	_____	_____	_____	_____	_____
Other	_____	_____	_____	_____	_____

3. What was the total amount of storage space for grain and feed at your facility on January 1, 1978?

	*Grain (bu corn equiv.)	Feed (tons)
a) Permanent storage		
(1) concrete silo	_____	_____
(2) wood silo	_____	_____
(3) welded steel tanks	_____	_____
(4) bolted steel bins	_____	_____
(5) quonset and pole bldgs.	_____	_____
b) Total permanent storage	_____	_____
c) Temporary storage		
(1) eligible for licensing ²	_____	_____
(2) not eligible for licensing ³	_____	_____

4. At the harvest peak, how many bushels of your permanent storage capacity were occupied by grain (corn, beans, wheat, and oats, Nov. 30, 1977)?

a) stored for farmers	
(1) grain bank	_____bu
(2) non-grain bank ⁴	_____bu
b) stored for CCC or other non-farm firms	_____bu
c) stored for your own account to which you have taken title ⁵ available for sale	_____bu
d) stored under a delayed price plan; grain to which you have taken title but farmers have not received payment	_____bu

¹Data are available from Daily Position Reports or some insurance reporting forms.

²Could a warehouse receipt be issued on stored grain? Would ASCS approve the facility for a warehouse receipt?

³If capacity is indefinite, ask how much was stored last year.

⁴Does not include delayed price grain; includes grain stored for farmers on premises or under warehouse receipts.

⁵Does not include delayed price grain.

5. How many bushels of grain did you receive on a delayed price contract in 1977?

Grain	bu at Harvest	bu Non-harvest
Corn	_____	_____
Soybeans	_____	_____
Wheat	_____	_____

*6. a. Did you have grain drying equipment at this facility as of December 31, 1977?

Yes _____ No _____

b. How many bushels were dried in 1977? _____ bu

7. If the answer to question 6 is yes, list and describe each dryer:

Kind of Dryer (batch, continuous flow, bin)	Rated Capacity (bu/hr at 5 points)	Source of Drying (nat. gas, LP, oil, unheated air, etc.)	Bushels Dried 1977
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
Total Capacity	_____		

8* .What is your normal⁶ hourly receiving and load-out capacity for each of the following kinds of transportation?

Mode	Receiving		Shipping	
	Grain	Feed	Grain	Feed
Trucks and semi-trailers	_____ bu/hr	_____ Tons/hr	_____ bu/hr	_____ Tons/hr
Covered hopper cars	_____ bu/hr	_____ Tons/hr	_____ bu/hr	_____ Tons/hr
Boxcars	_____ bu/hr	_____ Tons/hr	_____ bu/hr	_____ Tons/hr
Barges	_____ bu/hr	_____ Tons/hr	_____ bu/hr	_____ Tons/hr
Ocean or lake vessel	_____ bu/hr	_____ Tons/hr	_____ bu/hr	_____ Tons/hr

*9. If you are receiving grain by:

	Truck	Rail	Water
Can you ship at the same time by	truck _____	_____	_____
(yes, no, or N/A)	rail _____	_____	_____
	water _____	_____	_____

*10 How many rail cars of the following types can be spotted for loading or unloading on your tracks at one time:

	40-foot Boxcars	Covered Hopper Cars
Loading tracks	_____	_____
Unloading tracks	_____	_____

*11 How heavy is the largest load in a single car that can be railed into or out of your facility? _____ tons

⁶Normal is defined as the rate at which they could sustain the flow for a period of an 8-hour day if the supply of grain was continuous or the transportation equipment was not a limiting factor.

*12 If the answer to question 11 is less than 100-ton hoppers, what is the limiting factor?

- _____a) track limits (main line rail or roadbed)
- _____b) bridge limits
- _____c) siding weight limits
- _____d) other_____

*13a. What percent of your 1977 volume **shipped** by rail moved under each of the following rates by kind of grain:

	Single Car	Multiple Car			Unit Train Rates of _____ Cars	Combination Modes	Total
		2-5 Cars	6-25 Cars	26-50 Cars			
Corn	_____	_____	_____	_____	_____	_____	100 %
Soybeans	_____	_____	_____	_____	_____	_____	100 %
Wheat	_____	_____	_____	_____	_____	_____	100 %
Oats	_____	_____	_____	_____	_____	_____	100 %
_____	_____	_____	_____	_____	_____	_____	100 %
_____	_____	_____	_____	_____	_____	_____	100 %

13b. What percent of your 1977 volume **received** by rail moved under each of the following rates by kind of grain:

	Single Car	Multiple Car			Unit Train Rates of _____ Cars	Combination Modes	Total
		2-5 Cars	6-25 Cars	26-50 Cars			
Corn	_____	_____	_____	_____	_____	_____	100 %
Soybeans	_____	_____	_____	_____	_____	_____	100 %
Wheat	_____	_____	_____	_____	_____	_____	100 %
Oats	_____	_____	_____	_____	_____	_____	100 %
_____	_____	_____	_____	_____	_____	_____	100 %
_____	_____	_____	_____	_____	_____	_____	100 %

*14. a) What is the maximum load that you can ship in or out of your facility on a single barge?

_____bu or _____tons

b) If less than 60,000 bu (or 1,600 tons) what are the limiting factors?

(1) depth of water at the dock: when_____

(2) channel restrictions: when_____

(3) other_____

*15. a) How many barges can you handle at your dock at one time? _____

b) What are the factors limiting a larger number?

_____ (1) difficulty of moving barges in or out

_____ (2) shortage of space for mooring barges

_____ (3) shortage of space for fleeting barges

_____ (4) other_____

*16. What factors limit the total number of barges shipped or received per year and during what time of year?

- _____ (1) availability of barges when _____
- _____ (2) rates when _____
- _____ (3) river is frozen when _____
- _____ (4) flood periods when _____
- _____ (5) low water when _____
- _____ (6) channel restrictions when _____
- _____ (7) other when _____

17. Do you use a mechanical diverter type sampler for:

Inbound grain _____? Outbound grain _____?

18a. What percent of your grain is **sold** on origin grades? Destination grades?

	Origin Grade	Destination Grade
Corn	_____	_____
Soybeans	_____	_____
Wheat	_____	_____
Oats	_____	_____

18b. Of the grain reported as sold on destination grade, what percent do you have officially inspected at the origin _____?

19. What percent of your non-farm origin grain is **purchased** on origin grades? Destination grades?

	Origin Grade	Destination Grade
Corn	_____	_____
Soybeans	_____	_____
Wheat	_____	_____
Oats	_____	_____
_____	_____	_____

20. Indicate what percent of your grain receipts by rail, by truck, and by barge are inspected at the given locations. (Total for a mode may exceed 100% because of duplicate inspections.)

	At Origin	At Destination	En route
Receipts by rail	_____ %	_____ %	_____ %
Receipts by truck	_____ %	_____ %	_____ %
Receipts by barge	_____ %	_____ %	_____ %

21. a) Use the form below to indicate the bushels of each grain **received from farmers** from each distance category. Indicate on the back of page any deviation from a circular delivery area.

Kind of Grain	Total Receipts	Distance			
		0-25	26-50	50-100	over 100
Corn	_____	_____	_____	_____	_____
Beans	_____	_____	_____	_____	_____
Wheat	_____	_____	_____	_____	_____
Oats	_____	_____	_____	_____	_____

21. b) Use the form below to indicate the bushels of each grain **shipped to farmers** from each distance category. Indicate on the back of page any deviation from a circular destination pattern.

Kind of Grain	Total Receipts	Distance			
		0-25	26-50	50-100	over 100
Corn	_____	_____	_____	_____	_____
Beans	_____	_____	_____	_____	_____
Wheat	_____	_____	_____	_____	_____
Oats	_____	_____	_____	_____	_____

- c) Use the form below to indicate the bushels of each grain **received from other elevators** by truck from each distance category. Indicate on the back of page any deviation from a circular delivery area.

Kind of Grain	Total Receipts	Distance			
		0-25	26-50	50-100	over 100
Corn	_____	_____	_____	_____	_____
Beans	_____	_____	_____	_____	_____
Wheat	_____	_____	_____	_____	_____
Oats	_____	_____	_____	_____	_____

- d) Use the form below to indicate the bushels of each grain **shipped to other elevators** by truck from each distance category. Indicate on the back of page any deviation from a circular destination pattern.

Kind of Grain	Total Receipts	Distance			
		0-25	26-50	50-100	over 100
Corn	_____	_____	_____	_____	_____
Beans	_____	_____	_____	_____	_____
Wheat	_____	_____	_____	_____	_____
Oats	_____	_____	_____	_____	_____

- *22. Use loose sheets to record origin and destination of all grain receipts and shipments (farm and non-farm origin and destination should be treated as separate areas and designated with subscripts F or E).

Feed Questions

23. How many tons of feed were manufactured in your facility in calendar year 1977 as:
 A) custom grind and mix for farmers (excluding on-farm portable mill)

	Farmer-owned Grain	Elevator-owned Grain
1. tons of protein or concentrate	_____	_____
2. bushels of grain	_____	_____
B) formula or branded feeds	_____tons	
C) other feeds	_____tons	
Total feed manufactured	_____tons	

24. Of the total tons of feed produced, how many tons were:

	Pellets Tons	Mash Tons	Other Tons	Total Tons
Bags	_____	_____	_____	_____
Bulk	_____	_____	_____	_____
Other (_____)	_____	_____	_____	_____
Total tons produced	_____	_____	_____	_____

*25. How much of your grain was processed in 1977 (including ground, rolled, and crimped) (grain owned by elevator—non grain bank grain)

	Bushels
Corn	_____
Grain Sorghum	_____
Soybeans	_____
Wheat	_____
Oats	_____
Barley	_____
Rye	_____
Total	_____ ⁷

26. Of the total tons of feed products (include cracked or whole bagged corn, but not custom grind and mix), how many tons were:

Dairy feed	_____	Sheep feed	_____
Beef feed	_____	Horse feed	_____
Broiler feed	_____	Pet food	_____
Layer feed	_____	Fish needs	_____
Hog feed	_____	Non-specific livestock feed	_____
Turkey feed	_____	Other (specify)	_____
Other (specify)	_____	_____	_____
Total Tons Produced		_____	

27. What percent of the feed processed in 1977 was shipped directly to:
 farmers or feeders _____ %
 non-farmers _____ %

28. Use the attached sheets to identify the volume of each kind of feed shipped by truck to each distance category.

(Use as Needed and Attach to Main Questionnaire)

ID Number _____	Unit of Measure _____		
Mile Category	Bag	Bulk	Total
0-5	_____	_____	_____
6-10	_____	_____	_____
11-15	_____	_____	_____
16-20	_____	_____	_____
21-30	_____	_____	_____
31-40	_____	_____	_____
41-50	_____	_____	_____
Over 50	_____	_____	_____
Total Feed	_____	_____	_____

⁷Total should equal number of bushels of elevator-owned grain in 23A.

29. Use the attached sheets to show the volume of all feed moving to each destination by mode of transport. Use separate column for Farm (F) and Non-farm (NF) shipped to the same area.

Identification No. _____ Kind of Product _____ Unit of Measure _____

Month, Quantity and Mode of Transportation		Destination				
		Area*	Area*	Area*	Area*	Area*
January	Tot.					
	R					
	T					
	W					
February	Tot.					
	R					
	T					
	W					
March	Tot.					
	R					
	T					
	W					
April	Tot.					
	R					
	T					
	W					
May	Tot.					
	R					
	T					
	W					
June	Tot.					
	R					
	T					
	W					
July	Tot.					
	R					
	T					
	W					
August	Tot.					
	R					
	T					
	W					
September	Tot.					
	R					
	T					
	W					
October	Tot.					
	R					
	T					
	W					
November	Tot.					
	R					
	T					
	W					
December	Tot.					
	R					
	T					
	W					
TOTALS		()	()	()	()	()

- E. Cottonseed meal _____ tons
- F. Cottonseed hulls _____ tons
- G. Cottonseed oil
 - 1. Crude _____ lb
 - 2. Refined _____ lb
 - 3. _____ lb
- H. Other (list)
 - 1. _____
 - 2. _____

*8. What was the total amount of storage space at this facility on January 1, 1978, for:

- A. Soybeans
 - 1. Concrete silo _____ bu
 - 2. Metal bins _____ bu
 - 3. Other _____ bu
 - 4. Total _____ bu
- B. Soybean meal (bulk) _____ tons
- C. Cottonseed meal (bulk) _____ tons
- D. Vegetable oil (bulk)
(soybean and cottonseed) _____ lb
- E. Cottonseed _____ tons

*9. Did you have grain drying equipment at this facility as of January 1, 1978?

Yes _____ No _____

10. If yes, list volume dried and describe each dryer:

Kind of Dryer (batch, continuous flow, bin)	Capacity (bu/hr at 5 points)	Source of Drying Energy (nat. gas, LP, oil, unheated air, etc.)	Bushels Dried 1977
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
*Total	_____		_____

*11. What is your normal¹ hourly receiving and load-out capacity for each of the following kinds of transportation?

Mode	Receiving Soybeans	Shipping	
		Soybean Meal	Soybean Oil (Bulk)
Trucks and semi-trailers	_____bu	_____tons	_____tons
Covered hopper cars	_____bu	_____tons	XX
Boxcars	_____bu	_____tons	XX
Barges	_____bu	_____tons	_____tons
Ocean or lake vessel	_____bu	_____tons	_____tons
Tank cars	XX	XX	_____tons

12. If you are receiving soybeans by:

Can you ship at the same time by (yes, no, or N/A)	Truck	Rail	Water
truck	_____	_____	_____
rail	_____	_____	_____
water	_____	_____	_____

*13. How many rail cars of the following types can be spotted for loading or unloading on your tracks at one time?

	40-foot Boxcars	Covered Hopper Cars
Loading tracks	_____	_____
Unloading tracks	_____	_____

*14. How heavy is the largest load in a single car that can be railed into or out of your facility? _____tons

*15. If the answer to question 14 is less than 100 tons, what is the limiting factor?

- _____a) track limits (main line rail or roadbed)
- _____b) bridge limits
- _____c) siding weight limits
- _____d) other_____

*16. What percent of your soybean and soybean meal shipments in 1977 moved under each of the following rates?

	Soybean	Soybean Meal
Rail:		
Single car	_____%	_____%
Multiple car:		
2 - 5 cars	_____%	_____%
6 - 25 cars	_____%	_____%
26 - 50 cars	_____%	_____%
Unit train of _____ cars	_____%	_____%
Barge	_____%	_____%
Truck	_____%	_____%
Total	100.0	100.0

¹Normal is defined as the rate at which they could sustain the flow for a period of an 8-hour day if the supply of grain was continuous or the transportation equipment was not a limiting factor.

*17. a) What is the maximum load that you can ship in or out of your facility on a single barge?

_____bu or _____tons

b) If less than 60,000 bu (or 1,600 tons), what are the limiting factors?

(1) depth of water at the dock: when_____

(2) channel restrictions: when_____

(3) other_____

*18. a) How many barges can you handle at your dock at one time? _____

b) What are the factors limiting a larger number

_____ (1) difficulty of moving barges in or out

_____ (2) shortage of space for mooring barges

_____ (3) shortage of space for fleeting barges

_____ (4) other_____

19. What factors limit the total number of barges shipped or received per year and during what time of year?

_____ (1) availability of barges when_____

_____ (2) rates when_____

_____ (3) river is frozen when_____

_____ (4) flood periods when_____

_____ (5) low water when_____

_____ (6) channel restrictions when_____

_____ (7) other when_____

20. What percent of your non-farm origin grain is purchased on origin grades _____%? Destination grades _____%?

21. Indicate what percent of your grain receipts by rail, by truck and by barge are inspected at the given locations. (Total for a mode may exceed 100% because of duplicate inspections.)

	At Origin	At Destination	En route
Receipts by rail	_____ %	_____ %	_____ %
Receipts by truck	_____ %	_____ %	_____ %
Receipts by barge	_____ %	_____ %	_____ %

*22. Using as many of the loose sheets as needed, record all receipts and shipments of soybeans (meal and oil) by area, month, and mode of transportation. (Farm and nonfarm origins and destinations should be treated as separate areas and designated with subscripts "F" or "E". Use subscript "F" only if received directly from farms or shipped directly to farms.)

Use as Needed and Attach to Soybean Processor Questionnaire

ID No. _____

Check One: Receipts _____

Shipments _____

Check which applies to this sheet:

Soybeans (bu) _____

Meal (tons) _____

Oil (lb) _____

Month, Quantity and Mode of Transportation		Destination				
		Area*	Area*	Area*	Area*	Area*
January	Tot.					
	R					
	T					
February	Tot.					
	R					
	T					
March	Tot.					
	R					
	T					
April	Tot.					
	R					
	T					
May	Tot.					
	R					
	T					
June	Tot.					
	R					
	T					
July	Tot.					
	R					
	T					
August	Tot.					
	R					
	T					
September	Tot.					
	R					
	T					
October	Tot.					
	R					
	T					
November	Tot.					
	R					
	T					
December	Tot.					
	R					
	T					
TOTALS		()	()	()	()	()

FLOUR MILLER QUESTIONNAIRE

CONFIDENTIAL

Questionnaire No. _____ Date _____

State _____ Enumerator _____

Crop Reporting District _____ Multiplier _____

County _____ NCSR Area Code _____

Firm Classification _____

Firm Name _____

Address _____

Name of Parent Organization _____

Manager or Contact Name _____

Phone Number _____

Person giving information and his title _____

*1. What is the rated processing capacity of this plant in hundredweight per 24-hour day? _____

*2. What was the total amount of storage space at this facility on January 1, 1978, for:

	Total	Merchandising	Milling
A. Grains			
1) concrete silo	_____	_____	_____
2) metal bins	_____	_____	_____
3) other	_____	_____	_____
B. Millfeed	_____	_____	_____
C. Other	_____	_____	_____
D. Total of all storage	_____		

3. What percentage of total wheat milled was of the following type?

	Percent
a. Hard spring	_____
b. Hard winter	_____
c. Soft red winter	_____
d. Soft white	_____
e. Durum	_____
Total	100

*Indicates questions or parts of question to be asked in all states. All other questions are recommended but not required.

*4. What percent of your rail receipts in 1977 came in under the following rates?

	Percent
a. Single car	_____
b. Multiple car (2-5 cars)	_____
c. Multiple car (6-25 cars)	_____
d. Multiple car (26-50 cars)	_____
e. Unit train rates	_____
f. Other	_____

5. What percentage of your 1977 flour production was of the types listed below and what percentage of total production of each type was bagged?

	Percent of Production	Percent Bagged
a. Bakers white pan bread flour	_____	_____
b. Family flour and all-purpose flour	_____	_____
c. Straight flour	_____	_____
d. Government flour	_____	_____
e. Soft flour (pastry, cake, cracker, doughnut, etc.)	_____	_____
f. Other flour (specialty, hearth, whole wheat, blends, etc.)	_____	_____
g. Clears and low grade	_____	_____
h. Durum flours and Durum clears	_____	_____
i. Semolina	_____	_____
j. Other	_____	_____

6. Do you use a mechanical diverter type sampler for:
inbound grain _____? outbound grain _____?

7. What percent of your non-farm origin grain is purchased on origin grades _____%?
Destination grades _____%?

8. Indicate what percent of your grain receipts by rail, by truck and by barge are inspected at the given locations. (Total for a mode may exceed 100% because of duplicate inspections.)

	At Origin	At Destination	En route
Receipts by rail	_____ %	_____ %	_____ %
Receipts by truck	_____ %	_____ %	_____ %
Receipts by barge	_____ %	_____ %	_____ %

9. Use loose sheets to record origin of all *wheat receipts and destination of all flour and millfeed shipments in 1977.

Use as Needed and Attach to Main Questionnaire

ID No. _____

Check One: Receipts _____

Kind of Grain _____

Shipments _____

Month, Quantity and Mode of Transportation		Destination				
		Area*	Area*	Area*	Area*	Area*
January	Tot.					
	R					
	T					
	W					
February	Tot.					
	R					
	T					
	W					
March	Tot.					
	R					
	T					
	W					
April	Tot.					
	R					
	T					
	W					
May	Tot.					
	R					
	T					
	W					
June	Tot.					
	R					
	T					
	W					
July	Tot.					
	R					
	T					
	W					
August	Tot.					
	R					
	T					
	W					
September	Tot.					
	R					
	T					
	W					
	Tot.					
October	R					
	T					
	W					
November	Tot.					
	R					
	T					
	W					
December	Tot.					
	R					
	T					
	W					
TOTALS		()	()	()	()	()

CORN MILLER QUESTIONNAIRE
CONFIDENTIAL

Questionnaire No. _____ Date _____

State _____ Enumerator _____

Crop Reporting District _____ Multiplier _____

County _____ NCSR Area Code _____

Firm Classification _____

Firm Name _____

Address _____

Name of Parent Organization _____

Manager or Contact Name _____

Phone Number _____

Person giving information and his title _____

*1. What is the rated processing capacity of this plant?

cwt _____ bushels _____ of grain per 24-hour day _____

*2. How much grain was processed in 1977?

Corn, yellow	_____ bu
Corn, white	_____ bu
Sorghum	_____ bu
Wheat	_____ bu
Other (list) _____	_____ bu
_____	_____ bu

*3. What was the total amount of storage space at this facility on January 1, 1978, for:

	Total	Merchandising	Milling
A. Grains			
1) concrete silo	_____	_____	_____
2) metal bins	_____	_____	_____
3) other	_____	_____	_____
B. Millfeed	_____	_____	_____
C. Other	_____	_____	_____
D. Total of all storage	_____		

*Indicates questions or parts of question to be asked in all states. All other questions are recommended but not required.

*4. What is the normal hourly receiving capacity at this plant?

Mode

Trucks and semi-trailers _____bu
Covered hopper cars _____bu
Boxcars _____bu
Barges _____bu

5. What was your volume of each product in 1977?

A. Corn:

1) Merchandising _____bu
2) Wet processing _____bu
3) Dry milling _____bu

B. Wet Process Products:

1) Starch _____lb
2) Corn syrup _____lb
3) Corn sugar _____lb
4) Corn oil _____lb
 a. Crude _____lb
 b. Once refined _____lb
 c. Solid oil _____lb
 d. Hydrogenated oil _____lb
5) Feed products
 a. Corn gluten feed _____tons
 b. Corn gluten meal _____tons
 c. Corn germ meal _____tons
6) Other (list)
 a. _____
 b. _____
 c. _____

C. Dry Milling Products:

1) Granulated yellow corn meal _____tons
2) Granulated white corn meal _____tons
3) Bolted yellow corn meal _____tons
4) Bolted white corn meal _____tons
5) Yellow corn flour _____tons
6) White corn flour _____tons
7) Pearl hominy _____tons
8) Hominy grits _____tons
9) Brewers' grits _____tons
10) Corn germ _____tons

*6 What percent of your rail receipts in 1977 come in under the following rates?

	Percent
a. Single car	_____
b. Multiple car (2-5 cars)	_____
c. Multiple car (6-25 cars)	_____
d. Multiple car (26-50 cars)	_____
e. Unit train rates	_____
f. Other	_____

*7 What was your total grain drying capacity as of December 31, 1977?
 _____bu per hour at 5 points. Volume dried 1977_____

8. What was the volume of corn contracted with growers in 1977?

Type of Corn	Volume
_____	_____bu
_____	_____bu
_____	_____bu
_____	_____bu

9. Do you use a mechanical diverter sampler for inbound grain? _____

10. What percent of your non-farm grain is purchased on the basis of:
 origin grades _____? destination grades _____?

11. Indicate what percent of your grain receipts by rail, by truck, and by barge are inspected at the given locations. (Total for a mode may exceed 100% because of duplicate inspections.)

	At Origin	At Destination	En route
Receipts by rail	_____%	_____%	_____%
Receipts by truck	_____%	_____%	_____%
Receipts by barge	_____%	_____%	_____%

*12. Use loose sheets to record origin and destination of all corn receipts and shipments.

13. Show the volume of corn products shipped to various destinations in 1977.

Product	Destination				
	area	area	area	area	area
Truck					
Rail					
Barge					
Total					
Truck					
Rail					
Barge					
Total					
Truck					
Rail					
Barge					
Total					
Truck					
Rail					
Barge					
Total					

BETTER LIVING IS THE PRODUCT

of research at the Ohio Agricultural Research and Development Center. All Ohioans benefit from this product.

Ohio's farm families benefit from the results of agricultural research translated into increased earnings and improved living conditions. So do the families of the thousands of workers employed in the firms making up the state's agribusiness complex.

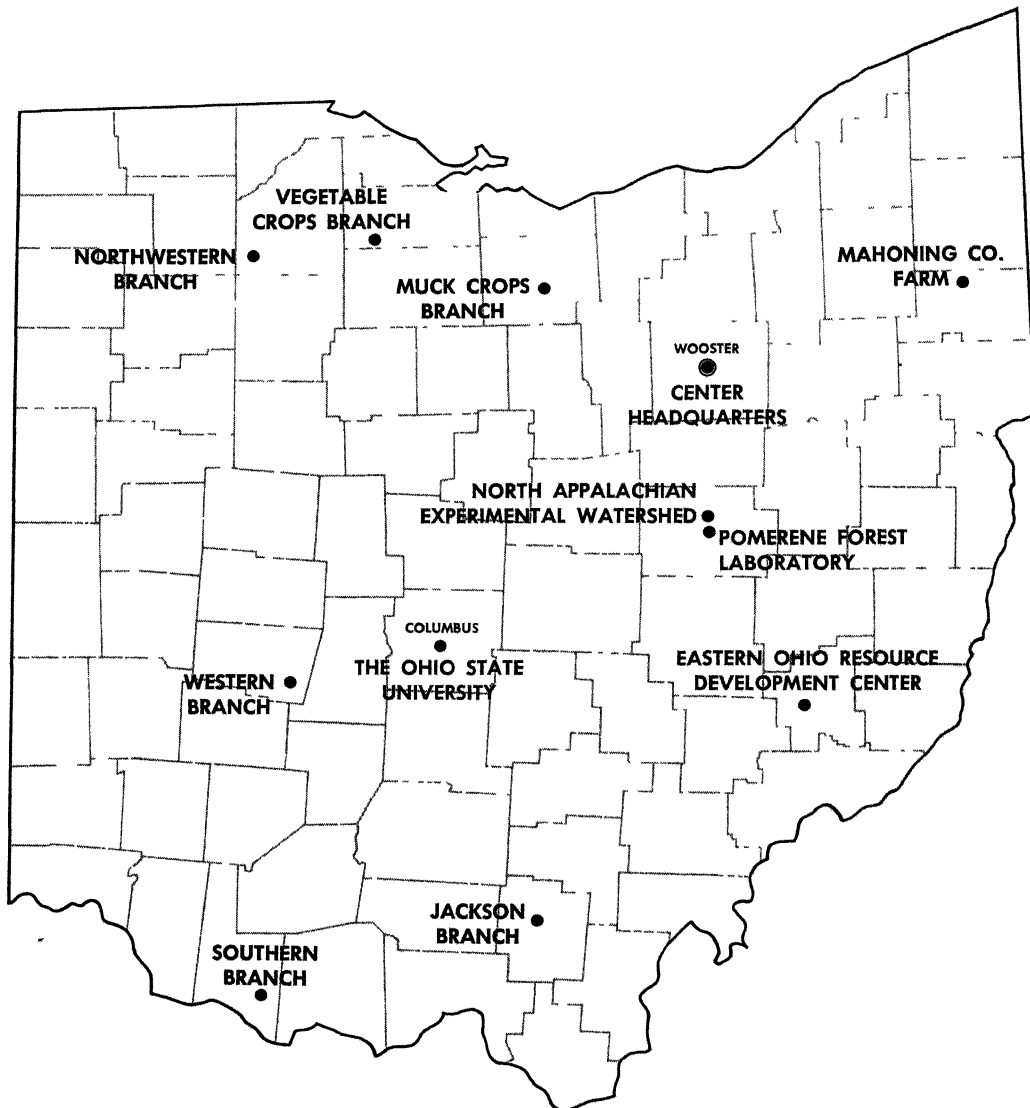
But the greatest benefits of agricultural research flow to the millions of Ohio consumers. They enjoy the end products of agricultural science—the world's most wholesome and nutritious food, attractive lawns, beautiful ornamental plants, and hundreds of consumer products containing ingredients originating on the farm, in the greenhouse and nursery, or in the forest.

The Ohio Agricultural Experiment Station, as the Center was called for 83 years, was established at The Ohio State University, Columbus, in 1882. Ten years later, the Station was moved to its present location in Wayne County. In 1965, the Ohio General Assembly passed legislation changing the name to Ohio Agricultural Research and Development Center—a name which more accurately reflects the nature and scope of the Center's research program today.

Research at OARDC deals with the improvement of all agricultural production and marketing practices. It is concerned with the development of an agricultural product from germination of a seed or development of an embryo through to the consumer's dinner table. It is directed at improved human nutrition, family and child development, home management, and all other aspects of family life. It is geared to enhancing and preserving the quality of our environment.

Individuals and groups are welcome to visit the OARDC, to enjoy the attractive buildings, grounds, and arboretum, and to observe first hand research aimed at the goal of Better Living for All Ohioans!

The State Is the Campus for Agricultural Research and Development



Ohio's major soil types and climatic conditions are represented at the Research Center's 12 locations.

Research is conducted by 15 departments on more than 7000 acres at Center headquarters in Wooster, eight branches, Pomerene Forest Laboratory, North Appalachian Experimental Watershed, and The Ohio State University.

Center Headquarters, Wooster, Wayne County: 1953 acres

Eastern Ohio Resource Development Center, Caldwell, Noble County: 2053 acres

Jackson Branch, Jackson, Jackson County: 502 acres

Mahoning County Farm, Canfield: 275 acres

Muck Crops Branch, Willard, Huron County: 15 acres

North Appalachian Experimental Watershed, Coshocton, Coshocton County: 1047 acres (Cooperative with Science and Education Administration/Agricultural Research, U. S. Dept. of Agriculture)

Northwestern Branch, Hoytville, Wood County: 247 acres

Pomerene Forest Laboratory, Coshocton County: 227 acres

Southern Branch, Ripley, Brown County: 275 acres

Vegetable Crops Branch, Fremont, Sandusky County: 105 acres

Western Branch, South Charleston, Clark County: 428 acres