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AGRICULTURE: ESSENTIAL TO MINNESOTA'S ECONOMY AND
ITS REGIONS AND COMMUNITIES — AN UPDATE

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Table of Contents

	<u>Page</u>
Introduction	1
Agriculture as a Basic Industry	2
Industry output and income payments	3
Employment and earnings	3
Industry purchases and sales	4
Substate differences	8
Interregional trade	10
Minnesota's Stake in Agricultural Trade	12
Direct trade effects	12
Total trade effects	14
Agriculture and Industry in the 1980's	19

Preface

This report updates an earlier report of the same title in this Department's Staff Paper Series. A section on Minnesota's stake in U.S. foreign agricultural trade has been added in this update, along with current estimates of farm income and sales.

AGRICULTURE: ESSENTIAL TO MINNESOTA'S ECONOMY AND
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In 1980, Minnesota agriculture had become a \$7 billion industry. Its 104,000 farms required a work force of more than 150,000. Another 300,000 jobs, even slightly more, were in agricultural processing and marketing, other agricultural-related industries, and trade and service businesses serving the households directly or indirectly dependent on agriculture. Net farm income in 1980 was about \$1.2 billion -- an average income per farm operator of \$9,500. Cash income from farming was nearly \$1.9 billion -- about 60% higher than net farm income. Total farm assets were \$52.3 billion while farm debt was \$9.1 billion.

Since 1980, net farm income has dropped sharply because of reduced commodity prices and rising production costs. The negative ripple effects of the most recent farm income downturn has been felt already throughout rural Minnesota as well as urban market centers. Less farm income has meant less farm and farm household purchases and reduced levels of sales and income tax collections from rural areas, as well as reduced levels of employment and earnings in rural communities.

Agriculture's importance to Minnesota's economy and its people is measured by its sales and purchases, the work force it supports, the assets it holds, and the contribution it makes to Minnesota's economic base. Most Minnesotans acknowledge the importance of agriculture to the state's economy, whether good years or bad. Usual statistical measures, however, fail to accurately portray this importance when only the size of agriculture's workforce and its net income and total sales are reported.

Agriculture as a Basic Industry

Statistical findings reported here show the contribution of agriculture to Minnesota's economic base -- the export-producing sector upon which the Minnesota economy ultimately depends -- and to its regions and communities. The export-producing industries bring the first dollars into the state which circulate from one economic activity to the next and eventually are used to pay for products not produced in the state, but which are essential to its economic survival. Each Minnesota region shares in this economic base.

Agriculture as a proportion of the state's basic industries declined from 66 percent in 1940 to 30 percent in 1970. This proportion varied from region to region, however. In eight of Minnesota's 13 substate regions, employment in agriculture was more than half of all basic employment.

While agriculture's proportion of total basic employment has declined, it accounts for as much as 40 percent of total Minnesota exports to other states and countries in some years. Agriculture also serves as a market for many input-supplying industries and it, in turn, is a principal source of raw materials for the even larger (in total sales dollars) food products manufacturing industry. And it serves as a buffer industry between the U.S. and the Minnesota economy. When it fails in its buffer role, the Minnesota economy is sharply and sometimes adversely affected by the general business cycle, as it was in 1980 and again in 1981 and 1982.

When much depends on sustaining the favorable competitive position of Minnesota industry, the role of agriculture as a highly productive basic industry becomes even more important. In this report, agriculture's importance is examined in the context of both the traditional statistical

measures cited earlier and as a basic industry in the state and each substate region.

Industry output and income payments

In 1977, the agriculture industry gross output exceeded \$4 billion (in 1972 dollars). This total had grown at an annual rate of 5.1 percent from \$3.2 billion in 1972).

Largest annual rates of output increase in the Minnesota economy were estimated for agriculture and, also, finance, insurance and real estate, and services during the 1970's. In comparison, for mining and construction, the estimated changes were negative (in constant dollars) from 1972 to 1977. Real output was less in 1977 than 1972 in these two industry groups.

Income payments to agricultural resource owners for primary inputs utilized in Minnesota increased from \$1.2 billion in 1972 to \$1.6 billion in 1977 (in 1972 dollars). This increase was equivalent to an annual rate of 5.9 percent. It was not sustained, however, from 1977 to 1980.

Largest annual rates of increase in the value added by primary inputs were estimated for agriculture and finance, insurance, and real estate and the smallest for mining and construction. The large increase in agriculture was due to the post-1973 farm prosperity which still lingered and sustained net farm income in 1977.

Employment and earnings

Economic importance of agriculture-related industry is represented, also, by employment and earnings. Employment in agriculture increased less rapidly than the industry average while earnings in agriculture increased more rapidly. (For the 1977-79 period, employment in agriculture actually declined.) However, wide differences occurred among individual

industries. Mining and food products manufacturing employment, for example, declined during the 1972-77 period, while trade and service employment increased faster than the industry average.

Earnings of the employed work force are figured in constant 1972 dollars to separate real increases from the large inflationary impacts (of 7.3 percent per year) of total earnings. The increase in real earnings was only 3.2 percent per year (compared with 10.5 percent in current dollars). The percentage increase in agricultural earnings was the largest of the 13 industry groups - nearly twice the industry average, but this was for the 1972-1977 period, not the most recent period.

Unlike total earnings, real earnings per position declined in four of the 13 major industry groups during the five-year period from 1972 to 1977. Losses in real earnings were estimated for trade and state government employment. The largest gains were estimated for mining and agriculture employment. Indeed, for the trade and service industry groups as a whole, the sharp increases in total jobs were accompanied by losses in real earnings per job.

Industry purchases and sales

Another measure of agriculture's importance is its sales to, and purchases from, other industries in Minnesota. All industry sales and purchases in Minnesota totaled to \$45.4 billion (in 1972 dollars) in 1977. They were higher, of course, in 1980, but only the 1977 figures are available for comparison. The agriculture industry in 1977 accounted for \$4.2 billion and the food products manufacturing industries accounted for \$5.6 billion in purchases. The two industry groups thus accounted for \$9.8 billion, or 21.5 percent, of total in-state purchases of the Minnesota business sector. The proportion of net exports of all industry originating from the agriculture

and food products manufacturing industry groups was even higher -- \$3.3 billion (in 1972 dollars), or 41.4 percent of the total. Included in the net exports all out-of-state shipments, of which a large proportion, especially wheat, corn, and soybeans, would become part of the U.S. foreign agricultural trade.

Total purchases of the Minnesota agriculture industry groups in each of the three sectors -- intermediate, primary, and import -- are summarized as follows:

Type of Inputs Purchased	Total Purchases			Per 1,000 Agr. Output (\$)	Per Agr. Worker (\$)
	All Industry (mil.\$)	Agri- culture (mil.\$)	Agr. as Prop. All Industry (%)		
Intermediate	18,528	2,085	11.2	496	12,792
Labor and Capital	22,460	1,649	7.3	392	10,117
Out-of-State Import	4,460	472	10.6	112	2,989
All Purchases	45,448	4,206	8.9	1,000	25,807

The summary data show that total purchases of the agriculture industry group of the three major inputs ranged from 7.3 percent to 11.2 percent of all industry purchases in 1977. The intermediate input purchases, i.e. inputs used in agricultural production, were the largest, not only as a proportion of all industry intermediate input purchases, but, also, per \$1,000 of agriculture industry output and per agriculture industry worker.

Major in-state agricultural input suppliers are the agricultural industries themselves, the food products manufacturing industries, transportation industries, and trade and service industries. Thus, the agricultural industries make large purchases from a wide variety of Minnesota industries.

Output disbursements of the agriculture industry group vary greatly depending upon the location of the agricultural processing and its nature. The sector distribution of the total agricultural output shows the dominance of in-state agricultural processing activities as follows:

Type of Purchasing Sector	Total Disbursements			Per \$1,000 Agr. Output (\$)	Per Agr. Worker (\$)
	All In- dustry (mil.\$)	Agri- culture (mil.\$)	Agr. as Prop. All Industry (%)		
Intermediate (Prod.)	18,528	3,289	17.8	782	20,180
Local Final (Cons.)	19,017	298	1.6	71	1,824
Out-of-State Export	7,903	619	7.8	147	3 803
All Sectors	45,448	4,207	8.9	1,000	25,807

Thus, total intermediate products sales were \$3.3 billion in 1977, or 17.8 percent of all industry intermediate product sales. Total intermediate product sales (to industries in Minnesota) and intermediate product purchases (from industries in Minnesota) were nearly \$5.4 billion (in 1972 dollars).

The food products manufacturing industries accounted for twice the intermediate purchases of the agricultural industry group and three times their exports in 1977. Intermediate purchases totaled \$4.1 million, or \$792 million more than the intermediate sales of the agriculture industry group. Total employment in this industry was only 50,713, or 3.1 percent of the state total of 1,926,251. This compares with a total agricultural employment of 162,976.

Distribution of food products manufacturing industry purchases from the three input-supply sectors in 1977 was as follows:

Type of Inputs Purchased	Total Purchases			Per \$1,000 Product Output (\$)	Per Food Product Worker (\$)
	All In-	Food	Food Prod.		
	dus- try (mil.\$)	Prod. Mfg. (mil.\$)	as Prop. All Ind. (%)		
Intermediate	18,528	4,081	22.0	731	80,478
Labor and Capital	22,460	1,036	4.6	185	20,427
Out-of-State Import	4,460	469	10.5	84	9,256
All Sectors	45,448	5,586	12.3	1,000	110,161

Intermediate input purchases from industries in Minnesota were the largest, followed by intermediate input purchases (imports) from industries in rest-of-nation. Much of these purchases originated from the agriculture industry group in Minnesota and in the rest-of-nation.

Output disbursements of the food products manufacturing industry group differed sharply from the agricultural output disbursements. Exports accounted for 47.5 percent of total value of food products manufacturing output, which was equivalent to 33.6 percent of all industry exports, as shown below:

Type of Purchasing Sector	Total Disbursement			Per \$1,000 Food Prod. Output (\$)	Per Food Product Worker (\$)
	All In-	Food	Food Prod.		
	dus- try (mil.\$)	Prod. Mfg. (mil.\$)	as Prop. All Ind. (%)		
Intermediate (Prod.)	18,528	1,663	9.0	298	32,798
Local Final (Cons.)	19,017	1,272	6.7	227	25,073
Out-of-State Export	7,903	2,652	33.6	475	52,290
All Sectors	45,448	5,587	12.3	1,000	110,161

Each food products manufacturing job produced, on the average, \$52,290 of exports to rest-of-nation demand sectors. Also, about 30 percent of the total output was disbursed to other industries and 25 percent was disbursed to local final markets, largely households.

Substate differences

When presented by substate region, the local economic indicators show much place-to-place variability of agriculture and its economic importance to regions and communities. Selected 1979 and 1980 statistical series presented in this report are summarized for four groups of substate development regions (each with 21 or 22 counties) as follows:

<u>Economic Indicator</u>	<u>Units</u>	<u>State-wide</u>	<u>West & North-west</u>	<u>South-central & Southwest</u>	<u>Central South-eastern</u>	<u>North-ern</u>
Total farms	thou.	104	25	30	31	19
Total farm land	thou.acr.	30,000	10,626	8,342	6,515	4,517
Corn production	thou.bu.	606,002	84,234	303,286	194,482	24,000
Wheat production	thou.bu.	90,653	81,857	4,821	1,344	2,631
Soybeans prod.	thou.bu.	167,362	29,349	103,352	33,203	1,458
Sugarbeets prod.	thou.tons	3,701	3,335	366	0	0
Sunflowers prod.	mil.lbs.	1,855	1,695	55	31	74
Cattle and calves	thou.	3,750	782	1,016	1,312	632
Hogs and pigs	thou.	4,899	719	2,522	1,463	195
Milk production	mil.lbs.	9,135	1,553	1,825	4,088	1,669
Farm cash receipts	mil.\$	5,855	1,615	2,299	1,524	417
Net farm income	mil.\$	1,304	282	580	361	83
Nonfarm earnings	mil.\$	26,996	1,300	2,059	20,607	2,616
Total personal income	mil.\$	35,507	2,509	3,524	24,869	4,351
Total population	thou.	4,060	359	467	2,600	634
Farm employment	thou.	157	40	44	44	22
Nonfarm employment	thou.	1,950	127	191	1,401	235

West and Northwest Minnesota accounts for most of the total farm exports of wheat while Southcentral and Southwest Minnesota accounts for much of the total exports of soybeans and corn. The major portion of milk produced for out-of-state markets originates in Central and Southeastern Minnesota. Cattle feeding is concentrated more in Southcentral and Southwest Minnesota than elsewhere in the state while the hog production is important in Southcentral and Southeastern Minnesota. The farm sector thus varies from region to region, as does the nonfarm sectors although in most regions outside the Metropolitan Council Region and Northeast Minnesota, the farm sector is a major part of the region's economic base.

Included in the economic base are the agricultural processing and marketing businesses, of which at least one is located in almost every Minnesota county. Indirectly, the agricultural input-supplying industries also are part of the economic base.

Agriculture-related manufacturing industries include food products, fertilizer products, and machinery. Food products manufacturing establishments, which accounted for 75 percent of total agriculture-related manufacturing establishments in 1978-79, were widely dispersed geographically, although nearly half were still located in Central and Southern Minnesota, as shown below:

<u>Industry</u>	<u>Statewide</u>	<u>West & North-west</u>	<u>South-central & Southwest</u> (number)	<u>Central & South-eastern</u>	<u>North-ern</u>
Meat Products	203	25	44	113	21
Dairy Products	245	38	46	111	50
Fruits & Veg.	69	6	16	41	6
Grain Prod.	346	71	116	110	49
Bakery Prod.	73	5	11	48	9
Sugar Prod.	34	4	5	23	2
Oil Prod.	16	1	3	11	1
Beverages	75	11	7	41	16
Misc. Food	100	22	6	60	12
Agr. Chemicals	216	74	75	56	11
Machinery	173	37	46	70	20
Total	1,534	294	375	676	197

One or more grain products and fertilizer establishments, which were more widely dispersed than agricultural-related establishments generally, would be located in almost every county.

The nonfarm sector is now expanding in each of the four agricultural regions. While total population increased in each region in the 1970-79 period, total employment increased even more as a result of the movement of manufacturing plants to low cost sites and of trade and service estab-

lishments to rural population centers.

Interregional trade

Interregional trade is represented by the imports from, and exports to, rest-of-nation and world supply and demand sectors. The livestock and crop agriculture industry group in Minnesota was a net exporter in 1977. Industry outshipments to rest-of-nation and abroad were larger than inshipments of gross output from rest-of-nation industries to the crop and livestock agriculture group in Minnesota. Inshipments of livestock and crop agriculture industry outputs from rest-of-nation also were less than corresponding Minnesota industry outshipments.

Agricultural exports to rest-of-nation industries and markets are small compared with the imports of intermediate inputs from the agricultural industries. Largest among the export markets are rest-of-nation livestock farms. Rest-of-nation dairy and poultry farms also are important domestic markets for Minnesota agriculture. In comparison, rest-of-nation food products manufacturing industries are less important markets.

Imports of agriculture industry inputs originate from a variety of rest-of-nation industries. Rest-of-nation food products manufacturing industries are important sources of inputs of dairy and livestock farms. Rest-of-nation energy and transportation related industries also are important input sources, along with rest-of-nation marketing-related industries.

Food products manufacturing industries account for a large part of total interregional trade between Minnesota and rest-of-nation industries and economic sectors. In 1977 the total interregional trade volume for the food products manufacturing industries was more than \$4.5 billion, of which \$2.7 billion was due to exports of the excess supply of manufactured food

products. Manufactured products exports were 33.6 percent of all exports to rest-of-nation purchasing industries and final demand sectors.

Meat and dairy products accounted for 75 percent of all Minnesota food products exports. Among the nine industries in this industry group, a deficit supply was estimated for one industry -- Sausages and Other Prepared Meats. Yet, the total imports of intermediate inputs from rest-of-nation industries for the meat and dairy products industries were only 6.2 percent of all imports. Thus, the meat and dairy products industries were an important trading asset to Minnesota because of their large positive export trade balances.

Grain products and oil products manufacturing industries also were important in Minnesota's interregional trade. Total exports of the individual industries in this industry group were 5.7 percent of all industry exports while total imports from these industries in the rest-of-nation were 1.3 percent of all imports from rest-of-nation industries.

Agriculture-related exports originate from farm and factories in three-fourths of the 87 counties in Minnesota. If the farm and food product exports were eliminated, total industry employment and income would be reduced 20 to 30 percent, depending upon the indices used and the particular stage in the export-trade cycle. Thus, agriculture, because of its importance as a basic industry, supports a much larger proportion of the Minnesota economy than represented by its own 8.5 percent of total Minnesota employment.

Minnesota's Stake in Agricultural Trade

The contribution of Minnesota's agricultural exports to U.S. foreign agricultural trade is especially important to both the U.S. balance of trade and Minnesota's economic base. In 1980, U.S. foreign agricultural trade was more than a \$40 billion enterprise. Minnesota's share of this total exceeded \$1.6 billion in 1980. This share is more than double its population share but less than its share of total U.S. agricultural production. Minnesota's trade share is less than its production share because of the importance of rice, tobacco and other crops in total U.S. exports which are not produced in Minnesota. Nonetheless, the impact of U.S. foreign agricultural trade on the Minnesota economy is large, indeed, much larger than \$1.6 billion direct impact, and this impact permeates virtually every sector of the Minnesota economy.

Direct trade effects

The direct effects of U.S. foreign agricultural trade on the Minnesota economy are due to agricultural and food commodity exports from both farm and off-farm sources. Minnesota's share of commodity exports in 1980 exceeded \$1.3 billion while the off-farm commodity exports were slightly more than \$0.3 billion, as shown in Table 1. Corn, wheat and soybeans accounted for most of the farm commodity exports while meat products, poultry, flour and other grain, and soybean meal were the principal off-farm commodity exports.

The classification of farm and off-farm commodity exports in Table 1 conforms with the standard industry classification system rather than the commodity classification system used in reporting the U.S. agricultural

Table 1. Estimated Value of Exports in Specified Agriculture-Related Commodity Groups, U.S. and Minnesota, 1980

Commodity Group	Minne- sota 214 Ind. Code	United, States ^{1/}	Minne- sota ^{2/}
(\$1,000)			
Farm:			
Dairy Farm	1	20,075	1,395
Poultry and Eggs	2	48,490	1,532
Meat Animals and Prod.	3	145,695	5,930
Food, Feed Grain	4	16,133,888	906,725
Vegetables	5	247,311	4,674
Sugar Crops	6	937	88
Oil-Bearing Crops	7	6,399,793	397,427
Other Crops	8	4,930,886	0
Total Farm		27,933,075	1,317,771
Processed Farm Products:			
Meat Packing	27	828,218	52,095
Sausages and Other	28	61,622	1,269
Poultry Dressed	29	395,213	14,741
Poultry and Egg Processing	30	115,553	10,954
Creamery Butter	31	973	227
Cheese	32	20,247	1,998
Cond. and Evap. Milk	33	121,841	9,606
Ice Cream and Frozen Des.	34	1,782	87
Fluid Milk	35	7,830	467
Canned Fruits and Vegetables	36	254,285	11,901
Frozen Fruits and Vegetables	37	75,145	2,277
Other Pres. Fruits and Veg.	38	1,207,422	7,607
Fresh, Frozen, Pres. Fish	39	0	0
Flour and Other Grain	40	285,540	26,669
Cereal Preparations	41	22,292	434
Blended and Prepared Flour	42	221,590	1,653
Dog, Cat and Other Pet	43	93,704	1,837
Prepared Feeds, N.E.C.	44	1,032,256	1,226
Rice Milling	45	1,288,540	0
Wet Corn Milling	46	3,455	2
Bread, Cake and Related Prod.	47	3,397	57
Cookies and Crackers	48	32,441	285
Sugar	49	327,638	8,060
Confectionery and Related	50	73,477	1,594
Alcoholic Beverages	51	91,378	1,636
Soft Drinks	52	19,457	434
Flavoring, Extracts, and Syrups	53	91,367	274
Fats and Oils	54	3,761,817	123,388
Misc. Food Prod.	55	273,829	5,477
Cotton Linters	—	15,983	0
Leather Tanning and Industrial	102	1,045,617	20,180
Total Processed		13,483,562	306,435
All Commodities		41,233,406	1,624,206

^{1/} U.S. Foreign Agricultural Trade Statistical Report, Calendar Year 1981: A Supplement to the Foreign Agricultural Trade of the United States, International Economics Division, Economic Research Service, U.S. Department of Agriculture, April 1982.

^{2/} Based on Minnesota's proportion of U.S. gross output of specified commodity in Minn. 214-industry listing.

foreign trade statistics. While Minnesota's share of U.S. agricultural foreign trade statistics are not readily allocated to individual states using the foreign trade commodity classification, this task is much easier accomplished when using the standard industrial classification system. Also, the use of the standard system makes possible a reasonably accurate estimate of the total within year impact of Minnesota's share of total U.S. foreign agricultural trade on the total Minnesota economy.

Total trade effects

The total impact of U.S. foreign agricultural trade on the Minnesota economy is represented by the direct effects, as measured by Minnesota's share of specific U.S. commodity exports, and the indirect effects, which are the second, third, and subsequent rounds of production increases in agriculture's input-supplying industries. The total impact discussed here is the within year direct and indirect effects of U.S. foreign agricultural trade on the Minnesota economy. The total accumulative long-term effect of agricultural commodity exports on the Minnesota economy are nearly twice the short-term, i.e., within year, effects. The larger long-term effect is associated only with those commodities in excess supply in Minnesota, like agricultural exports.

Individual commodity effects. Individual commodity effects on all industry in Minnesota are summarized in Table 2. The total output effect of the four farm commodities on industry exceeded \$2.2 billion in 1980, or nearly twice the value of the four agricultural exports. The total output effect of the eight off-farm commodities on all Minnesota industry approached \$750 million or more than twice the value of the eight off-farm agriculture-related

Table 2. Direct and Indirect Effects of Specified Minnesota Industry in U.S. Foreign Agricultural Trade on Minnesota Gross Output, Income, and Employment, 1980.

No.	Industry Title	Minne- sota Exports	Direct and Indirect Effects		
			Gross Output	Income	Employ- ment
		(\$1,000)	(\$1,000)	(\$1,000)	(number)
Farm:					
1.	Dairy and Poultry Prod.	2,927	6,667	1,243	98
2.	Meat An. and Prod.	5,930	16,939	2,520	231
3.	Food, Feed Gr.	906,725	1,551,236	295,369	26,559
4.	Other Crops	402,189	661,445	177,850	15,882
	TOTAL	1,317,771	2,236,287	476,982	42,770
Off Farm:					
16.	Meat Products	79,059	230,018	29,540	2,303
17.	Dairy Products	12,385	38,353	5,059	355
18.	Canned, Froz. Pres.	21,785	48,000	9,358	566
19.	Grain Mill. Prod.	31,820	83,969	11,845	824
20.	Bakery Prod.	342	696	155	9
21.	Alch. Bev., Soft Dr.	2,344	4,616	930	50
22.	Misc. Food, Tob.	138,519	291,328	48,628	3,111
35.	Leather Prod.	20,180	49,180	13,098	832
	TOTAL	306,435	746,162	118,613	8,050
	All Exports	1,624,206	2,982,449	595,595	50,820

exports. The combined on-farm and off-farm total output effect was close to \$3 billion in 1980, of which nearly three fourths was the farm share.

Personal income effects of U.S. foreign agricultural trade are represented by changes in total earnings of the employed work force associated with corresponding changes in industry outputs. The farm share of the total income effect differs from the farm share of the total gross output effect for individual industries because of differences in earnings-to-output ratios. In 1980, the larger earnings-to-output ratios for farm than off-farm commodities resulted in a farm share which was 80 percent of the economy-wide income effect, or about five percent more than the farm share of the economy-wide industry output effect.

Alternate measures of farm income change the farm share of the economy-wide income effects. For example, total farm proprietor income for 1980 was estimated at \$1,065.7 million by the U.S. Department of Commerce in its Regional

Employment effects of U.S. agricultural foreign trade again differ from either the output or the income effects because of differences in employment-to-output and earnings-to-output ratios among individual commodity groups. Because output per worker is larger in the agricultural processing industries than in agriculture itself, the off-farm share of the economy-wide employment effect is down to 16 percent. In short, 84 percent of the overall Minnesota employment impact of U.S. foreign agricultural trade due to the farm commodity exports. The overall employment impact, like the overall output and income impacts, includes both the direct and indirect effects of U.S. foreign agricultural trade.

The employment effects of \$1-million change on foreign agricultural trade

were reduced sharply from 1977 to 1980 because of two divergent trends -- declining output per worker in much of agriculture and rising commodity prices. The reduction in trade impact was more pronounced for the four farm commodity groups than for all off-farm agricultural commodity groups. In comparison, the farm income effect of a \$1-million change in foreign agricultural trade dropped even more from 1977 to 1980 than the farm employment effect because of declining net farm income.

Individual industry effects. Individual industry effects of Minnesota's share of total U.S. foreign agricultural trade are summarized in Table 3. Rather than showing the total effects of each commodity, the individual industry effects of all the commodities listed in Table 1 are shown as a basis for demonstrating the importance of U.S. foreign agricultural trade in the Minnesota economy. Almost every industry is affected in some degree because of interindustry linkages. This results in high industry multipliers for the directly-affected export-producing industries.

The individual industry output effects range from none to nearly \$1 billion. While the overall industry output effects are the same in Table 2 and Table 3, their distribution between farm and off-farm commodities differs by more \$661 million. The large indirect effects of agricultural exports accounts for the large overall trade impact on individual off-farm commodities.

Both income and employment effects are smaller for the farm share of the total trade impact because of the large indirect effects. The income effect for the farm share is down to 54 percent of the overall income impact while the employment effect for the farm share is down to 70 percent of the overall employment impact.

Table 3. Direct and Indirect Effects of All Minnesota Industry Outputs
in U.S. Foreign Agricultural Trade on Minnesota Gross Output,
Income, and Employment, 1980.

No.	Industry Title	Gross Output (\$1,000)	Income (\$1,000)	Employ- ment (number)
Farm:				
1.	Dairy and Poultry Prod.	28,318	4,785	426
2.	Meat An. & Prod.	102,241	3,393	1,213
3.	Food, Feed Gr.	984,796	172,243	20,037
4.	Other Crops	459,082	134,926	13,331
	TOTAL	1,574,437	320,847	35,507
Off Farm:				
5.	Forest., Fish. Prod.	153	90	5
6.	Agr., For., Fish. Serv	25,837	8,374	1,002
7.	Iron & Ferr. Ores	153	31	1
8.	Nonferrous Ores	373	195	7
9.	Coal and Peat Mining	0	0	0
10.	Oil and Nat. Gas	0	0	0
11.	Stone, Clay Mfg., Qua.	2,826	1,299	59
12.	Other Mining	0	0	0
13.	New Construction	0	0	0
14.	Main. & Rep. Constr.	32,712	12,943	362
15.	Ordinance	223	55	2
16.	Meat Products	103,240	6,742	384
17.	Dairy Products	22,013	937	64
18.	Canned, Froz. Pres.	25,831	2,396	182
19.	Grain Mill. Prod.	57,481	2,567	200
20.	Bakery Prod.	1,199	278	14
21.	Alch. Bev., Soft Dr.	4,179	566	30
22.	Misc. Food, Tob.	195,690	19,836	1,047
23.	Textile Goods	4,062	813	53
24.	Apparel, Fab. Tex.	1,054	290	41
25.	Logging	684	104	5
26.	Sawmills	389	97	5
27.	Other Wood Prod.	1,646	901	42
28.	Furniture	153	46	3
29.	Pulp and Paper Prod.	17,365	3,078	148
30.	Paperboard Cont.	8,774	1,968	108
31.	Printing and Publ.	17,820	7,221	403
32.	Chem. and Allied Prod.	149,299	17,791	766
33.	Petr. Ref. and Prod.	64,914	1,970	65
34.	Rubber Prod.	12,485	2,905	162
35.	Leather Prod.	25,740	7,916	508
36.	Glass, Stone, Clay	4,957	1,368	53
37.	Primary Fe/Steel	3,172	577	26
38.	Iron and Steel Found.	1,758	448	18
39.	Primary Copper	73	14	0
40.	Other Prim. Met.	3,994	2,449	107
41.	Fabricated Metals	21,860	5,397	260
42.	Farm Machinery	14,753	3,381	188
43.	Machine Shops	1,785	862	31
44.	Other Non. Electr.	7,011	1,638	84
45.	Comp., Off. Mach.	338	149	4
46.	Serv. Ind. Mach.	1,833	473	27
47.	Electrical Mach.	6,107	1,735	108
48.	Motor Vehicles	1,520	353	17
49.	Other Trans. Equip.	341	121	8
50.	Prof., Scienc.	860	234	10
51.	Optical, Opth., Pho.	1,004	240	12
52.	Misc. Mfg.	2,205	483	49
53.	Railroad Trans.	19,864	9,293	418
54.	Local Transit	2,391	574	59
55.	Truck Trans.	26,981	13,458	661
56.	Air Trans.	5,834	2,263	76
57.	Other Trans.	4,521	2,122	82
58.	Communications	11,822	4,902	176
59.	Electric Utilities	14,884	1,686	68
60.	Gas Utilities	25,537	2,033	84
61.	Water and San. Serv.	9,534	2,384	36
62.	Wholesale Trade	93,839	41,857	2,351
63.	Retail Trade	4,792	2,759	255
64.	Finance, Ins.	47,308	22,135	1,151
65.	Real Estate	170,997	7,419	397
66.	Hotels, Pers., Rep.	5,533	2,358	236
67.	Business Serv.	72,710	22,789	1,359
68.	Eat. and Drink. Places	9,066	2,603	439
69.	Automobile Repair	13,016	3,596	247
70.	Motion Pic. and Recr.	1,057	517	40
71.	Health Services	711	430	26
72.	Educ., Nonpr.	2,591	1,342	132
73.	Fed. Gov't. Enter.	6,088	1,202	178
74.	State and Local Enter.	7,700	2,691	170
75.	Scrap, Used and Second	1,175	0	0
	TOTAL	1,408,012	274,747	15,313
	ALL INDUSTRY	2,982,449	595,594	50,820

Agriculture and Industry in the 1980's

Once economic recovery starts, as hopefully it will start sometime in 1983, Minnesota industry is again projected to expand in almost every sector, according to the most recent U.S. Department of Commerce forecasts prepared in 1980. However, the overall economic forecasts of employment, population and total earnings show declining rates of increase for both Minnesota and the U.S. During the 1969 to 1978 period, for example, total industry jobs increased at an annual rate of 2.5 percent in Minnesota and 1.9 percent in the U.S. The forecast series show annual increases of 1.8 percent and 1.6 percent, respectively, for the 1979 to 1980 period.

Both Minnesota and U.S. economic growth projects are dependent on an expanding national and world economy and increasing labor productivity and personal income. Indeed, an increasing share of the annual increase in personal income is now being attributed to increasing labor productivity in current projections. By 1990, more than half of the total Minnesota population would be employed. In 1978, total jobs numbered slightly less than half of the total population (49.6 percent in Minnesota and 46.4 percent in the U.S.).

Current industry projections for the 1980's above-average overall growth for the Minnesota economy in the 1979 to 1990 period, for example, with Minnesota growth rates exceeding corresponding U.S. growth rates by 10 percent or more for individual industry groups as follows:

Earnings

Farm
Mfg., nondurables
Mfg., durable goods
Fed., civilian

Employment

Farm
Agr. serv., for., fish
Construction
Mfg., nondurables
Mfg., durable goods
Services

Three industry groups -- durable goods manufacturing, retail trade, and services -- are identified as the leading growth industries in the Minnesota economy. These industries account for over 62 percent of the forecast 1978 to 1990 employment increase of 463,000.

Agriculture's economic importance can be summarized now with reference to all industry sales and purchases, income and jobs. These sales, especially exports of farm and food products to rest-of-nation and world markets, are large compared with all industry sales. Forty-one percent of all Minnesota industry exports originated in the agriculture and food products manufacturing industries in 1977. In-state purchases of production inputs were nearly as large -- 33 percent of the total. In jobs and income, however, agriculture's importance is much less. In 1977, the two agriculture-related industry groups accounted for 11 percent of all jobs and 12 percent of all value added by Minnesota industry, including government. The percentage distributions for the two industry groups and all other industry were as follows:

<u>Industry Group</u>	<u>Export Sales</u>	<u>In-State Purchases</u> (pct.)	<u>Value Added</u>	<u>Jobs</u>
Agriculture	7.8	11.2	7.	8.5
Food Products	33.6	22.0	4.6	2.6
All Other	58.6	66.8	88.0	88.9

Simple numerical comparisons between the industry groups for the 1972-1977 period show percentage increases in the sales, purchases and value added as follows:

<u>Industry Group</u>	<u>Total Sales</u>	<u>Export Sales</u>	<u>In-State Purchases</u> (pct.)	<u>Value Added</u>
Agriculture	18.3	18.8	26.3	15.9
Food Products	24.1	24.7	28.2	33.2
All Other	15.7	1.2	18.0	18.5

Of the three industry groups, the largest increases were estimated in food products manufacturing, particularly in export sales and value added. Total sales are included, also, for comparison with export sales, which dropped sharply, in constant dollar value, for the "all other" industry group.

Both agriculture and food products manufacturing in Minnesota are projected to increase total sales and earnings, but not total employment. In these two industry groups, the increases in total sales lag behind the increases in output per worker. The latter also account for increases in real earnings per worker.

Unlike the agriculture-related industries, the services-producing industries generally experienced large increases in total employment in the 1970's. The largest employment increases were reported in the trade, finance, insurance, and real estate, and personal, business, and professional service industry groups. Except for trade, above-average employment increases are projected for these industries in the 1980's. Total earnings also are projected to increase at above-average rates.