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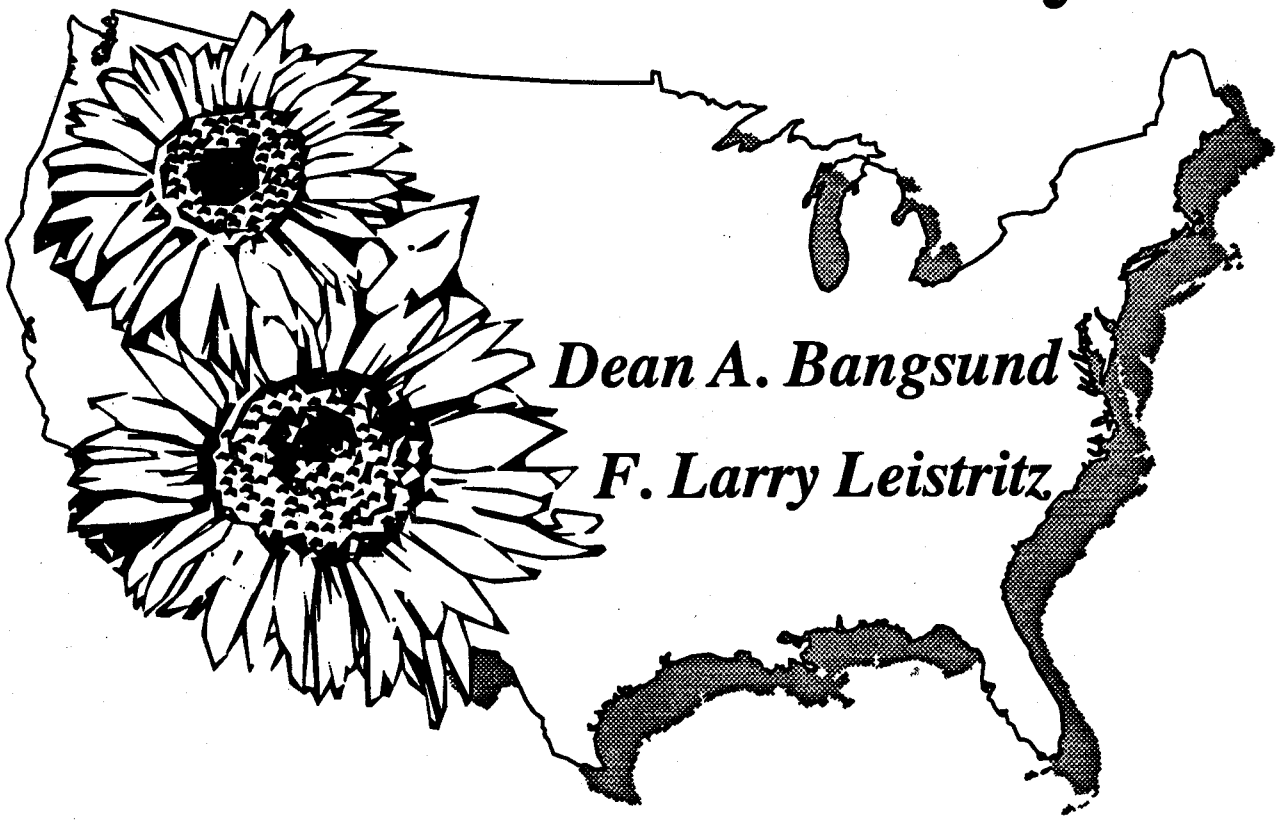
Economic Contribution of the United States Sunflower Industry



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HIGHLIGHTS

This report estimates the economic contribution (direct and secondary effects) of the U.S. sunflower industry to the national economy and to the regional economies of sunflower-producing states. Expenditures and returns from production, handling, transportation, processing, packaging, distribution, consuming, and exporting activities represented the direct economic impacts from the sunflower industry. Generally, all economic activity from production to final use (domestic and export) was estimated for all major sunflower products. Subsequently, the direct impacts were used with an input-output model to estimate the secondary impacts.

The U.S. sunflower industry was divided into four separate subindustries: (1) crop production, (2) sunflower oil industry, (3) confection sunflower industry, and (4) birdfood activities. Crop production included all the activities of producing sunflower and delivering the commodity to local elevators and/or processors. The sunflower oil industry included all activities dealing with oil sunflower, except oil sunflower sold as birdfood. The confection sunflower industry collects, processes, and distributes edible sunflower for human consumption. Birdfood activities in the sunflower industry included collecting, processing, and distributing sunflower for use as birdfood.

The supply and disappearance of oil sunflower, confection sunflower, sunflower oil, and sunflower meal were estimated from 1991 through 1993. Supply was composed of beginning stocks, imports, and domestic production, while disappearance was composed of exports and domestic use. Exports and domestic use were further divided into various uses and products (e.g., crude sunflower oil exports, domestic refined sunflower oil use).

***Sunflower production** in the U.S. averaged 2.58 million acres from 1991 to 1993. The 2.58 million acres of sunflower generated about $268 million in production expenditures and $48.8 million in returns to unpaid labor, management, and equity. Total direct impacts (expenditures and returns) from sunflower production were estimated at $123 per acre or $316.8 million. Oil sunflower accounted for about 80 percent of all sunflower production impacts.*

*The U.S. **sunflower oil industry** crushed about 847,000 metric tons of oil sunflower yearly from 1991 through 1993, representing nearly three-fourths of all oil sunflower use. Oil sunflower crushings produced about 348,700 metric tons of crude sunflower oil and 406,700 metric tons of sunflower meal annually from 1991 through 1993. Nearly 65 percent of all sunflower oil produced was exported, while the remaining oil was consumed domestically.*

Direct economic impacts in the sunflower oil industry included $4.3 million in elevator handling, $14.3 million in transportation of oil sunflower to crushing plants, $49.2 million in oil crushing activities, $11.3 million in refining activities, $137.1 million in domestic consumption of sunflower oil and meal, and $25 million in export activity. Total direct impacts in the sunflower oil industry were $241 million annually.

*The **confection sunflower industry** processed about 241,400 metric tons of sunflower into 35,300 metric tons of birdfood, 70,600 metric tons of whole seed, and 51,800 metric tons of kernel annually from 1991 through 1993. Of the whole seed and kernel produced, about 42 percent of the whole seed and 59 percent of the kernel produced were exported.*

Direct economic impacts in the confection sunflower industry included $31.8 million in primary processing, $16.6 million in secondary processing, $10.2 million in export activity, and $217.1 million in domestic consumption. Total direct impacts in the sunflower confection industry were $276 million annually.

*The **birdfood segment** of the U.S. sunflower industry includes both oil and confection sunflower for birdfood. About 236,450 metric tons of oil sunflower and about 35,300 metric tons of confection sunflower were consumed annually for birdfood from 1991 through 1993. Direct economic impacts from birdfood activities included $45.4 million for primary processing and $91.9 million for domestic consumption. Total direct impacts in the birdfood segment of the sunflower industry were $137.3 million annually.*

All sunflower activities combined created $971 million in direct impacts. An input-output model was used to estimate the secondary economic impacts. Sunflower production, sunflower oil industry, confection industry, and birdfood activities generated another $1.65 billion in secondary impacts, for a total industry impact of $2.62 billion.

Direct impacts in the major sunflower-producing states were estimated to be $268 million in North Dakota, $83 million in Minnesota, $74 million in South Dakota, $34 million in Kansas, and $21 million in Colorado, Nebraska, and Texas combined. Total economic impacts were estimated to be $712 million in North Dakota, $223 million in Minnesota, $194 million in South Dakota, $92 million in Kansas, and $54 million in Colorado, Nebraska, and Texas combined. Economic activity in all other states combined was estimated to be $1.34 billion.

Annual tax collections from the economic activity of all sunflower industries in the producing states were estimated at $24 million, which included $16 million in sales and use, $6.2 million in personal income, and $1.9 million in corporate income taxes. Processing firms in the sunflower oil, confection sunflower, and birdfood industries also generated about $928,000 in property taxes, $313,000 in sales and use taxes, and $483,000 in other taxes (state and federal income and miscellaneous taxes). Producers also paid about $11.9 million in property taxes.

Direct employment by primary and secondary processing firms, including hybrid seed employment, in the various sunflower industries was estimated at 1,094 full-time equivalent (FTE) jobs. Economic activity generated by all sunflower activities was responsible for an additional 33,350 full-time equivalent secondary jobs. Total industry-related employment was estimated at about 34,450 FTE jobs, not including on-farm employment.

Sunflower in the United States could be categorized as a regional crop; one that is an important crop to many Great Plains states both in terms of crop production and associated processing activities. Initial economic analysis of the U.S. sunflower industry indicates that changes in sunflower production, and subsequently changes in primary processing, likely have the greatest effect on the economies of sunflower-producing states. The greatest impacts (the most net value added) among all industry activities (both in terms of per unit impacts and percent of all impacts) are generated through the stages and activities of domestic consumption. Thus, the magnitude and distribution of future industry impacts will depend upon changes in sunflower supply and corresponding changes in demand for sunflower products.

Economic Contribution of the United States Sunflower Industry

Dean A. Bangsund and F. Larry Leistritz*

INTRODUCTION

Sunflower, a plant native to North America, was first discovered in the 16th century by early European explorers. Sunflower seed was taken back to Europe, where the plant eventually found its way east into Russia. It was in Russia that the plant became an important food crop. The plant was subsequently reintroduced to North America by Russian immigrants to the southern prairies in Canada. From its reintroduction to North America, sunflower continued its expansion, first as an imported food source from Canada, then later (late 1800s and early 1900s) as a silage crop in the United States. Sunflower has since continued its expansion, not only in the United States, but throughout the world, to become the fifth largest oil seed crop in the world.

United States, from 1987 through 1991, ranked sixth in world sunflower production, accounting for about 5 percent of world sunflower production (National Sunflower Association *various issues*). The top five producers of sunflower, the former Soviet Union, EC-12,[1] Argentina, Eastern Europe, and China, produced over 80 percent of world sunflower production during the same period. Current sunflower export activity from the U.S. has shifted from an emphasis on sunflower seed to sunflower oil.

Domestic production of sunflower in the U.S. increased throughout the 1970s, peaked in 1979 with a record production of nearly 7.5 billion pounds, then declined steadily during the 1980s to reach a 13-year low of 1.7 billion pounds in 1989 (National Sunflower Association *various issues*). However, since 1989, production has increased by an average of 210 million pounds annually, with production averaging 2.8 billion pounds from 1990 through 1993.

Domestically, from 1984 through 1993, sunflower oil accounted for about 4 percent of all edible oil production, placing it fourth behind soybean oil (77.8 percent), corn oil (9.3 percent), and cottonseed oil (6.8 percent) (U.S. Department of Agriculture 1994). Domestic sunflower oil disappearance has averaged about 81,500 metric tons from 1984 through 1993, placing it eighth behind soybean, corn, coconut, cottonseed, canola, palm, and palm kernel oil. Sunflower oil use in the

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[1]All 12 European Community countries combined.

United States has averaged less than 2 percent of all edible oil use from 1983 through 1994 (U.S. Department of Agriculture 1994).

Sunflower in the United States could be categorized as a regional crop; one that is not necessarily a leading crop in the United States in terms of acreage or overall crop value, but an important crop to many Great Plains states in terms of crop production and associated processing activities.

Information from an economic impact or contribution study can be valuable to a regional industry, especially those that lack recognition from individuals unfamiliar with the industry. Determining the economic contribution of a given industry provides information about its importance to local and regional economies, and generally provides information for industry, education, and public relations efforts.

In the case of the sunflower industry, an industry study can be particularly helpful since (1) sunflower is an important component of the U.S. vegetable oil market--yet lacks sufficient size to be recognized as a major U.S. crop, (2) crop production and processing are concentrated regionally--which enhances the importance of the crop to regional economies, (3) recent policy changes have affected sunflower production and exports--thus, an economic measure of the industry could be useful to demonstrate the economic significance of future policy decisions, and (4) important components within the sunflower industry remain unquantified--which by documenting, could provide useful information for businesses and policymakers within the industry.

Existing literature provides a good overview regarding many aspects of the U.S. sunflower industry (McCormick et al. 1992; National Sunflower Association 1991); however, measures of the value of the industry have not been published. The purpose of this study is to quantify the economic activity generated by the sunflower industry.

OBJECTIVES

The purpose of this study is to estimate the economic contribution (direct and secondary effects) of the U.S. sunflower industry to the national economy and to the regional economies of sunflower-producing states. Specific objectives include

1) estimating the direct and secondary economic impacts from sunflower production,

2) estimating the direct and secondary economic impacts from the sunflower oil industry,

3) estimating the direct and secondary economic impacts from the sunflower birdfood industry, and

4) estimating the direct and secondary economic impacts from the confection sunflower industry.

INDUSTRY STRUCTURE

The U.S. sunflower industry is actually composed of three distinguishable subindustries: sunflower oil industry, confection industry, and birdfood industry. While each industry is actually part of a larger industry--the sunflower oil industry is part of the domestic edible oils industry--the confection industry is part of the consumer nut industry--and sunflower is but one of the many crops/commodities used by the birdfood industry, each has specific and separate functions within the framework of the U.S. sunflower industry.

Sunflower Oil Industry

The sunflower oil industry is generally viewed as the largest of the sunflower industries, partially because of the amount (both volume and acres) of the sunflower crop devoted to oil production and because of the historic existence of the oil crushing infrastructure. The oil crushing industry has, in recent years, consumed about 75 percent of all oil sunflower production.

The sunflower oil industry is defined in this study to include all activities dealing with oil sunflower, except oil sunflower sold as birdfood. The sunflower oil industry centers predominantly around oil seed crushing, which produces crude sunflower oil, the primary product of the sunflower oil industry. Sunflower meal, the residual from oil seed crushing, is also a major product produced from oil seed crushing, although the crushing process is undertaken to produce oil. Other activities included in the sunflower oil industry were oil seed exports, crude and refined oil exports, sunflower oil refining, and domestic consumption of sunflower oil.

The sunflower oil industry has several major processing components and markets for its products (Figure 1). Initially, sunflower is moved from local elevators to processing plants located throughout the sunflower-producing regions. Upon delivery to a crushing plant, sunflower is processed into sunflower oil and meal. Sunflower oil then is generally exported as crude sunflower oil or undergoes several additional processes to prepare the oil for human consumption, generally called refining. Sunflower meal is primarily delivered to domestic markets for use as livestock feed, although small amounts are exported. Sunflower oil that becomes refined is predominantly bottled and packaged into consumer products, which are sold as pure oil or as vegetable oil blends, while a small amount of refined sunflower oil is exported. A small portion of the sunflower crop is exported as oil seed and was included as part of the sunflower oil industry.

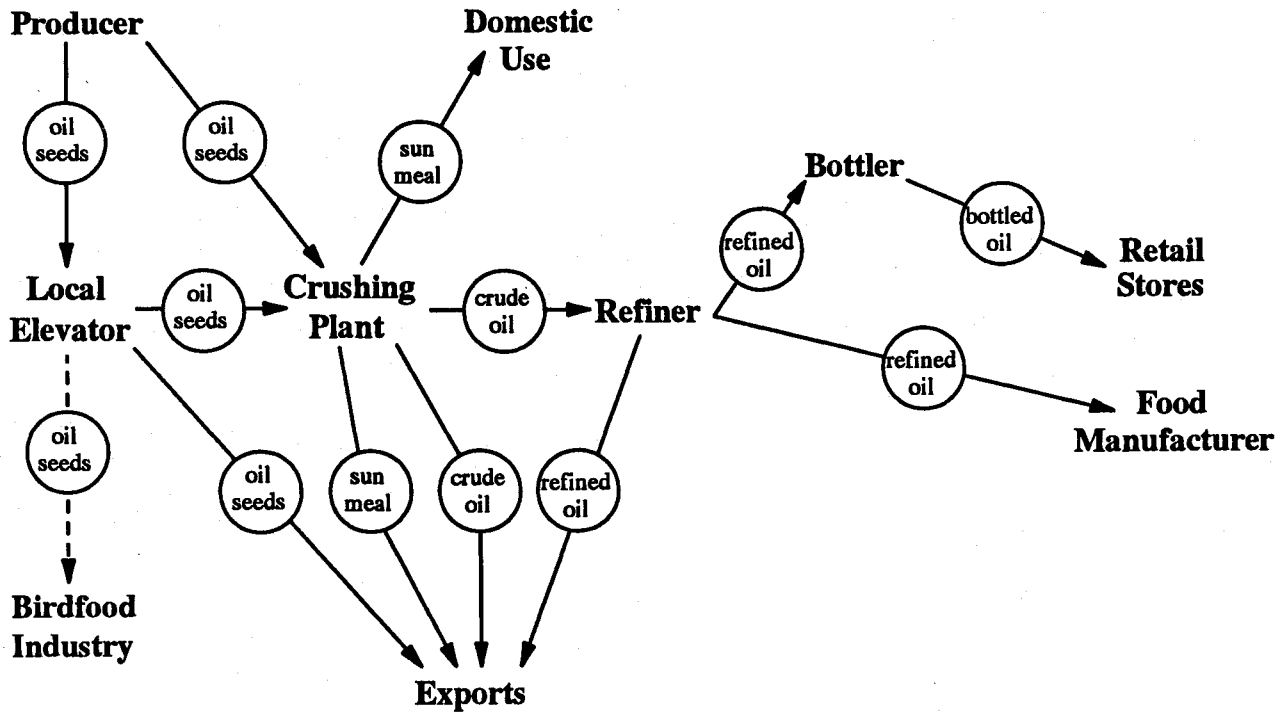

Figure 1. U.S. Sunflower Oil Industry Structure

Confection Industry

The confection sunflower industry is the portion of the U.S. sunflower industry that processes edible sunflower seed for human consumption. The confection industry is defined in this study to include all the activities of processing and preparing confection sunflower and related products for export and domestic consumption. Confection sunflower not suitable for human consumption after the initial processing stage was considered part of the birdfood industry.

Unlike the sunflower oil industry, confection sunflower is usually shipped directly from the producer to a processing plant. At this point, confection sunflower is processed into whole seed, kernel, and birdfood. After this stage of production, much of the confection industry exports kernel and whole seed to other countries for human consumption. Whole seed and kernel that enter the U.S. domestic market undergo some additional processing before they end up as consumer products (Figure 2).

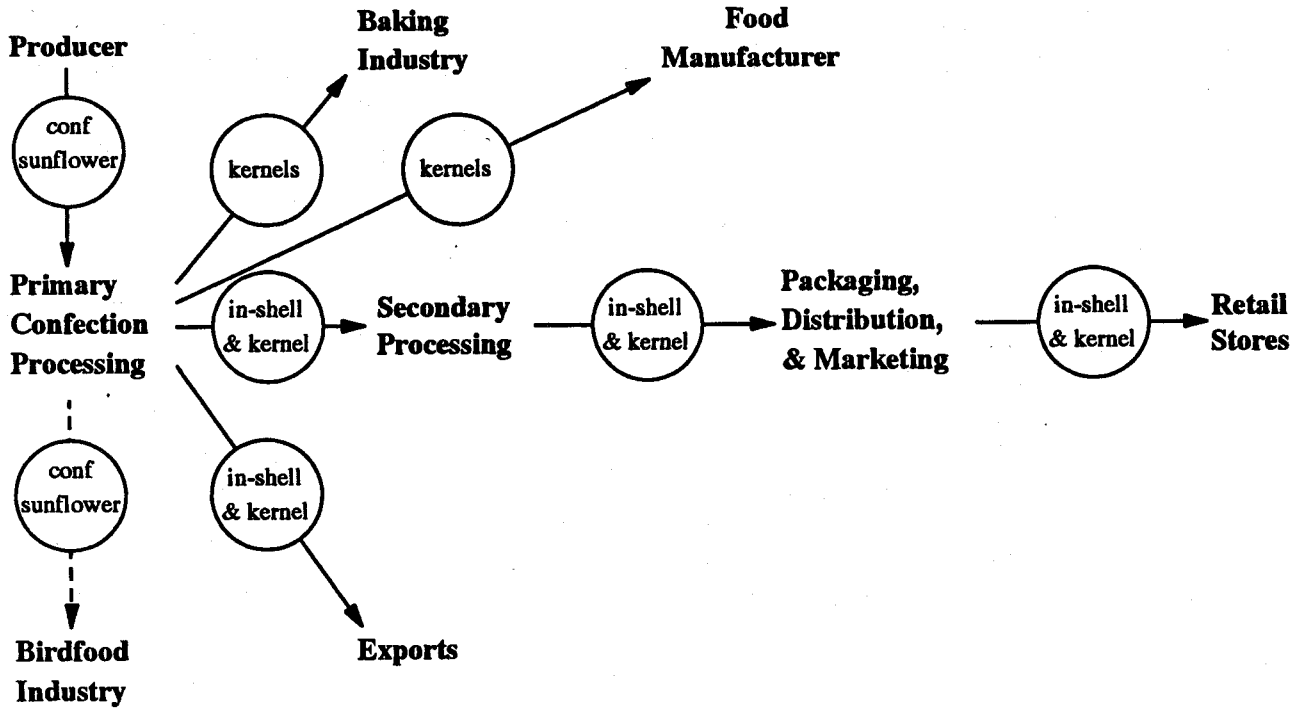

Figure 2. U.S. Confection Sunflower Industry Structure

Birdfood Activities

A portion of the U.S. sunflower industry contributes to the U.S. birdfood industry. Most of the sunflower that enters the birdfood markets are oil-type sunflower. In past years, oil sunflower not used for crushing, exports, or hybrid seed was disposed of as birdfood, which functioned as a residual market. Recently, the demand for oil sunflower in birdfood markets has increased, creating competition with traditional oil sunflower uses. The U.S. birdfood industry predominantly uses the oil-type sunflower; however, confection sunflower not suitable for human use is also sold as birdfood. Thus, the U.S. sunflower birdfood industry is composed of oil and confection sunflower, sometimes entering the birdfood market for different reasons.

Oil sunflower sold as birdfood is typically delivered to a local elevator or local birdfood processor by the producer. Upon initial processing, oil sunflower is typically sold to rebaggers or retail distributors. At that point, sunflower is either bagged for sale as pure sunflower seed or combined with other birdfood commodities and sold as a birdfood mix. Confection sunflower also ends up being sold either as pure sunflower seed or as a birdfood mix; however, they initially move through the marketing channel in the same manner as all confection sunflower (Figure 3). In some special occasions, confection sunflower has moved directly from the producer to a birdfood processor; this practice is not widespread and was not included in this study.

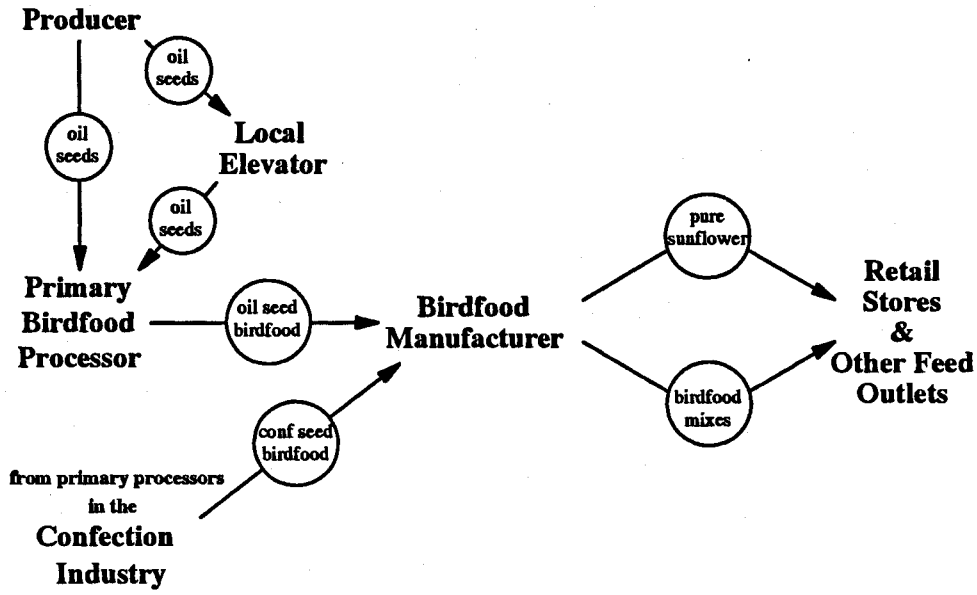

Figure 3. U.S. Sunflower Birdfood Industry Structure

PROCEDURES

An economic contribution analysis, as defined in this study, represents an estimate of all expenditures and returns associated with an industry (i.e., economic activity from producing, handling, transporting, processing, consuming, and exporting sunflower and its associated products). The economic contribution approach to estimating economic activity has been used for several similar studies in North Dakota (Bangsund, Sell, and Leistritz 1994; Bangsund and Leistritz 1993; Bangsund and Leistritz 1992; Coon and Leistritz 1988).

Analysis of the impacts associated with the sunflower industry required several steps. A general discussion of the procedures used in the study is divided into (1) industry supply and disappearance, (2) value of crop production, (3) sunflower processing, (4) domestic consumption, and (5) input-output analysis. More in-depth presentations for many of the procedures, techniques, and information used to estimate economic activity from the U.S. sunflower industry have been included in Appendixes A through F.

Industry Supply and Disappearance

An important step in estimating the economic impact of any commodity-based industry is quantifying yearly production, imports and exports, and domestic consumption.. Thus, crop production and crop disappearance provided the framework for the economic analysis of the U.S. sunflower industry.

Sunflower supply represents industry-wide estimates of yearly sunflower supplies, which are composed of beginning (carryover) stocks, domestic production, and imports. Sunflower disappearance represents industry-wide estimates of yearly sunflower utilization, which is divided into domestic use, exports, and carryover stocks.

Information to determine U.S. sunflower supply and disappearance was obtained from a variety of sources (National Sunflower Association *various issues*, U.S. Department of Agriculture *various issues*, and U.S. Department of Commerce 1992, 1993, 1994); in addition, some items were independently estimated. Sunflower supply and disappearance were averaged from 1991 through 1993 for both oil and confection sunflower to eliminate yearly fluctuations that typically occur in crop production, imports, exports, and domestic use. Average U.S. sunflower supply and disappearance estimates, data sources, and estimation procedures are documented in later sections of this report (Appendix A).

Similarly, separate supply and disappearance estimates were also generated for sunflower oil and sunflower meal (Appendix A).

Sunflower Production

The first step in assessing the value of sunflower production was to quantify production. Sunflower production statistics were obtained for all major sunflower-producing states. Agricultural Statistics Services in Colorado, Kansas, Minnesota, Nebraska, North Dakota, South Dakota, and Texas provided estimates of oil and confection sunflower yields, acreage, and production by county for production years 1991 through 1993. Estimates of sunflower production in minor sunflower-producing states were obtained from the United States Department of Agriculture (USDA) (1992, 1993, 1994). Sunflower production was averaged to eliminate fluctuations in yearly production, thus providing a better indication of impacts generated by the industry in a typical year. A three-year average of sunflower production was used to estimate impacts from the sunflower industry (Appendix A).

Average sunflower prices were estimated for production years 1991 through 1993 for all major sunflower-producing states (USDA 1994). Statewide marketing-year average prices were weighted by yearly production to determine average sunflower values (1991 through 1993) by state (Appendix B). The weighted average sunflower price (calculated separately for oil and confection sunflower) was multiplied by average crop production to determine overall crop value.

Production budgets containing expenses and returns were obtained from University Extension Services in each major sunflower-producing state (Appendix B). The budgets either reflected typical statewide costs or regional crop production costs/returns within a state. The crop budgets were used to determine expenditures for production inputs (e.g., seed, herbicide, fertilizer, machinery) and producer returns, from which unpaid labor, management, and equity considerations are met.

Sunflower Processing

Processing in the U.S. sunflower industry involves oil, confection, and birdfood activities. Oil processing generally involves crushing oil sunflower to obtain sunflower oil and meal and additional preparation of crude sunflower oil into edible products for human consumption. Confection sunflower processing generally includes the various processes sunflower undergo before they can be

sold for human consumption, which include, but are not limited to, cleaning, sorting, dehulling, salting, roasting, and consumer packaging. Birdfood processing activities prepare sunflower for birdfood and other miscellaneous feeds.

Sunflower Oil

Impacts from oil sunflower crushing activities were estimated by first determining the quantity of oil and meal produced and the amount of oil sunflower crushed (Appendix A). By combining average yields of crude oil and sunflower meal resulting from oil seed crushing with average prices for crude oil, sunflower meal, and prices paid for sunflower crushed, a direct impact margin was estimated (Appendix C). The direct impact margin represents the value added to sunflower seed by converting them into oil and meal products. The direct impact margin for oil crushing was allocated to various economic sectors based on information obtained from a survey of oil seed crushers.

A questionnaire was developed to determine the amount and type of expenditures and revenues associated from oil seed crushing activities at all major sunflower processing plants in the United States (Appendix F). In addition to oil seed crushing expenditures and revenues, information on total sunflower related employment, oil seed crushed, and oil produced was solicited. Information obtained from the survey of oil seed crushers, combined with additional information, was used to allocate industry crushings among the various crushing plants in the sunflower-producing region, and thus allocate direct impacts of oil seed crushings to the respective state economies.

Expenditures and revenues associated with sunflower oil refining were obtained from industry contacts. Oil refining included the processes of bleaching, hydrogenation, dewaxing, and deodorizing of crude oil. The amount of oil refined was determined indirectly from average U.S. sunflower oil supply and disappearance data and information obtained from the U.S. Department of Commerce (1992, 1993, 1994) (Appendix C).

The value of oil seed, crude sunflower oil, refined sunflower oil, and sunflower meal exports was included in the impacts of the sunflower oil industry. The value of sunflower oil industry exports was determined from information obtained from the National Sunflower Association (Appendix C).

Confection

Economic activity from the primary processing[2] of confection sunflower was estimated from a combination of industry information and information obtained from a survey of confection processors. An approximate overall yield from confection processing (i.e., amount of kernel, whole seed, and birdfood) was developed from industry information. The overall confection processing yield was combined with (1) approximate values for primary confection processing outputs and (2) the value of confection sunflower purchased to develop a direct impact margin for primary confection processing.

The direct impact margin for primary confection processing was allocated to various economic sectors based on information obtained from a survey of confection processors. A questionnaire was developed to determine the amount and type of expenditures and revenues associated from primary confection processing at most major confection processing plants in the United States (Appendix F). In addition to processing expenditures and revenues, information on total sunflower-related employment and confection sunflower processed was solicited.

Economic activity from secondary confection processing[3] was estimated from industry contacts and secondary sources (Appendix D). A direct impact margin for secondary processing was based on the difference between the value of sunflower products from secondary processing and the value of sunflower products entering that process (Appendix D).

Birdfood

Economic activity from primary birdfood processing[4] was estimated from a survey of birdfood processors, and indirectly from the survey of confection processors. The U.S. sunflower industry processes both oil sunflower and

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[2]Primary processing is defined as activities involving confection seed cleaning, sorting and/or sizing, dehulling, and bagging.

[3]Secondary processing is defined as activities involving confection seed roasting, salting, and various degrees of packaging. Secondary processing takes place after confection sunflower have undergone primary processing.

[4]Primary birdfood processing included activities of preparing oil sunflower for use by birdfood manufacturing and retail distribution companies.

confection sunflower (i.e., seeds unfit for human consumption) for birdfood. Structured identical to the confection survey, the questionnaire asked for measures of expenditures and revenues from birdfood processing activities, sunflower-related employment, and quantity of sunflower processed (Appendix F). A substantial number of birdfood processors in the Upper Great Plains were surveyed. Since not all processors were surveyed and not all those surveyed returned completed questionnaires, information obtained from completed questionnaires and industry information was used to develop expenditures and revenues that were representative of the primary birdfood processing industry in the United States.

The economic impacts from primary processing of birdfood-quality confection sunflower were included in the confection industry. Confection sunflower is primarily grown and processed for human consumption and birdfood-quality confection sunflower leaving the primary processing plants were considered a byproduct of the confection industry. After primary confection processing, confection sunflower sold as birdfood was considered an input to the birdfood industry, and the economic impact generated thereafter was considered part of the birdfood industry.

Domestic Consumption

The value of sunflower products at the retail level was included in the industry impacts. As a result, the value of sunflower products at the consumer level was estimated along with the economic activity created by the retail process. However, market activity becomes inherently difficult to quantify, both economically and structurally, for most of the consumer sunflower products using methods and procedures employed for the primary and secondary processing stages. Thus, the economic impacts created by the various activities performed by firms involved in retailing sunflower products were based on common areas of the marketing chain, even though the same product, with different brand names, may follow different paths before it reaches the retail outlet. Because the specifics of market structure differed across the consumer channels for sunflower oil, confection sunflower products, and birdfood, common areas of economic activity were estimated separately for each, such as retail activity, transportation, consumer packaging, and distribution and marketing.

Monthly retail prices and sales quantities for sunflower oil and most confection sunflower products were obtained from a national market research firm (Appendix C and D). Prices and quantities were averaged across various brands and package sizes by month from January 1991 through December 1993 to obtain

a weighted average price for sunflower oil and confection products. The weighted average prices were used in conjunction with other values to determine the economic impacts of domestic consumption of sunflower products (Appendix D). Retail prices of birdfood were developed through industry information (Appendix E).

Input-Output Analysis

Economic activity from a project, program, or policy can be categorized into direct and secondary impacts. Direct impacts are those changes in output, employment, or income that represent the initial or direct effects of the project, program, or policy. Secondary impacts (sometimes further categorized into indirect and induced effects) result from subsequent rounds of spending and respending within the economy. This process of spending and respending is sometimes termed the multiplier process, and the resultant secondary effects are sometimes referred to as multiplier effects (Leistritz and Murdock 1981).

Input-output (I-O) analysis is a mathematical tool that traces linkages among sectors of an economy and calculates the total business activity resulting from a direct impact in a basic sector (Coon et al. 1985). The North Dakota I-O Model has 17 economic sectors, is closed with respect to households (households are included in the model), and was developed from primary (survey) data from firms and households in North Dakota.

Empirical testing has shown the North Dakota Input-Output Model is sufficiently accurate in estimating gross business volume, personal income, retail activity, and economic activity in other major sectors in North Dakota (Coon and Leistritz 1994). The North Dakota Input-Output Model was considered appropriate for measuring impacts in the major sunflower-producing states because (1) the economic structure for much of the Great Plains states is similar to that of North Dakota and (2) empirical testing has indicated that the North Dakota I-O coefficients are accurate in estimating changes in levels of economic activity in other Great Plains states (Coon et al. 1984; Leistritz et al. 1990).

ECONOMIC IMPACTS

The economic contribution of the U.S. sunflower industry was estimated from production, handling, transportation, processing, packaging, distribution, consuming, and exporting activities. Expenditures and returns from these activities represent the direct economic impacts from the sunflower industry.

Subsequently, the direct impacts were used with an input-output model to estimate the secondary impacts. Secondary impacts result from the turnover or respending of direct impacts within the economy. The following section is divided into six major parts: (1) direct impacts, (2) secondary impacts, (3) employment, (4) tax revenue, (5) total economic impacts, and (6) future impacts.

Direct Impacts

From an economic perspective, direct impacts are those changes in output, employment, or income that represent the initial or direct effects of a project, program, or activity. The discussion of direct impacts from the U.S. sunflower industry on the national economy and the economy of producing states has been divided into the following sunflower industries: (1) sunflower production, (2) sunflower oil, (3) confection sunflower, and (4) birdfood.

Sunflower Production

Farmers and producers generate direct economic impacts to area economies through (1) expenditures for production outlays and (2) returns to unpaid labor, management, and equity. Direct economic impacts from sunflower production (i.e., production outlays and producer returns) were estimated by developing crop production budgets. The sunflower production budgets contained estimated revenue, variable and fixed costs, and returns to unpaid labor, management, and equity. Separate budgets were generated for both oil and confection sunflower for the states of Minnesota, Kansas, Colorado, Nebraska, and Texas, with multiple budgets developed for various production regions in North Dakota and South Dakota (Appendix B).

Sunflower production in the U.S. averaged 2.58 million acres from 1991 to 1993. The 2.58 million acres of sunflower generated about $268 million in production expenditures and $48.8 million in returns to unpaid labor, management, and equity. Total direct impacts (expenditures and returns) from sunflower production were estimated at $123 per acre or $316.8 million (Table 1).

Oil sunflower in the U.S. averaged 2.2 million acres from 1991 to 1993. The 2.2 million acres of oil sunflower generated about $222.5 million in production expenditures and $35.2 million in returns to unpaid labor, management, and equity. Total direct impacts (expenditures and returns) from oil sunflower production were estimated at $118 per acre or $257.8 million (Table 1).

Table 1. Annual Direct Economic Impacts from Sunflower Production in the United States, 1991 Through 1993

Crop/State	Production Expenditures	Returns to Unpaid Labor, Management, and Equity	Total Production Impacts	Percent of Impacts
	----------	000s $	----------	
Oil Sunflower				
North Dakota	120,985	13,487	134,472	52.2
South Dakota	43,398	15,844	59,242	23.0
Minnesota	31,029	2,715	33,744	13.1
Kansas	12,852	2,025	14,877	5.8
Colorado	4,973	203	5,176	2.0
Nebraska	3,160	208	3,368	1.3
Texas	2,094	157	2,251	0.9
Other states	4,024	597	4,621	1.7
Total	222,515	35,236	257,751	
Confection Sunflower				
North Dakota	21,261	6,589	27,850	47.1
South Dakota	1,387	847	2,234	3.8
Minnesota	10,342	3,196	13,538	22.9
Kansas	3,122	723	3,845	6.5
Colorado	3,068	769	3,837	6.5
Nebraska	1,648	994	2,642	4.5
Texas	2,265	409	2,674	4.5
Other states	2,423	50	2,473	4.2
Total	45,516	13,577	59,093	
All Sunflower				
North Dakota	142,246	20,076	162,322	51.2
South Dakota	44,785	16,691	61,476	19.4
Minnesota	41,371	5,911	47,282	14.9
Kansas	15,974	2,748	18,722	5.9
Colorado	8,041	972	9,013	2.8
Nebraska	4,808	1,202	6,010	1.9
Texas	4,359	566	4,925	1.6
Other states	6,447	647	7,094	2.3
Total	268,031	48,813	316,844	

Confection sunflower production in the U.S. averaged 396,000 acres from 1991 to 1993. The 396,000 acres of confection sunflower generated about $45.5 million in production expenditures and $13.6 million in returns to unpaid labor, management, and equity. Total direct impacts (expenditures and returns) from confection sunflower production were estimated at $149 per acre or $59.1 million (Table 1).

North Dakota was the largest producer of all sunflower from 1991 through 1993 with about 1.42 million acres and also generated the greatest direct impacts from production--$162.3 million or about 50 percent of all production impacts. The closest other state was South Dakota with 19 percent of all production impacts (Table 1). In North Dakota, South Dakota, Minnesota, and Kansas, the four largest sunflower-producing states, oil sunflower accounted for nearly 84 percent of all sunflower production impacts. Nationally, oil sunflower accounted for about 81 percent of all sunflower production impacts; however, in the minor sunflower-producing states (Colorado, Nebraska, Texas, and miscellaneous states) oil sunflower only accounted for 57 percent of all production impacts (Table 1).

Sunflower Oil Industry

Direct economic impacts from the U.S. sunflower oil industry were generated separately for country elevator handling activities, oil seed exports, transportation of oil sunflower to crushing plants, oil sunflower crushing activities, sunflower oil and meal exports, sunflower oil refining activities, and domestic consumption of sunflower oil and meal. Although the U.S. sunflower oil industry generates economic activity through a variety of activities, the U.S. sunflower oil industry predominantly evolves around producing and handling sunflower oil. Nearly three-fourths of all oil sunflower in the U.S. are crushed each year. Other uses for oil sunflower include oil seed exports (3.3%), planting seed (0.3%), and birdfood (20.7%) (Appendix A). Thus, most of the economic impacts from the sunflower oil industry result from crushing activities and the subsequent activity associated with sunflower oil.

Firms in the U.S. sunflower industry generate direct economic impacts to the U.S. economy through expenditures for processing inputs and returns from operations. Other impacts are generated by the activities associated with exporting sunflower products, such as transporting, handling, and selling activities. The direct impacts from the U.S. sunflower oil industry were divided into (1) export activities, (2) crushing and refining activities, (3) domestic consumption, and (4) combined activities.

Export Activities

The U.S. sunflower oil industry exports oil seed, planting seed, crude sunflower oil, refined sunflower oil, and sunflower meal. Direct impacts from exporting sunflower products were estimated as the additional value created by the exporting of sunflower commodities. These additional values or additional economic activities were separated into transportation, maritime activity, and handling and trader margins. Transportation impacts were an estimate of the transportation costs incurred to move the commodity from local collection points to ports of export. Maritime activity was limited to the shipping costs incurred within the United States that are in addition to the economic activity covered by free-on-board (f.o.b.) prices. Handling and trader margins were the residual of the export value at point of export less transportation costs and commodity values at the last handling stage. State-level economic impacts from sunflower oil industry exports, along with greater discussion of above items, are presented in Appendix C.

The U.S. was estimated to export about 38,350 tons[5] of oil sunflower annually from 1991 through 1993 or about 3.3 percent of total oil sunflower supply (Appendix C). Transportation generated about $2.1 million, maritime activity generated about $0.1 million, and handling and trader margins for oil sunflower exports generated about $5.2 million in direct impacts (Appendix C). The total direct impact from exporting oil sunflower was estimated at $7.4 million annually or about $194 per ton (Appendix C).

Exports of sunflower oil are greater than any other sunflower commodity. Approximately 226,150 tons of sunflower oil were exported annually from the U.S. from 1991 through 1993. Crude oil comprised about 97 percent of all sunflower oil exports. Transportation, maritime activity, and handling and trader margins for sunflower oil exports generated about $12.5 million, $1.3 million, and $3.4 million in direct impacts, respectively (Appendix C). The total direct impact from exporting sunflower oil was estimated at $17.2 million annually or about $76 per ton (Appendix C).

The U.S. also exports sunflower meal, but in relatively small amounts compared to sunflower oil. Annual exports of sunflower meal averaged about 38,200 tons from 1991 through 1993, which was about 9 percent of annual sunflower meal supply. Transportation, maritime activity, and handling and

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[5]Tons in this report reflect metric tons (2,204.6 pounds per ton) unless otherwise noted. Most analyses were performed using short tons and subsequently, short tons were converted back to metric tons for discussion.

trader margins for sunflower meal exports generated about $210,000, $11,000, and $136,000 in direct impacts, respectively (Appendix C). The total direct impact from exporting sunflower meal was estimated at $357,000 annually or about $9.35 per ton (Appendix C).

The average direct impact from sunflower oil industry exports from 1991 through 1993 were $25 million. Total direct impacts from transportation, maritime activity, and handling and trader margins associated with sunflower oil industry exports were $14.8 million, $1.5 million, and $8.7 million, respectively. Exports of sunflower oil, sunflower meal, and oil sunflower accounted for 69, 1, and 30 percent of impacts from sunflower oil industry exports, respectively.

Crushing and Refining Activities

Oil sunflower typically flows from the producer to a local elevator and then from the local elevator to export destinations, crushing facilities, or other processors. Local elevators incur handling expenses for receiving, cleaning, and storing oil sunflower. Local elevator handling activities were estimated to create about $4.3 million in annual direct impacts. The $4.3 million includes handling margins for oil sunflower shipped to crushing plants, seed exported, and seed sold to other entities for miscellaneous uses. In addition to handling expenses, elevators incur transportation expenses to move sunflower from the elevator to other destinations. The transportation costs of moving oil sunflower to crushing facilities were estimated to generate about $14.3 million in annual direct impacts.

The U.S. sunflower oil industry crushed 847,000 tons of oil sunflower yearly from 1991 through 1993 (Appendix C), representing nearly three-fourths of all oil sunflower use. Oil sunflower crushings produced 348,700 tons of crude sunflower oil and 406,700 tons of sunflower meal annually from 1991 through 1993. The direct impact of crushing activities was estimated by subtracting the value of oil sunflower crushed from the value of sunflower oil and meal produced from each ton of oil sunflower crushed. The direct economic impact of crushing activities was estimated to be $58 per ton of oil sunflower crushed (Appendix C). The total direct economic impact from oil crushing activities was estimated at $49 million annually from 1991 through 1993.

Sunflower oil consumed domestically in the United States typically undergoes several refining processes designed to remove impurities and make the oil edible for human consumption. Economic impacts from refining sunflower oil were estimated by developing a refining budget and quantifying the amount of sunflower oil refined (Appendix C). Sunflower oil refining was estimated to have

a direct impact of $93 per ton of refined sunflower oil. Approximately 128,500 tons of crude sunflower were refined annually from 1991 through 1993, generating a total direct economic impact of $11.3 million annually.

Domestic Consumption

After the refining process, sunflower oil is typically bottled for retail, commercial, or food manufacturing uses. The activities leading to the final use of refined sunflower oil were categorized into transportation, bottling, distribution, and retail margins (see Appendix C for greater clarification). Approximately 116,000 tons of refined sunflower oil were consumed annually in the United States from 1991 through 1993. The direct impacts from transportation were $6.4 million, bottling impacts were $27.3 million, distribution impacts were $55.8 million, and retail margins for the domestic consumption of sunflower oil were estimated at $35.4 million. The total annual direct impact of these activities was $124.9 million or about $1,076 per ton (Appendix C).

Sunflower meal is also a major product of the sunflower oil crushing industry. Over 90 percent of all sunflower meal was consumed domestically as livestock feed from 1991 through 1993. Unlike sunflower oil, sunflower meal is typically moved from the crushing plant to final destination without incurring any additional processing. Thus, the direct impact from the domestic consumption of sunflower meal was limited to transportation from crushing plants to final destinations. Total direct impacts were estimated to be $12.2 million or $33 per ton (Appendix C).

Summary

Direct economic impacts from the U.S. sunflower oil industry were divided into export activities, crushing and refining activities, and domestic consumption. Exports of oil sunflower, sunflower oil, and sunflower meal were estimated to generate about $25 million in direct impacts annually, based on industry activity from 1991 through 1993. Total annual direct impacts from local elevator handling margins, transportation to crushing facilities, crushing activities, and refining activities were estimated at $79.1 million. Domestic consumption of sunflower oil and meal was estimated to generate about $137.1 million in annual direct impacts. All U.S. sunflower oil industry activities were estimated to generate about $241 million in annual direct impacts (Table 2).

Table 2. Average Direct Economic Impacts from Sunflower Oil Industry Activities in the United States, 1991 Through 1993

Sunflower Oil Industry Activities	Annual Direct Impacts from Sunflower Oil Industry
Local Elevator Handling	$ 4,300,000
Transportation--Elevator to Crushing Plant	14,300,000
Crushing Activities	49,200,000
Refining Activities	11,300,000
Domestic Consumption of Sunflower Oil and Meal	137,100,000
Exports	
Sunflower Oil	17,200,000
Sunflower Meal	400,000
Sunflower Seed	7,400,000
All Sunflower Oil Industry Activities	$241,200,000

Confection Sunflower Industry

The U.S. confection sunflower industry is comprised of a variety of activities that process and prepare confection sunflower for human consumption. Economic activity for the confection industry can be broken into processing, exports, and domestic consumption. Processing activities involve seed cleaning, sizing, dehulling, roasting, salting, and bagging. Export activity includes transportation, maritime activity, and handling margins for processed confection sunflower. Domestic consumption includes the economic activity of transporting, distributing, packaging, and retailing of confection sunflower products consumed in the United States.

Confection sunflower is typically delivered to processing plants by the producer. Thus, nearly the entire supply of confection sunflower undergoes some primary processing--cleaning, sizing, dehulling, and bagging. Primary processing typically produces sunflower kernel, whole seed, and birdfood. A direct economic impact of primary processing activities was estimated by subtracting the value of confection sunflower processed from the value of the products resulting from the primary processing activities (see Appendix D for more explanation).

The direct impact per ton of confection sunflower processed was estimated to be $132. Approximately 241,400 tons of confection sunflower were initially processed each year from 1991 through 1993, generating an annual direct economic impact of about $31.8 million. Approximately 60,300 tons of confection sunflower (kernel and whole seed) were salted and roasted. Salting and roasting generated about $16.6 million in direct economic impacts or about $275 per ton processed.

About 45 percent (in-shell equivalent) of the confection sunflower processed are exported out of the country (Appendix A and D). The process of exporting hybrid seed, whole seed, kernel, and miscellaneous confection sunflower generates economic activity through transportation, maritime activity, and handling margins. About 62,000 tons of confection sunflower products were exported annually from 1991 through 1993. Export activities for confection sunflower generated annual direct impacts of about $10.2 million or $164 per ton (Appendix D). The total direct impact of all activities associated with confection sunflower exports (primary processing and export activities) was $25.7 million or $415 per ton.

The process of preparing and distributing confection sunflower products (whole seed and kernel) for domestic consumption generates direct economic activity through transportation, packaging, distribution and marketing, and retail selling. About 62,400 tons of confection sunflower were consumed in the U.S. annually from 1991 through 1993. Confection sunflower is traditionally consumed as ingredients in snack mixes, nuts for direct consumption, baking inputs, and salad toppings. The direct impact of domestic consumption of confection sunflower was estimated by determining the retail value of confection sunflower, then subtracting the value at the highest level of processing. Across all confection sunflower uses, domestic consumption was estimated to generate about $217.1 million in direct impacts. Total annual direct impacts from the confection sunflower industry were estimated at $276 million (Table 3).

Table 3. Average Direct Economic Impacts from Confection Sunflower Activities in the United States, 1991 Through 1993

Confection Sunflower Activities	Annual Direct Impacts from Confection Sunflower Industry
Primary Processing[a]	$ 31,800,000
Secondary Processing[b]	16,600,000
Transportation	12,600,000
Marketing and Distribution Activities	87,700,000
Retail Packaging	4,700,000
Retail Margins	122,300,000
Maritime Activity[c]	17,000
All Confection Sunflower Activities	$275,700,000

[a] Activities included cleaning, sizing, dehulling, and bagging.
[b] Activities included salting, roasting, and some packaging.
[c] Activities at U.S. seaports that are not included in free-on-board (f.o.b.) values.

Birdfood Activities

Sunflower is an important ingredient for the birdfood industry; however, traditionally, birdfood sales have been considered a secondary market for sunflower use. In the confection sunflower industry, sunflower is produced primarily to be used for human consumption and is sold as birdfood only after failing to meet human consumption standards. In the sunflower oil industry, oil sunflower is primarily used by the oil crushing industry. In recent years, the demand for oil sunflower for use as birdfood at critical times during the year has become sufficient to be a major factor in determining market prices for oil sunflower. Also, in years when tight supplies are coupled with strong birdfood demand, confection sunflower have been known to be marketed directly as birdfood, bypassing altogether the normal confection marketing channels. Whether the birdfood markets for sunflower are viewed as secondary to traditional markets or viewed as viable options for producers and processors, sunflower activities involving birdfood use have become a major part of the overall U.S. sunflower industry.

The amount of oil sunflower used as birdfood was estimated by subtracting known uses for oil sunflower from yearly supplies. Traditional uses for oil sunflower include seed exports, oil crushing, and planting seed. Occasionally oil sunflower may be used as a feed ingredient for livestock; however, this practice is unusual, consuming only trivial quantities of sunflower. Also, oil sunflower have occasionally been dehulled to meet the needs of some sunflower kernel markets in periods of confection sunflower shortages. However, again this practice is limited and generally accounts for only a minimal amount of oil sunflower use. Thus, oil sunflower for birdfood use, after subtracting all traditional uses from total supplies, was estimated to be 236,450 tons annually from 1991 through 1993. Confection sunflower for birdfood use, based on the percentage of confection sunflower after primary processing that remains inedible for human consumption, was estimated to be 35,300 tons annually from 1991 through 1993.

The direct economic impact from the primary processing of oil sunflower for birdfood was estimated to be about $45.4 million annually or $192 per ton. Direct impacts from confection sunflower processing that were attributable to birdfood products were included in the confection industry impacts. The process of preparing and distributing sunflower for birdfood sales generates direct economic activity through transportation, handling, packaging, distribution and marketing, and retail selling. About 271,750 tons of sunflower were consumed as birdfood in the U.S. annually from 1991 through 1993. Domestic consumption of sunflower for birdfood was estimated to have a direct economic impact of about $91.9 million annually. Of the economic components of domestic consumption, transportation generated $14.9 million, packaging generated $12.0 million, distribution/marketing accounted for $23.7 million, and retail margins generated another $41.3 million in direct economic impacts (Appendix E). Primary processing and domestic consumption of sunflower for birdfood was estimated to generate a total annual direct impact of $137.3 million or about $507 per ton (Table 4).

Table 4. Average Direct Economic Impacts from Sunflower Activities in the Birdfood Industry in the United States, 1991 Through 1993

Sunflower Activities-Birdfood Industry	Annual Direct Impacts from Birdfood Activities
Primary Processing[a]	$ 45,400,000
Transportation	14,900,000
Packaging	12,000,000
Marketing and Distribution Activities	23,700,000
Retail Margins	41,300,000
All Sunflower Activities-Birdfood Industry	$137,300,000

[a] Activities limited to preparation for use by birdfood manufacturing companies.

Secondary Impacts

Secondary economic impacts result from subsequent rounds of spending and respending within an economy. Input-output (I-O) analysis traces linkages (i.e., the amount of spending and respending) among sectors of an economy and calculates the total business activity resulting from a direct impact in a basic sector (Coon et al. 1985). An economic sector is a group of similar economic units (e.g., communications and public utilities, retail trade, construction).

This process of spending and respending can be explained by using an example. A single dollar from an area wheat producer (**Households** sector) may be spent for a loaf of bread at the local store (**Retail Trade** sector); the store uses part of that dollar to pay for the next shipment of bread (**Transportation** and **Agricultural Processing** sectors) and part to pay the store employee (**Households** sector) who shelved or sold the bread; the bread supplier uses part of that dollar to pay for the grain used to make the bread (**Agriculture-Crops** sector) ... and so on (Hamm et al. 1993).

Secondary economic impacts were estimated separately for sunflower production, sunflower oil industry, confection sunflower industry, and birdfood activities. The following sections discuss the allocation of direct impacts to various economic sectors of the North Dakota Input-Output Model and the amount of secondary impacts generated in those economic sectors.

Sunflower Production

Sunflower production expenditures and returns were allocated to various economic sectors of the North Dakota Input-Output Model. Seed, herbicide, fungicide, insecticide, fertilizer, fuel, lubrication, repairs, equipment overhead, and one-half of miscellaneous variable, one-half of drying, and 20 percent of miscellaneous overhead expenses were allocated to the **Retail Trade** sector. Crop insurance, interest on variable costs, interest on machinery debt, and land interest payments were allocated to the **Finance, Insurance, and Real Estate** (FIRE) sector. One-half of drying, one-half of miscellaneous variable, and 40 percent of miscellaneous overhead were allocated to the **Business and Personal Services** sector. Forty percent of the miscellaneous overhead expenses were allocated to the **Communications and Public Utilities** sector. Property taxes were allocated to the **Government** sector. Returns to unpaid labor, management, and equity were allocated to the **Households** sector.

Total direct impacts of $316.8 million from sunflower production in the United States generated about $482 million in secondary impacts (Table 5). Secondary impacts were greatest in the **Households** sector ($181 million), the **Retail Trade** sector ($133 million), the **Finance, Insurance, and Real Estate** sector ($29 million), and the **Communications and Public Utilities** sector ($24 million). For every dollar in direct economic activity from sunflower production, another $1.52 was generated in secondary economic activity. Total economic impacts from sunflower production were about $799 million and included about 9,200 secondary jobs. Secondary jobs represent employment outside of the sunflower industry, but employment that is dependent on the existence of the sunflower industry.

Table 5. Direct, Secondary, and Total Annual Economic Impacts from Sunflower Production, by Economic Sector, United States, 1991 Through 1993

Economic Sector	Economic Impacts From Sunflower Production		
	Direct	Secondary	Total
	000s $		
Agriculture-Livestock	0	23,675	23,675
Agriculture-Crops	0	9,427	9,427
Nonmetal Mining	0	1,073	1,073
Construction	0	16,017	16,017
Transportation	0	3,233	3,233
Comm and Public Utilities	4,272	24,155	28,427
Ag Proc and Misc Mnfg	0	14,674	14,674
Retail Trade	181,385	133,087	314,472
Fin, Ins, and R Estate	55,960	28,876	84,836
Business and Pers Service	11,511	11,675	23,186
Prof and Social Service	0	15,458	15,458
Households	51,822	180,688	232,510
Government	11,894	20,054	31,948
TOTAL IMPACTS	316,844	482,092	798,936
Secondary Employment (full-time equivalent jobs)			9,201

Sunflower Oil Industry

Expenses for handling sunflower at local elevators were allocated according to a general grain handling budget (Appendix C). Transportation costs to move sunflower from local elevators to crushing facilities, from local elevators to ports of export, and general transportation costs associated with domestic oil movements were based on the percentage of those costs involving truck and rail transportation and on budgets containing approximate expenditures in various economic sectors for both truck and rail transportation (Appendix C). Oil crushing activity was allocated based on information obtained from a survey of oil crushing firms (Appendix C). Oil refining expenses and returns were allocated according to an oil refining budget developed from industry sources (Appendix C). Retail margins for domestic consumption of sunflower oil were allocated to the **Retail Trade** sector. Distribution, packaging, and marketing activities from the domestic consumption of sunflower oil were allocated to the **Transportation, Communication and Public Utilities, Miscellaneous Manufacturing and**

Agricultural Processing, Retail Trade, and **Finance, Insurance, and Real Estate** sectors.

Total direct impacts of $241 million from the U.S. sunflower oil industry generated about $462 million in secondary impacts (Table 6). Secondary impacts were greatest in the **Households** sector ($148 million), the **Retail Trade** sector ($120 million), the **Miscellaneous Manufacturing and Agricultural Processing** sector ($35 million), and the **Agriculture-Livestock** sector ($29 million). For every dollar in direct economic activity from sunflower oil industry activity, another $1.92 was generated in secondary economic activity. Total economic impacts from the U.S. sunflower oil industry were about $703 million and included about 10,155 secondary jobs.

Table 6. Direct, Secondary, and Total Annual Economic Impacts from the United States Sunflower Oil Industry, by Economic Sector, 1991 Through 1993

	Economic Impacts From the Sunflower Oil Industry		
Economic Sector	Direct	Secondary	Total
	---------- 000s $ ----------		
Agriculture-Livestock	0	20,722	20,722
Agriculture-Crops	0	28,519	28,519
Nonmetal Mining	0	1,264	1,264
Construction	2,965	13,732	16,697
Transportation	33,190	2,487	35,677
Comm and Public Utilities	10,399	19,324	29,723
Ag Proc and Misc Mnfg	35,736	34,569	70,305
Retail Trade	80,794	120,099	200,893
Fin, Ins, and R Estate	10,171	26,544	36,715
Business and Pers Service	10,256	9,975	20,231
Prof and Social Service	2,061	13,258	15,319
Households	52,898	147,830	200,728
Government	2,727	23,571	26,298
TOTAL IMPACTS	241,198	461,894	703,091
Secondary Employment (full-time equivalent jobs)			10,156

Confection Sunflower Industry

Expenditures and returns associated with the confection sunflower industry were allocated to various economic sectors in the same manner as those incurred in the sunflower oil industry. Primary processing expenditures and returns were allocated based on information obtained from a survey of firms processing confection sunflower (Appendix F). Secondary processing impacts were allocated according to a budget developed from industry sources (Appendix D). Transportation impacts for moving confection products to retail markets and moving confection sunflower to ports of export were allocated according to the percentage of truck and rail transportation and on budgets containing approximate expenditures in various economic sectors for both truck and rail transportation (Appendix D). Retail margins for domestic consumption of confection products were allocated to the **Retail Trade** sector. Distribution, packaging, and marketing activities from the domestic consumption of confection sunflower were allocated to the **Transportation, Communication and Public Utilities, Miscellaneous Manufacturing and Agricultural Processing, Retail Trade,** and **Finance, Insurance, and Real Estate** sectors.

Total direct impacts of $276 million from the U.S. confection sunflower industry generated about $417 million in secondary impacts (Table 7). Secondary impacts were greatest in the **Households** sector ($146 million), the **Retail Trade** sector ($115 million), the **Finance, Insurance, and Real Estate** sector ($25 million), and the **Agriculture-Crops** sector ($22 million). For every dollar in direct economic activity from confection sunflower activities, another $1.51 was generated in secondary economic activity. Total economic impacts from the U.S. confection sunflower industry were about $693 million and included about 8,740 secondary jobs.

Birdfood Activities

Primary processing expenditures and returns were allocated based on information obtained from a survey of firms processing oil sunflower for birdfood (Appendix F). Transportation impacts for moving sunflower for birdfood to final processors and retail markets were allocated according to the percentage of truck and rail transportation and allocated using budgets containing approximate expenditures in various economic sectors for both truck and rail transportation (Appendix E). Retail margins for domestic consumption of birdfood (oil and confection sunflower) were allocated to the **Retail Trade** sector. Distribution, packaging, and marketing activities from the domestic consumption of sunflower as birdfood were allocated to the **Miscellaneous Manufacturing and Agricultural Processing** sector.

Table 7. Direct, Secondary, and Total Annual Economic Impacts from the United States Confection Sunflower Industry, by Economic Sector, 1991 Through 1993

Economic Sector	Economic Impacts From the Confection Sunflower Industry		
	Direct	Secondary	Total
	---------- 000s $ ----------		
Agriculture-Livestock	0	21,633	21,633
Agriculture-Crops	0	11,871	11,871
Nonmetal Mining	0	1,124	1,124
Construction	2,480	13,880	16,360
Transportation	19,492	2,835	22,327
Comm and Public Utilities	11,297	20,016	31,313
Ag Proc and Misc Mnfg	6,534	16,208	22,742
Retail Trade	162,514	115,346	277,860
Fin, Ins, and R Estate	11,127	25,378	36,505
Business and Pers Service	9,717	9,316	19,033
Prof and Social Service	389	13,002	13,391
Households	51,258	145,588	196,846
Government	861	20,729	21,590
TOTAL IMPACTS	275,668	416,926	692,595
Secondary Employment (full-time equivalent jobs)			8,741

Total direct impacts of $137.3 million from birdfood activities generated about $285 million in secondary impacts (Table 8). Secondary impacts were greatest in the **Households** sector ($82 million), the **Retail Trade** sector ($69 million), the **Miscellaneous Manufacturing and Agricultural Processing** sector ($32 million), and the **Agriculture-Livestock** sector ($27 million). For every dollar in direct economic activity from sunflower-related birdfood activities, another $2.08 was generated in secondary economic activity. Total economic impacts from birdfood activities in the sunflower industry were about $423 million and included about 5,255 secondary jobs.

Table 8. Direct, Secondary, and Total Annual Economic Impacts from Birdfood Activities of the United States Sunflower Industry, by Economic Sector, 1991 Through 1993

Economic Sector	Economic Impacts From the Birdfood Industry		
	Direct	Secondary	Total
	---------- 000s $ ----------		
Agriculture-Livestock	0	14,626	14,626
Agriculture-Crops	0	27,462	27,462
Nonmetal Mining	0	696	696
Construction	1,208	7,749	8,957
Transportation	11,630	1,458	13,088
Comm and Public Utilities	1,043	10,382	11,425
Ag Proc and Misc Mnfg	38,064	32,314	70,378
Retail Trade	51,123	68,861	119,984
Fin, Ins, and R Estate	3,126	15,054	18,180
Business and Pers Service	832	5,604	6,436
Prof and Social Service	559	7,316	7,875
Households	28,788	82,101	110,889
Government	922	11,773	12,695
TOTAL IMPACTS	137,296	285,396	422,691
Secondary Employment (full-time equivalent jobs)			5,256

Employment

The U.S. sunflower industry benefits the economy by creating and supporting direct and secondary employment. Direct employment is a measure of the number of full-time jobs within an industry. Secondary jobs are an estimate of employment outside of an industry, but employment that is created from the industry's economic activity.

Direct Employment

Direct employment in the sunflower industry is difficult to quantify for many components of the industry. Some of the positions (employment) affiliated with the sunflower industry (i.e., those outside of production) exist in other industries. Employment at local elevators is part of the grain handling business;

jobs in shipping and hauling sunflower are part of the transportation industry; and jobs involved with selling sunflower products (retail end of the market chain) are likely part of large, complex food-based industries. In each case, some jobs might be lost without the sunflower industry, while others may not be affected. For example, an elevator that relies on sunflower for a major portion of its grain handling activities may reduce its work force if it no longer handled sunflower, providing it could not make up for the loss in grain handling with other activities.

Estimates of direct employment in the sunflower industry were limited to primary processing activities. Primary processing activities are usually structured around handling and processing sunflower, as opposed to activities associated with marketing and distributing consumer products. The initial stages of the marketing process for sunflower products are the most distinct, with the least amount of overlap between functions performed and number of firms involved. However, after sunflower products move beyond the primary processing stages, the structure of the firms and the activities performed become less clear and proportionately less definitive with regards to sunflower-related employment. For example, confection sunflower are processed by a confection processing firm. That firm has another firm custom roast and salt the confection products. The product is then sold to a company involved with a host of consumer products, few of which may be sunflower related. At this point, employment in the last company to handle the product is not likely to be contingent upon having sunflower products to sell (some exceptions may exist). Thus, employment further up the marketing chain for domestically consumed sunflower products was not estimated.

Employment-related questions in other industry related activities, such as transportation are similar. For example, independently employed truck drivers who haul farm commodities, in the absence of any sunflower to haul, likely would remain employed, but seek alternative hauling opportunities with other commodities. Even in the case where sunflower is the only commodity hauled, alternative commodities raised in the place of sunflower likely would provide similar shipping opportunities. Thus, most of the jobs outside of primary sunflower processing are within industries that are supported only in part by the sunflower industry. This makes estimating direct employment extremely difficult. The sunflower industry does directly affect jobs in grain handling, transportation, and miscellaneous processing; however, actual quantification of those jobs is not clear.

Sunflower Production

Direct employment (full-time equivalent jobs) in sunflower production is difficult to quantify. Approximately 9,900 farms raised sunflower in the United States in 1992 (U.S. Department of Commerce 1995). The number of farms raising sunflower in North Dakota, South Dakota, Minnesota, Kansas, Colorado, Nebraska, Texas, and other states in 1993 was 5,287, 1,571, 1,131, 657, 251, 312, 180, and 525, respectively. A noticeable number of farms also raise sunflower in Wisconsin, California, Illinois, Michigan, and New York. However, the number of full-time equivalent positions that could be attributable to sunflower production from those 9,900 farms is nearly impossible to estimate, given the scope of this study. Unless those farms raised only sunflower each year, the time spent raising sunflower usually would be less than a full-time job. The degree of time or fraction of employment for any particular farmer raising sunflower varies nearly every year. An estimate of the number of full-time jobs would require knowing the number of people employed by those farms, and the fraction of employment devoted to sunflower production for each worker. Also, many farmers, even in the absence of sunflower, likely would remain employed raising other crops.

Sunflower Oil Industry

Estimating the direct employment within the sunflower oil industry poses some of the same constraints associated with employment estimates in other industries. Employment with some aspects of the industry would be nearly impossible to estimate; however, employment at the primary processing level was estimated. Based on employment information obtained from the survey of oil crushing firms, sunflower oil crushing activities in the United States directly employ about 315 full-time equivalent positions. These jobs provide additional benefits to the communities which contain processing facilities, and since oil crushing facilities are located in major production regions, the addition of these jobs enhances the impacts of the industry in those regions.

Obviously, additional employment is generated through related activities, such as refining, bottling, transportation, distribution, exporting, and other miscellaneous enterprises. However, most of those related activities are not solely dependent upon sunflower oil or meal for their existence. Oil refining is somewhat capital intensive, requiring relatively large investments in handling and processing facilities, and once those facilities become established, they can refine, with some modifications, other vegetable oils. Thus, their employment may not be solely attributable to sunflower oil. Similar employment relationships exist in other aspects of the sunflower oil industry.

Confection Sunflower Industry

Employment in the confection sunflower industry was estimated for primary processing and secondary processing activities. Information obtained from a survey of confection processors was used to estimate employment from primary processing activities. Annual employment by firms involved in primary processing was estimated to be 303 full-time equivalent jobs. Information obtained from industry sources was used to estimate employment from secondary processing activities. Annual employment by firms involved in secondary processing of confection sunflower was estimated to be 280 full-time equivalent jobs. For reasons previously discussed, employment in the many activities related to the disappearance of confection products (domestic consumption and exports) is extremely difficult to quantify.

Birdfood Activities

Employment in the sunflower industry that is related to birdfood production was estimated for primary processing activities. Information obtained from a survey of birdfood processors was used to estimate employment from primary processing activities. Annual employment by firms involved in the primary processing of sunflower for birdfood was estimated to be 144 full-time equivalent jobs.

Hybrid Seed Industry

Firms in the hybrid sunflower seed business were surveyed to estimate the direct employment relating to all aspects of hybrid sunflower activities (Appendix F). The questionnaire asked for full-time equivalent positions for workers involved with plant genetics, field production, warehouse operations, sales and their support staff, transportation, record keeping, and administration. Direct employment in the hybrid sunflower seed industry was estimated to be 52 full-time equivalent positions.

Secondary Employment

Secondary employment was estimated separately for sunflower production, sunflower oil industry, confection sunflower industry, and birdfood activities. Secondary employment estimates represent the number of full-time jobs generated based on the volume of business activity created by the industry. Productivity ratios[6] were used with estimates of business activity to obtain secondary employment.

Sunflower production indirectly supported about 9,200 full-time equivalent jobs. Sunflower oil industry activities indirectly supported about 10,155 full-time equivalent jobs. Confection sunflower activities indirectly supported about 8,740 full-time equivalent jobs. About 5,255 full-time equivalent jobs were indirectly supported by sunflower-related birdfood activities. All U.S. sunflower industry activities combined indirectly supported about 33,350 full-time equivalent jobs annually in the United States, 1991 through 1993 (Table 9).

Table 9. Estimated Annual Secondary Employment Generated by the Sunflower Industry in the United States, 1991 Through 1993

Industry Activity	Estimated Secondary Employment
	---- full-time jobs ----
Sunflower Production	9,200
Sunflower Oil Industry	10,155
Confection Sunflower Industry	8,740
Birdfood Activities	5,255
Total Secondary Employment	33,350

[6]A measure of the amount of economic activity needed in an economic sector to support one full-time job.

Tax Revenue

Tax collections are another important measure of the economic impact of an industry on an economy. Tax implications are an important measure of local and state-level impacts. Some of the interest in estimating tax revenue generated by an industry stems from public awareness of the importance of tax revenue to local and state governments. In an era of reduced federal funding, revenue shortfalls, and growing public demand on governments to balance their budgets while providing constant or increased levels of services and benefits, tax collections are an important factor in assessing economic impacts.

Business activity alone does not directly support local government functions; however, taxes on personal income, retail trade, real estate property, and corporate income are important revenue sources for local and state governments. Total economic impacts in the **Retail Trade** sector were used to estimate revenue from sales and use taxes. Economic activity in the **Households** sector was used to estimate personal income tax collections. Similarly, corporate income was estimated from the economic activity in all business sectors (excluding the **Households, Government**, and **Agriculture** sectors).

Tax collections were estimated for all areas of sunflower activity for the seven major sunflower-producing states. Tax revenue estimates were based on the economic activity (direct and secondary) of the various sunflower industries. Total economic impacts for all aspects of sunflower activity were summed by major sunflower-producing states. I-O analysis was used to estimate personal income, retail trade, and other business activity, which was used to estimate tax revenue. Obviously, sunflower industry activities in non sunflower-producing states (which includes those states with minor amounts of sunflower production) generate important state-level taxes; however, the individual states and the impacts specifically attributable to those states were not identified. Much of the sunflower industry's impacts, especially domestic consumption, takes place outside of the sunflower production region and is dispersed throughout the nation.

Annual tax revenue generated by the sunflower industry in North Dakota included $11.1 million in sales and use taxes, $2.8 million in personal income taxes, and $1.3 million in corporate income taxes (Table 10). Total collections of sales and use, personal income, and corporate income taxes were about $15.3 million. Estimates of tax revenue generated by the sunflower industry in South Dakota were limited to $2.1 million in sales and use taxes since South Dakota did not have a state personal income or state corporate income tax (Table 10). Tax revenue generated by the sunflower industry in Minnesota included $1.6 million in sales and use taxes, $2.5 million in personal income taxes, and $0.4 million in corporate income taxes (Table 10). Total collections in Minnesota from sales and use, personal income, and corporate income taxes were about $4.5 million. Total collections in Kansas, Colorado, Nebraska, and Texas from sales and use, personal income, and corporate income taxes were about $2.1 million (Table 10). Total estimated tax collections in the seven major sunflower-producing states were about $24 million annually from 1991 through 1993. Processing firms in the sunflower oil, confection sunflower, and birdfood industries also generated about $928,000 in property taxes, $313,000 in sales and use taxes, and $483,000 in other taxes (state and federal income and miscellaneous taxes). Producers involved with sunflower production paid an estimated $11.9 million annually in property taxes from 1991 through 1993. These taxes were included as part of the direct impacts for each industry.

Table 10. Estimated Annual Tax Collections Generated by the Sunflower Industry in Various States, 1991 Through 1993

State	Estimated Tax Collections			
	Sales and Use	Personal Income	Corporate Income	Total
	000s dollars			
North Dakota	11,085	2,845	1,342	15,272
Minnesota	1,647	2,450	392	4,489
South Dakota	2,100	na	na	2,100
Kansas	798	619	101	1,518
Colorado	134	157	11	302
Nebraska	95	107	16	218
Texas	99	na	na	99
Total Taxes	15,958	6,178	1,862	23,998

Total Economic Impacts

The general objective of the study was to measure the economic activity of the U.S. sunflower industry in terms of its impact on the national economy and the economies of the sunflower-producing states. The following section is divided into cumulative impacts for the entire industry and industry impacts in the sunflower-producing states.

Cumulative Industry Impacts

Total direct impacts from the U.S. sunflower industry were estimated at $971 million annually from 1991 through 1993 (Table 11). Direct impacts were estimated separately for sunflower production, sunflower oil industry, confection sunflower industry, and birdfood activities. Sunflower production generated the greatest amount of direct impacts ($316.8 million), followed closely by the confection sunflower industry ($276 million). Sunflower oil industry direct impacts ($241 million) were slightly less than those of the confection sunflower industry. Birdfood activities generated the least amount of direct impacts out of all the major sunflower industry activities accounting for only 14 percent of all direct impacts. The economic sectors with the greatest total direct impact included the **Retail Trade** ($476 million), **Households** ($185 million), **Miscellaneous Manufacturing and Agricultural Processing** ($80 million), **Finance, Insurance, and Real Estate** ($80 million), and **Transportation** ($64 million) sectors (Table 11).

Total annual secondary impacts from the U.S. sunflower industry were estimated at $1.65 billion from 1991 through 1993 (Table 12). Sunflower production generated the most secondary impacts, accounting for about $482 million, followed closely by sunflower oil activities ($462 million) and confection sunflower activities ($417 million). Birdfood activities generated the least amount of secondary economic impacts accounting for 17 percent of all secondary impacts. The economic sectors of the economy with the greatest secondary impacts included the **Households** ($556 million), **Retail Trade** ($437 million), **Miscellaneous Manufacturing and Agricultural Processing** ($98 million), **Finance, Insurance, and Real Estate** ($96 million), **Agriculture-Crops** ($81 million), **Agriculture-Livestock** ($77 million), and **Government** ($76 million) sectors (Table 12). Each dollar of direct impacts (industry-wide) generated about $1.70 in secondary impacts. Secondary impacts, per dollar of direct impacts, varied from $1.51 for confection activities to $2.08 for birdfood activities.

Table 11. Annual Direct Impacts of the United States Sunflower Industry, by Economic Sector and Industry Activity, 1991 Through 1993

Economic Sector	Direct Impacts by Sunflower Industry				
	Sunflower Production	Sunflower Oil	Confection Sunflower	Birdfood Activities	Total Direct
	000s dollars				
Construction		2,965	2,480	1,208	6,653
Transportation		33,190	19,492	11,630	64,312
Comm and Pub Util	4,272	10,399	11,297	1,043	27,011
Ag Proc and Misc Mnfg		35,736	6,524	38,064	80,334
Retail Trade	181,385	80,794	162,514	51,123	475,816
Fin, Ins, and R Estate	55,960	10,171	11,127	3,126	80,385
Bus and Pers Service		10,256	9,717	832	32,316
Prof and Soc Service		2,061	389	559	3,008
Households	51,822	52,898	51,258	28,788	184,767
Government	11,894	2,727	861	922	16,404
Total Direct Impacts	316,844	241,198	275,668	137,296	971,006

Direct employment was estimated for the primary processing activities in all three major sunflower industries--oil, confection, and birdfood. Although full-time employment for sunflower production is not known, about 9,900 farms in the U.S. raised sunflower in 1993 (U.S. Department of Commerce 1995). Sunflower oil crushing activities were responsible for 315 full-time equivalent jobs in 1993. Confection processing activities were responsible 583 full-time equivalent jobs, birdfood processing activities supported another 144 full-time equivalent jobs, and activities relating to hybrid sunflower development and sales supported 52 full-time equivalent jobs in 1993.

Secondary employment was estimated for sunflower production, sunflower oil industry, confection sunflower industry, and birdfood activities. Secondary employment estimates represent the number of full-time jobs generated outside an industry based on the volume of business activity created by the industry. The U.S. sunflower industry indirectly supported about 33,350 full-time equivalent jobs annually from 1991 through 1993. Sunflower oil industry supported the most secondary jobs (10,155), followed by sunflower production (9,200 jobs), confection sunflower industry (8,740 jobs), and birdfood activities (5,255 jobs) (Table 12).

Table 12. Annual Secondary Impacts of the United States Sunflower Industry, by Economic Sector and Industry Activity, 1991 Through 1993

Economic Sector	Secondary Impacts by Sunflower Industry				
	Sunflower Production	Sunflower Oil	Confection Sunflower	Birdfood Activities	Total Secondary
	000s dollars				
Agriculture-Livestock	23,675	20,722	21,633	14,626	80,656
Agriculture-Crops	9,427	28,519	11,871	27,462	77,279
Nonmetal Mining	1,073	1,264	1,124	696	4,157
Construction	16,017	13,732	13,880	7,749	51,378
Transportation	3,233	2,487	2,835	1,458	10,013
Comm and Pub Util	24,155	19,324	20,016	10,382	73,877
Ag Proc and Misc Mnfg	14,674	34,569	16,208	32,314	97,765
Retail Trade	133,087	120,099	115,346	68,861	437,393
Fin, Ins, and R Estate	28,876	26,544	25,378	15,054	95,852
Bus and Pers Service	11,675	9,975	9,316	5,604	36,570
Prof and Soc Service	15,458	13,258	13,002	7,316	49,034
Households	180,688	147,830	145,588	82,101	556,207
Government	20,054	23,571	20,729	11,773	76,127
Total Secondary Impacts	482,092	461,894	416,926	285,396	1,646,308
Secondary Employment	9,201	10,156	8,741	5,256	33,354

Total annual economic impacts from the U.S. sunflower industry were estimated at $2.62 billion from 1991 through 1993 (Table 13). Sunflower production and sunflower oil industry activities each generated over $700 million in annual economic impacts (Table 13). Confection sunflower activities and birdfood activities generated another $693 million and $423 million in annual economic impacts, respectively. The economic sectors with the greatest economic impacts included the **Retail Trade** ($913 million), **Households** ($741 million), **Miscellaneous Manufacturing and Agricultural Processing** ($178 million), **Finance, Insurance, and Real Estate** ($176 million), **Communication and Public Utilities** ($101 million), and **Government** ($93 million) sectors (Table 13).

Table 13. Total Annual Economic Impacts of the United States Sunflower Industry, by Economic Sector and Industry Activity, 1991 Through 1993

Economic Sector	Total Economic Impacts by Sunflower Industry				
	Sunflower Production	Sunflower Oil	Confection Sunflower	Birdfood Activities	Total
	000s dollars				
Agriculture-Livestock	23,675	20,722	21,633	14,626	80,656
Agriculture-Crops	9,427	28,519	11,871	27,462	77,279
Nonmetal Mining	1,073	1,264	1,124	696	4,157
Construction	16,017	16,697	16,360	8,957	58,031
Transportation	3,233	35,677	22,327	13,088	74,325
Comm and Pub Util	28,427	29,723	31,313	11,425	100,888
Ag Proc and Misc Mnfg	14,674	70,305	22,742	70,378	178,099
Retail Trade	314,472	200,893	277,860	119,984	913,209
Fin, Ins, and R Estate	84,836	36,715	36,505	18,180	176,236
Bus and Pers Service	23,186	20,231	19,033	6,436	68,886
Prof and Soc Service	15,458	15,319	13,391	7,875	52,043
Households	232,510	200,728	196,846	110,889	740,973
Government	31,948	26,298	21,590	12,695	92,531
Total Economic Impacts	798,936	703,091	692,595	422,691	2,617,313

Each acre of sunflower planted (oil and confection averaged from 1991 through 1993) generated about $1,015 in total economic activity (production, processing, transportation, packaging, distribution, retail activity, and exports) or, expressed alternatively, each ton of sunflower produced generated about $1,970 in total business activity. Confection sunflower generated $1,749 in total economic activity per planted acre ($3,525 per ton harvested) while oil sunflower generated about $516 in total economic activity per planted acre ($990 per ton harvested). For every 77 acres of sunflower planted or 40 tons of sunflower harvested, one secondary full-time equivalent job was supported. Each acre of sunflower planted generated $14.70 in tax revenue (property taxes and industry generated taxes).

Impacts in Sunflower-producing States

U.S. sunflower industry impacts that could be identified as remaining in the economy of a sunflower-producing state were allocated to those states. All impacts that could not be allocated to major sunflower-producing states were grouped together into one category. Secondary economic impacts were estimated only after the direct impacts were accumulated for all sunflower industries. Thus, separate estimates of the secondary economic impacts for only sunflower production or confection activities in each state were not generated.

Sunflower production impacts were calculated separately for each sunflower-producing state. Thus, impacts from sunflower production were actually produced by state and then accumulated for the industry. To avoid disclosing individual firm activity, allocation of processing impacts by state could not be revealed in this study; however, total impacts by state for all industries were reported. In some cases, economic activity that involved many firms in each state was disclosed (e.g., elevator handling impacts, transportation). Allocation of industry impacts to individual states that would not reveal any single firm's activity has been included in Appendixes C through E.

The largest sunflower-producing state, North Dakota, generated the greatest amount of sunflower-related economic impacts ($712 million in total economic activity) (Table 14). Since North Dakota produced over 50 percent of the nation's sunflower crop, contains nearly 60 percent the entire industry's sunflower crushing capacity, and has numerous confection and birdfood processing plants, North Dakota could be expected to have the greatest impact among all the sunflower-producing states. However, production and processing decline substantially in the other sunflower-producing states and the impacts in those states are not as easily distinguishable.

Total impacts in the other top sunflower-producing states were not nearly as large as the impacts in North Dakota. The total economic activity from sunflower activities were $223 million in Minnesota, $194 million in South Dakota, $92 million in Kansas, $25 million in Colorado, $16 million in Nebraska, and $13 million in Texas. Relatively small sunflower acreage and noticeably less overall processing activities contributed to the substantial decrease in impacts in sunflower-producing states other than North Dakota.

Table 14. Summary of Annual Direct and Total Economic Impacts of the United States Sunflower Industry by Sunflower-producing States, 1991 Through 1993

State	Economic Activity	
	Direct	Total
	000s $	
North Dakota	267,963	711,507
Minnesota	83,073	223,166
South Dakota	73,805	193,605
Kansas	34,135	92,218
Colorado	9,637	24,564
Nebraska	6,485	15,993
Texas	5,302	13,276
Other states	490,606	1,342,940
Total--All states	971,006	2,617,269

Future Impacts

This study represents an attempt to determine the economic contribution of the U.S. sunflower industry over a small time period. However, the economic contribution of an industry changes with fluctuations in domestic production, export demand, and domestic demand. This section generates a rough estimate of the economic impact of the sunflower industry given potential changes in crop production, exports, and domestic use.

The most commonly seen change in commodity-based industries is one involving fluctuations in crop production. Major changes in sunflower production from one season to the next are not uncommon. Thus, how changes in production levels affect the overall industry and its corresponding components can be of particular interest. Average sunflower production (oil and confection sunflower) in the United States from 1991 through 1993 was increased by 25 percent to determine the effects of changes in sunflower production on the economic impacts of the industry. Two scenarios were developed: (1) the increase in production was translated directly into increased export activity, with little or no increase in domestic consumption and (2) export levels were allowed to increase only slightly and the remaining increase in production, and subsequent increase in sunflower products, was absorbed by increases in domestic consumption.

A situation where both oil and confection sunflower production increased by 25 percent would likely lead to increases in sunflower oil and processed confection products. Oil crushing activities, from 1991 through 1993, accounted for about 75 percent of all oil sunflower use. Thus, providing the crushing industry could and was willing to maintain its share of oil sunflower use, increases in oil sunflower could translate directly into greater quantities of sunflower oil and meal. Likewise, considering that nearly all confection sunflower undergo some initial processing, the quantities of confection products (whole seed, kernel, and birdfood) would also likely increase, assuming crop quality and processing rates did not materially change. From this initial structure, the extra sunflower products could be exported, consumed domestically, or result in a combination of both uses. All prices (export values and retail prices) that were representative of industry markets and activity from 1991 through 1993 were used in both scenarios.

Under the assumption that domestic consumption of sunflower products is not related to product availability (supply), extra sunflower products were assumed to be exported (except sunflower meal exports were left unchanged). Direct impacts changed from $971 million to $1.093 billion. Direct impacts in sunflower production, sunflower oil industry, and confection industry increased by $77 million, $39 million, and $7 million, respectively. Under this scenario the birdfood industry, as defined in this study, did not change since birdfood impacts were directly related to domestic consumption (extra confection birdfood was exported). Statewide impacts also changed, although the impacts in individual states were not listed. The greatest increases would occur in the states with the greatest crop production increases and the states benefiting from sunflower processing activities. Secondary impacts for the sunflower industry changed from $1.65 billion to $1.86 billion, an increase of about $217 million. Thus, this hypothetical example shows that the total impacts could increase by 13 percent or about $339 million from an increase in production (25 percent) that was translated into increased exports.

Under the assumption that domestic consumption of sunflower products is related to product availability (supply), extra sunflower products were assumed to be consumed domestically (sunflower meal was left unchanged). Direct impacts for the industry changed from $971 million to $1.29 billion. Direct impacts in sunflower production, sunflower oil industry, confection industry, and the birdfood industry increased by $77 million, $169 million, $65 million, and $5 million, respectively. Secondary impacts for the sunflower industry changed from $1.65 billion to $2.21 billion, an increase of about $563 million. Thus, this hypothetical scenario showed that total impacts could increase by 34 percent or

about $878 million from an increase in production (25 percent) that was translated into increased domestic consumption.

The previous two scenarios represent improbable extremes in what would likely occur within the industry given changes in production. However, the exact outcome of changes in sunflower production is nearly impossible to accurately predict, as there are numerous factors which affect market behavior and ultimately industry activity. Thus, potential impacts from increases in sunflower production are likely to be somewhere between the two estimates.

SUMMARY

Sunflower is not a dominant crop in any of the states where it is currently produced. Likewise, consumer products from the sunflower industry have to compete with large quantities of products produced by other U.S. food-based industries. Thus, information on the industry's contribution to the economy can be valuable for promotional, educational, and public relations efforts. In the case of the U.S. sunflower industry, national recognition, regional economic concentration, agricultural policy changes, and industry documentation are all reasons for producing an industry study. The single purpose of this report was to estimate the economic contribution (direct and secondary impacts) of the U.S. sunflower industry.

Overall economic activity of the U.S. sunflower industry was estimated by categorizing the industry into smaller, but naturally distinct industry groups. Sunflower production, sunflower oil activities, confection sunflower activities, and birdfood activities were categorized as distinct segments of the sunflower industry. Sunflower production was separated into oil sunflower and confection sunflower. Likewise, the sunflower oil industry and the confection sunflower industry stem from oil and non-oil seed production. Another industry group, birdfood activities, combines elements of both oil and non-oil sunflower. Within each distinct sunflower industry, the direct impacts generated were estimated from initial or primary processing activities through retail sales or final uses for sunflower products. Within this overall framework, an economic contribution analysis of the sunflower industry was performed.

Sunflower acreage, yields, prices, and production expenses and returns were used to estimate the economic activity from sunflower production in the major sunflower-producing states. Sunflower production averaged 2.58 million acres and 1.3 million tons in the U.S. from 1991 through 1993. Average yield during that time was 1,140 pounds per planted acre. Sunflower production

impacts were estimated based on a three-year average of sunflower acreage and production. Total annual direct impacts (expenditures and returns) from sunflower production were estimated at $316.8 million or about $123 per acre from 1991 through 1993. The $316.8 million in direct impacts generated another $482 million in secondary economic impacts. The top three states with the greatest economic impact from sunflower production were North Dakota ($162.3 million), South Dakota ($61.5 million), and Minnesota ($47.3 million).

The sunflower oil industry consisted of oil sunflower exports, elevator handling margins, oil crushing, oil refining, sunflower oil and meal exports, and domestic consumption of sunflower oil and meal. The economic activities in the sunflower oil industry centered around sunflower oil production, with the industry producing about 348,700 tons of crude sunflower oil and 406,700 tons of sunflower meal annually from 1991 through 1993. Exports by the sunflower oil industry included about 38,350 tons of oil sunflower, 226,150 tons of sunflower oil, and 38,200 tons of sunflower meal.

Total annual direct impacts for the sunflower oil industry were $241 million, with elevator handling and elevator transportation generating $18.6 million, crushing and refining activities generating about $60.5 million, exports generating $25 million, and the largest component of the industry, domestic consumption, generating about $137 million. The oil industry generated an additional $462 million in secondary economic impacts. The total annual economic impact from the sunflower oil industry was estimated to be about $703 million from 1991 through 1993.

The confection sunflower industry processes and prepares confection sunflower for use in snack mixes, nuts for direct consumption, baking inputs, and salad toppings. Approximately 241,400 tons of confection sunflower were initially processed each year from 1991 through 1993, generating an annual direct economic impact of about $31.8 million. Approximately 60,300 tons of confection sunflower (kernel and whole seed) were salted and roasted, generating an annual direct impact of about $16.6 million. About 62,400 tons of confection sunflower were consumed in the U.S. annually from 1991 through 1993. The process of packaging, distributing, and selling confection sunflower products (whole seed and kernel) for consumers generated about $217 million in direct impacts. The confection sunflower industry was estimated to generate about $276 million in direct impacts and $417 million in secondary impacts for a total annual economic impact of about $693 million.

Whether birdfood markets for sunflower are viewed as secondary to traditional markets or viewed as competing markets for sunflower, sunflower

activities involving birdfood use have become a major part of the overall U.S. sunflower industry. The direct economic impact from the primary processing of oil sunflower for birdfood was estimated to be about $45.4 million annually. Domestic consumption of sunflower for birdfood was estimated to have a direct economic impact of about $91.9 million annually. Primary processing and domestic consumption of sunflower for birdfood was estimated to generate a total annual direct impact of $137.3 million. Birdfood activities generated about $285 million in secondary impacts which result in a total annual economic impact of about $423 million.

Collectively, sunflower production, the sunflower oil industry, the confection sunflower industry, and birdfood activities generated about $971 million in direct impacts annually from 1991 through 1993. The $971 million in direct impacts (industry expenditures and returns) generated an additional $1.65 billion in secondary impacts. All U.S. sunflower industry economic impacts were estimated to be about $2.62 billion annually.

Direct employment in the U.S. sunflower industry for the primary processing stages of sunflower oil, confection sunflower, and birdfood activities was estimated at 315, 583, and 144 full-time equivalent jobs, respectively. Hybrid seed activities generated an additional 52 FTE jobs. The U.S. sunflower industry indirectly supported about 33,350 full-time equivalent secondary jobs. Secondary jobs represent employment outside the sunflower industry, but employment that is dependent on the existence of the sunflower industry. In addition to secondary employment, economic activity associated with the U.S. sunflower industry generated about $16 million, $6.2 million, and $1.9 million in sales and use, personal income, and corporate income taxes, respectively. The sunflower industry also was estimated to be directly responsible for about $11.9 million in property taxes. Also included in the direct impacts for the sunflower industry were about $928,000 in property taxes, $313,000 in sales and use taxes, and $483,000 in other taxes (state and federal income and miscellaneous taxes) paid by processing firms in the sunflower oil, confection sunflower, and birdfood industries. Total taxes generated by the sunflower industry, taxes directly paid by firms and producers in the industry and taxes resulting from economic activity of the industry, were estimated at $37.6 million.

To the extent possible, industry impacts were allocated to the seven major sunflower-producing states (North Dakota, South Dakota, Minnesota, Kansas, Colorado, Nebraska, and Texas) based on whether or not the industry's direct impact (expenditures and returns) remained within the state's economy. The industry impacts allocated included the activities of crop production, crop handling, transportation, oil crushing, oil refining, primary processing (confection

and birdfood), secondary processing (confection), and returns from exports. North Dakota, the nation's leading oil sunflower and confection sunflower-producing state, and the location for two large oil crushing facilities and several confection processing plants, incurred the greatest total economic impacts of the seven major sunflower-producing states ($712 million). North Dakota was followed in total economic impacts by Minnesota ($223 million), South Dakota ($194 million), and Kansas ($92 million). Colorado, Nebraska, and Texas collectively incurred about $54 million in total economic impacts. Collectively, all the remaining states (minor sunflower-producing states and other states involved with processing and distributing sunflower products) incurred about $1.34 billion in total economic impacts.

Two industry-wide scenarios examining the effects of an increase in sunflower production were analyzed. In the first scenario, extra industry output (sunflower related products), created by increasing sunflower production 25 percent, was exported while domestic consumption was held constant. In the second scenario, given the same underlying conditions, exports were held constant while extra sunflower products were allowed to be consumed domestically. Total (direct and secondary) industry-wide impacts increased by $339 million (13 percent) in the first scenario, while impacts increased by $878 million (33 percent) in the second scenario. Potential impacts from increases in sunflower production are likely to be somewhere between the two estimates, considering that increased output of sunflower products would not likely result in only increases in exports or increases in domestic consumption.

CONCLUSIONS

Sunflower is a regional crop which can be grown competitively in the Upper Great Plains. The crop has the distinct advantage over many of the region's crops in that almost the entire crop (both in terms of oil sunflower and confection sunflower) receives some, if not all, of the processing needed for export and/or domestic consumption within the production region.

The sunflower industry, when measured in terms of acreage, is not large compared to other cash crops in the United States. Likewise, the quantity of sunflower products produced is not large when compared to competing products from related industries. A simple comparison of product quantities would clarify this point. For example, although sunflower oil competes nationally against other vegetable oils, noticeably soybean oil, canola oil, corn oil, cottonseed oil, and other oils, sunflower oil typically only accounts for about 1 percent of all vegetable oil consumption in the United States. Further, confection sunflower products such as

sunflower kernel and whole seed are part of the consumer nut industry. Sunflower nuts must compete with cashews, peanuts, almonds, and other nuts. Sunflower consumption pales in comparison to the volume of domestic peanut use. These comparisons (or measures of economic activity) are not intended to compare the importance of the sunflower industry (or its products) relative to competing industries (or their products), but instead to measure the importance of sunflower activities to the states and economies that support them.

Initial economic analysis of the U.S. sunflower industry indicates that changes in sunflower production likely have the greatest effect on the economies of sunflower-producing states. Changes in sunflower production are felt most in the sunflower-producing states because (1) acreage is concentrated among a few states and those impacts remain almost entirely within those economies, and (2) economic activity from primary processing activities, which are concentrated in the sunflower-producing states and whose impacts also almost entirely remain in those economies, is directly linked to production.

The greatest impacts (the most net value added) among all industry activities (both in terms of per unit impacts and percent of all impacts) are generated through the stages and activities of domestic consumption. Thus, the one trend that could make the largest change in industry impacts would be increases in domestic use of its products (noticeably the two most prevalent sunflower exports--oil and confection products). Both sunflower oil and confection products currently exported would create more economic activity in the United States as consumer products. However, most of the impacts from domestic consumption are distributed among a variety of non-producing states. Thus, direct substitution of domestic use for exports would be unlikely to change the impacts in sunflower-producing states, but would increase the impacts throughout the rest of the nation. The magnitude of these changes would of course vary with the rate of substitution between exports and domestic consumption and any corresponding changes in their relative values.

The sunflower industry can make changes to the distribution and level of impacts through (1) increasing general levels of sunflower production (changes in supply) and/or (2) place greater value on industry products by increasing domestic consumption (changes in demand). Changes in domestic sunflower production only, with no additional domestic consumption, would likely have the greatest direct effect on the sunflower-producing states, assuming the extra sunflower products could be exported at near current values, which would require expansion of current export markets. Alternatively, if production remained constant, industry impacts could be increased by substituting domestic consumption for exports. Thus, the magnitude and distribution of industry impacts in the future will depend upon changes in sunflower supply and corresponding changes in demand for sunflower products.

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APPENDIX A

U.S. Sunflower Industry Supply and Disappearance

Average supply and disappearance for confection sunflower, oil sunflower, sunflower oil, and sunflower meal were determined from information obtained from several sources. Beginning stocks and imports were obtained from various sunflower crop quality reports (National Sunflower Association *various issues*). Confection sunflower and oil sunflower production statistics were obtained from Agricultural Statistics Services in the major sunflower-producing states. Export quantities were obtained from the U.S. Department of Commerce (1992, 1993, 1994). Sunflower oil and meal statistics were obtained from various sunflower crop quality reports (National Sunflower Association *various issues*) except export quantities of sunflower oil and meal were obtained from the U.S. Department of Commerce (1992, 1993, 1994).

Export quantities and values reported by the U.S. Department of Commerce (1992, 1993, 1994) for confection sunflower were found to contain a variety of problems. Confection sunflower exports in years prior to 1990 were lumped into a single export code. This category inevitably contained the quantities of all confection sunflower exports and, correspondingly, the value reported for this category was an average of the various export products. Subsequently, confection sunflower exports were broken into more meaningful codes (ones that distinguished confection sunflower exports by product or seed type). However, problems in identifying confection sunflower exports continued to persist even after separate codes were established for the various confection sunflower products.

The most widespread coding problems present for years 1991 through 1993 (the years used in this study) included (1) most confection sunflower exports to Canada were lumped under one code, (2) sufficient in-shell exports were included in the code for shelled exports which inflated the quantity of shelled exports and deflated the value of shelled exports, and (3) quantities and values reported for hybrid seed exports were inappropriate, implying hybrid seed exports were being misrepresented by the inclusion of other confection exports. The situation was compounded further by the U.S. Department of Commerce occasionally imputing quantities/values of some exports in an attempt to compensate for mishandled and/or mislabeled export forms.

Industry sources believe that the widespread coding problems in the years that closely followed the switch to separate codes are not nearly as prevalent in the 1993 and 1994 export figures, as the figures reported in those years more closely reflect actual industry activity (i.e., as it is perceived by those within the industry). Also, industry sources feel that the total tonnage reported from 1991 through 1994 appears to be representative of the overall quantity of confection exports during that period. However, because of coding problems in the years

that closely followed the switch to separate codes, the specific quantities and values of in-shell and shelled exports are not representative of overall industry activity during that period.

For purposes of this study, several adjustments were made to the export figures reported by the U.S. Department of Commerce (1992, 1993, 1994). First, exports of confection sunflower to Canada were reallocated to in-shell, shelled, and birdfood codes by applying the average export values of in-shell, shelled, and birdfood to estimated quantities of in-shell, shelled, and birdfood exports. The quantities were manipulated until the overall value (export product times export value) matched the total value of exports as reported by the U.S. Department of Commerce (1992, 1993, 1994). The estimated quantities were also required to match the overall quantity of exports shipped to Canada in that code. Second, the quantities of shelled and in-shell exports were estimated using average exports from 1991 through 1993 and export information from 1993 and 1994. The value of shelled exports from 1991 through 1993 was also estimated.

The total quantities of confection sunflower exports reported by the U.S. Department of Commerce (1992, 1993, 1994) from 1991 through 1993 were assumed to be acceptable. Also, the quantities of shelled and in-shell exports reported in 1993 and 1994 were assumed to be acceptable for use in allocating in-shell and shelled exports from 1991 through 1993. Since the value of in-shell exports from 1991 through 1993 was perceived to have not been affected by coding errors, the average value for in-shell exports from 1991 through 1993 was not adjusted. Since the value of shelled exports from 1991 through 1993 was assumed to be understated by the inclusion of in-shell exports (which are valued less than shelled exports), the average value from 1993 through 1994 was used.

Hybrid confection seed exports appear to be overstated according to industry sources. Also, the value of hybrid seed exports correspondingly appear to be under priced. Thus, the figures reported for hybrid seed exports would imply that other confection exports are included in the code for hybrid seed exports. However, even though the figures reported by the U.S. Department of Commerce (1992, 1993, 1994) for hybrid seed exports likely contain coding errors, they were considered acceptable for use in this study. Any adjustments made would likely result in inconsequential refinements in quantity exported. The value per ton of hybrid seed exports would likely increase by removing all non-hybrid seed exports from that category. However, the overall tonnage and combined values of confection exports originally reported in that code would not change.

Average oil sunflower supply from 1991 through 1993 was estimated by determining inventory changes, imports, and domestic production. Oil sunflower disappearance was estimated as the combined volumes of oil crushing, exports, and other domestic uses. Oil crushing and exports (known quantities) were subtracted from total supply to determine other domestic use. No problems were suspected in the export figures reported by the U.S. Department of Commerce (1992, 1993, 1994) for oil sunflower, sunflower oil (crude and refined), and sunflower meal. Planting uses were estimated from average seeding rates and historic planted acreage and also adjusted for potential changes in planted acreage. Additional seed stock use of 25 percent over estimated plantings was included. The residual of oil crushing, exports, and planting seed was considered birdfood. Other miscellaneous uses of oil sunflower were considered trivial to overall use and not included. Two percent shrink was factored into the amount of seed available for domestic uses.

The breakdown of confection sunflower use was estimated by first determining total industry supply, which was composed of inventory changes, imports, and domestic consumption. Planting seed use was estimated in the same manner as oil sunflower. From total industry supply, hybrid seed exports and planting seed uses were subtracted. The remaining quantity of confection sunflower was assumed to be primary processed. The breakdown of processing into kernel, whole seed, and birdfood was estimated from industry sources. Based on typical industry practices given average crop conditions (normal supplies and crop quality) and other factors present from 1991 through 1993, about 15, 30, and 55 percent of all confection sunflower were processed into birdfood, whole seed, and kernel, respectively. These ratios of processed outputs can be highly variable depending upon individual processors, crop quality, crop quantity, and market factors.

By applying the ratio of processed outputs to total supply processed, the total tonnage of confection birdfood, whole seed, and kernel was determined. After the total amount of birdfood, whole seed, and kernel was determined (in-shell basis), kernel tonnage was converted to actual tonnage. Upon determining actual tonnage for the processed outputs, actual tonnage of exports was then subtracted from estimated tonnage available to arrive at the quantities of processed outputs that did not leave the country (synonymous with domestic consumption). Thus, total product available was estimated first, export tonnages second, and domestic tonnage last.

U.S. SUNFLOWER INDUSTRY
Supply and Disappearance
Average 1991/92 through 1993/94 (1000 metric tons)

Confection Sunflower

Supply	1991-93 Average	Allocation of U.S. Production
Beginning Stocks	82.7	
Production	196.5	196.5 *
Seed Imports	29.7	
Total	308.8	
Disappearance		
Exports	110.5	89.3 **
Domestic Utilization	132.6	107.1 ***
Ending Stocks	65.7	

* Average U.S. production from 1991-1993.
** Exports of U.S. produced seeds were assumed to be proportional to industry use.
*** Domestic use from U.S. production was assumed proportional to industry disappearance. Domestic use includes in-shell, seeds for dehulling, birdfood, and planting seed.
**** Domestic utilization (i.e., combination of U.S. production, imports, and carryover stocks) was estimated as residual between average ending stocks and average supply.

Oil Sunflower

Supply	1991-93 Average	Allocation of U.S. Production
Beginning Stocks	55.3	
Production	1,134.3	1,134.3 *
Seed Imports	21.0	
Total	1,210.6	
Disappearance		
Exports	38.3	38.3 **
Oilseed Crushed	847.0	839.1 ***
Domestic Utilization	259.3	256.8 ****
Ending Stocks	66.0	

* Average U.S. production from 1991-1993.
** Oilseed exports were assumed to come from only U.S. production.
*** Oilseed crushed and domestic use were proportionately allocated as the residual of domestic production less exports. Domestic use includes birdfood, planting seed, and other domestic uses.
**** Domestic utilization and oilseed crushed (i.e., combination of U.S. production, imports, and carryover stocks) was estimated as residual between average ending stocks, exports, and total supply.

U.S. SUNFLOWER INDUSTRY
Supply and Disappearance
Average 1991/92 through 1993/94 (1000 metric tons)

Sunflower Oil

	1991-93 Average	Allocation of U.S. Production
Supply		
Beginning Stocks	25.0	
Oil Production	348.7	345.1 *
Total	373.7	
Disappearance		
Oil Exports	226.2	221.3 **
Domestic Oil Use	126.5	123.8 ***
Ending Stocks	21.0	

* Determined by dividing estimated tons of oil seeds crushed (839.1) by the average ratio of seeds crushed to oil produced (2.43 tons of oil seeds per ton of oil).
** Determined by allocating estimated oil production by the ratio of average domestic use and exports.
*** Domestic use was estimated as residual between average ending stocks, exports, and total supply.

Sunflower Meal

	1991-93 Average	Allocation of U.S. Production
Supply		
Beginning Stocks	9.3	
Meal Production	406.7	402.9 *
Total	416.0	
Disappearance		
Domestic Use	367.4	365.0 **
Exports	38.2	38.0 ***
Ending Stocks	10.3	

* Determined by multiplying estimated tons of oil produced (345.1) by the average ratio of meal produced to oil produced (1.17 tons of meal per ton of oil).
** Determined by allocating estimated meal production by the ratio of average domestic use and exports.
*** Domestic use was estimated as residual between average ending stocks, exports, and total supply.

Sources: National Sunflower Association, National Agricultural Statistics Service, and U.S. Department of Commerce

Oil Sunflower Disappearance

Breakdown of Oil Seed Disappearance--U.S. Production and Total U.S. Supply
Average 1991/92 through 1993/94 (short tons)

	U.S. Production Only	Sunflower Industry
Inventory (+/-)	0	(11,758)
Imports	0	23,148
U.S. production	1,250,310	1,250,310
Total Domestic Supply	1,250,310	1,261,700
Exports		
Crushing Seeds	21,009	21,009
Hybrid Seeds	13,726	13,726
Other	7,536	7,536
Total Exports	42,271	42,271
Domestic Use		
Oil Crushing	924,927	933,648
Other Uses	263,373	265,864
Planting Seed	5,220	5,220
Birdfood	258,153	260,644

Confection Sunflower Disappearance

Breakdown of Non-Oil Seed Disappearance--U.S. Production and Total U.S. Supply
Average 1991/92 through 1993/94 (short tons)

In-shell tonnage		
U.S. production only		Entire Industry
0	Inventory (+/-)	18,739
0	Imports	32,702
216,562	U.S. production	216,562
216,562	total seed available	268,002
1,179	less planting seed	1,179
719	less hybrid seed exports	719
214,664	processed at the following rates*	266,105
31,395	15%	38,918 birdfood
62,789	30%	77,836 whole seed
115,114	55%	142,699 kernel

	U.S. Production Confection Sunflower Disappearance		Entire Industry Supply Confection Sunflower Disappearance	
	In-shell Equivalent	Actual Weight**	In-shell Equivalent	Actual Weight**
Total Production	211,195	142,127	261,350	175,731
Exports	98,454	56,694	118,813	68,353
Kernel	69,601	27,840	84,100	33,640
Whole seed	26,884	26,884	32,485	32,485
Hybrid Seed	719	719	719	719
Other	1,250	1,250	1,509	1,509
Planting Seed	1,179	1,179	1,179	1,179
Domestic Consumption	111,562	84,254	141,358	106,199
Whole seed	35,905	35,905	45,351	45,351
Birdfood	30,144	30,144	37,409	37,409
Kernel	45,513	18,205	58,598	23,439

* Processed assuming a 2.5 percent shrink to account for moisture loss, handling loss, foreign material, and over packing

** Assuming a 40 percent conversion from in-shell to kernel.

Oil and Confection Sunflower Exports--Reported by the Department of Commerce (actual tonnage)

	1991		1992		1993	
	Quantity	Value/ton	Quantity	Value/ton	Quantity	Value/ton
	short tons					
Oil Sunflower						
Crushing Seeds	40,777.46	$202.20	3,778.25	$258.65	18,472.36	$279.32
Hybrid Seeds	19,566.26	$520.96	17,707.90	$527.85	3,904.08	$1,455.85
Other	3,779.63	$351.46	12,691.72	$347.89	6,135.95	$358.50
Totals	64,123.35	19,766,865	34,177.87	14,739,734	28,512.39	13,762,496
Confection Sunflower						
In-shell	10,105.97	$506.57	15,221.30	$563.24	32,221.09	$586.79
Shelled	55,745.93	$756.14	49,196.65	$802.68	35,883.71	$963.04
Hybrid Seeds	0.00	$0.00	0.00	$0.00	2,156.44	$1,696.63
Other	825.98	$289.94	2,489.20	$273.61	1,211.50	$363.37
Totals	66,677.88	47,510,877	66,907.15	48,743,299	71,472.73	57,563,160
Total Seed Exports	130,801	67,277,742	101,085	63,483,033	99,985	71,325,655
	metric tons					
Oil Sunflower						
Crushing Seeds	36,993.07	$222.89	3,427.61	$285.11	16,758.02	$307.90
Hybrid Seeds	17,750.39	$574.25	16,064.50	$581.85	3,541.76	$1,604.78
Other	3,428.86	$387.42	11,513.85	$383.48	5,566.50	$395.18
Totals	58,172.32	19,766,865	31,005.96	14,739,734	25,866.27	13,762,496
Confection Sunflower						
In-shell	9,168.07	$558.39	13,808.67	$620.86	29,230.78	$646.82
Shelled	50,572.38	$833.50	44,630.91	$884.79	32,553.48	$1,061.56
Hybrid Seeds	0.00	$0.00	0.00	$0.00	1,956.31	$1,870.19
Other	749.32	$319.60	2,258.19	$301.60	1,099.06	$400.55
Totals	60,489.78	47,510,877	60,697.77	48,743,299	64,839.63	57,563,160
Total Seed Exports	118,662	67,277,742	91,704	63,483,033	90,706	71,325,655

Confection Sunflower Exports--Revised Estimates

	1991-93 Average		1993-94 Average		Revised Estimates*	
	Quantity	Value/ton	Quantity	Value/ton	Quantity	Value/ton
Confection Sunflower (metric tons)						
In-shell	17,403	$624.42	29,294	$629.48	29,470	$624.42
Shelled	42,586	$909.53	30,336	$1,110.66	30,518	$1,110.66
Hybrid Seeds	652	$1,870.19	na	na	652	$1,870.19
Other	1,369	$331.36	na	na	1,369	$331.36
Totals	62,009	$819.54	-----	-----	62,009	$870.36
Confection Sunflower (short tons)						
In-shell	19,183	$566.47	32,290	$693.88	32,485	$566.47
Shelled	46,942	$825.12	33,439	$1,224.28	33,640	$1,007.58
Hybrid Seeds	719	$1,696.63	na	na	719	$1,696.63
Other	1,509	$300.61	na	na	1,509	$300.61
Totals	68,353	$750.12	-----	-----	68,353	$789.58
Confection (in-shell equivalent)					40% yield from in-shell to shelled	
In-shell (metric tons)					29,470	
Shelled (metric tons)					76,295	
Hybrid Seed (metric tons)					652	
Other (metric tons)					1,369	
Total Confection Exports					107,786	
In-shell (short tons)					32,485	
Shelled (short tons)					84,100	
Hybrid Seed (short tons)					719	
Other (short tons)					1,509	
Total Confection Exports					118,813	

* The ratio of average in-shell and shelled exports from 1993-94 was used to reallocate the average total tonnage of in-shell and shelled exports from 1991-93. The revised estimates were used to calculate the industry impacts.

Sunflower Oil and Meal Exports

	1991		1992		1993		Average	
	Quantity	Value/ton	Quantity	Value/ton	Quantity	Value/ton	Quantity	Value/ton
	short tons							
Crude Sunflower Oil	170,294	$467.40	279,812	$422.65	277,927	$447.51	242,678	$442.61
Refined Sunflower Oil	1,266	$764.93	11,102	$510.56	7,472	$669.78	6,613	$586.76
Sunflower Meal	19,917	$93.53	52,003	$88.06	54,520	$102.10	42,147	$94.98
	metric tons							
Crude Sunflower Oil	154,490	$515.22	253,843	$465.89	252,134	$493.29	220,156	$487.89
Refined Sunflower Oil	1,149	$843.18	10,071	$562.79	6,779	$738.29	5,999	$646.78
Sunflower Meal	18,069	$103.10	47,177	$97.07	49,460	$112.55	38,235	$104.69

1991, 1992, and 1993 Sunflower Exports (KG)

Port	Oil Seeds	
East Coast	3,784,608	3.29%
Great Lakes	53,867,638	46.82%
Gulf	18,168,822	15.79%
Midwest	34,549,026	30.03%
West Coast	4,674,460	4.06%
Total	115,044,554	

Port	Non-Oil Seeds	
East Coast	10,304,230	5.66%
Great Lakes	123,178,208	67.71%
Gulf	24,083,055	13.24%
Midwest	13,552,376	7.45%
West Coast	10,802,737	5.94%
Total	181,920,606	

	Crude Oil	
	Quantity	Percent
East Coast	27,431	0.00%
Great Lakes	17,504,645	2.65%
Gulf	611,944,743	92.65%
Midwest	4,861,967	0.74%
West Coast	26,128,422	3.96%
Total	660,467,208	

	Refined Oil	
	Quantity	Percent
East Coast	73,060	0.41%
Great Lakes	2,725,678	15.14%
Gulf	10,855,968	60.32%
Midwest	1,796,354	9.98%
West Coast	2,547,426	14.15%
Total	17,998,486	

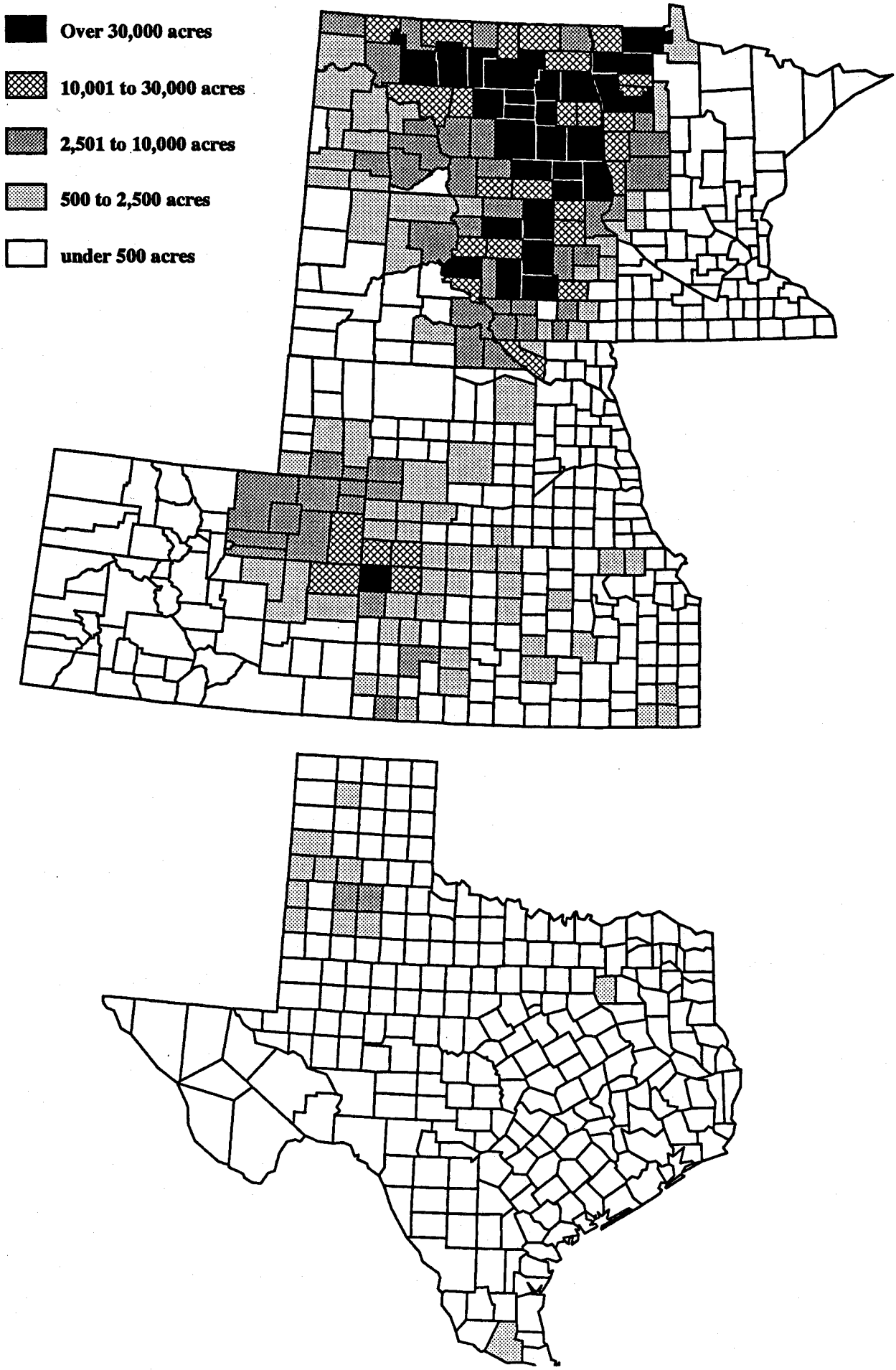
	Sunflower Meal	
	Quantity	Percent
East Coast	70,471	0.06%
Great Lakes	2,192,729	1.91%
Gulf	111,076,493	96.84%
Midwest	1,366,252	1.19%
West Coast	0	0.00%
Total	114,705,945	

Refined Oil	17,998,486	2.653%
Crude Oil	660,467,208	97.347%

Sunflower Production Statistics

State	1991-93 Average All Sunflower				1991-93 Average Oil Sunflower				1991-93 Average Non-Oil Sunflower			
	Acres Planted	Acres Harvested	Yield	Total Production	Acres Planted	Acres Harvested	Yield	Total Production	Acres Planted	Acres Harvested	Yield	Total Production
			lbs/ac	--- lbs ---			lbs/ac	--- lbs ---			lbs/ac	--- lbs ---
North Dakota	1,418,333	1,316,667	1,051	1,490,566,667	1,216,667	1,133,333	1,063	1,293,700,000	201,667	183,333	976	196,866,667
South Dakota	500,000	483,333	1,247	623,406,667	486,667	470,667	1,246	606,273,333	13,333	12,667	1,285	17,133,333
Minnesota	298,333	277,333	1,343	400,800,000	226,667	210,667	1,348	305,483,333	71,667	66,667	1,330	95,316,667
Kansas	148,333	140,667	1,239	183,843,333	118,000	112,333	1,256	148,190,000	30,333	28,333	1,175	35,653,333
Colorado	72,667	68,000	1,096	79,616,667	47,667	44,333	1,071	51,043,333	25,000	23,667	1,143	28,573,333
Nebraska	50,667	48,333	1,072	54,336,667	33,333	31,333	1,034	34,450,000	17,333	17,000	1,147	19,886,667
Texas	34,333	32,667	1,232	42,300,000	17,333	17,000	1,225	21,240,000	17,000	15,667	1,239	21,060,000
Other	56,000	48,333	1,051	58,872,667	36,333	31,000	1,108	40,239,333	19,667	17,333	947	18,633,333
United States	2,578,667	2,415,333	1,138	2,933,742,667	2,182,667	2,050,667	1,146	2,500,619,333	396,000	364,667	1,094	433,123,333

Average Planted Acres, All Sunflower, 1991 through 1993



APPENDIX B

U.S. Sunflower Production Expenses and Returns

Crop production expenses and returns were estimated for both oil and confection sunflower for all seven major sunflower-producing states. Sunflower production and acreage were obtained from each state's respective agricultural statistics service. In North Dakota and South Dakota, separate budgets were used for various crop reporting districts. Prices were obtained from the National Agricultural Statistics Service (USDA 1992, 1993, 1994), averaged from 1991 through 1993, and weighted by each state's production in each year. Total revenue, for most states, consisted of sunflower sales (yield x price), crop insurance adjustments, and disaster payments. Disaster payments were not available for all states. Variable and fixed expenses were obtained from university extension services in each state. In some cases, some costs were adjusted to normalize the costs to be representative of items across state budgets. For example, some budgets contained machinery expenses that represented combined principal and interest expenses, while others reported those expenses separately. All fixed expenses were normalized to equate returns from sunflower production to represent money left to cover unpaid labor, equity, and management. Thus, expenses for land investment (opportunity cost of land ownership and/or land principal payments) were not included as expenses, and would subsequently be extracted from producer returns. Returns in the attached budgets do not represent producer profit, as profit would represent the returns left over after subtracting expenses for equity investments, management charges, and unpaid labor.

Total direct impacts from sunflower production were synonymous with gross revenue. All revenue from sunflower production (that also implies expenses and returns) was assumed to remain within the economy of the producing state (i.e., economic leakage from sunflower production did not occur). Thus, gross revenue from production would represent the net direct impact from sunflower production.

The following sources were used to develop crop production budgets:

North Dakota	Swenson and Aakre (1993)
South Dakota	Peterson (1994)
Minnesota	Fuller (1991)
Kansas	Nelson and Dhuyvetter (1991) and Standage (1994)
Colorado	Nitchie (1994)
Nebraska	Selley et al. (1994)
Texas	Lippke (1994)

Disaster payments were estimated from information received from the Consolidated Farm Service Agencies in various states. Federal crop insurance premiums and indemnities were obtained from the Federal Crop Insurance Corporation in Kansas City, Missouri. Marketing-year average prices were obtained from the National Agricultural Statistics Service.

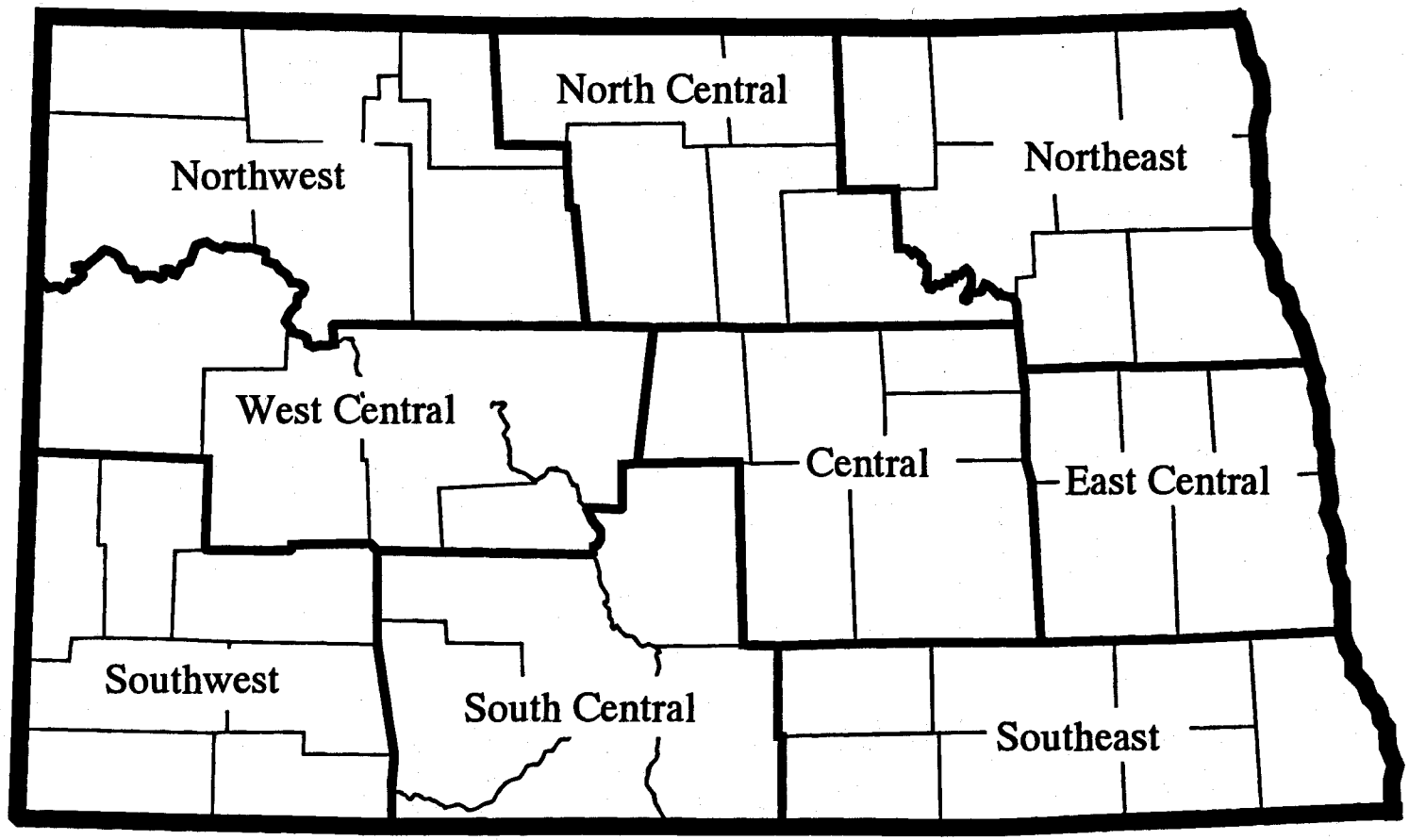
North Dakota--Production Expenses and Returns by Region

Oil Sunflower		NW	NC	NE	SW	SC	WC	C	EC	SE	Average	Total
	Acres	69,333	136,000	165,000	9,867	19,667	18,467	285,000	243,333	270,000		1,216,667
Yield	lbs	918.3	876.7	981.0	418.9	486.4	696.8	948.9	1,285.6	1,255.9	1,063.3	
Price	$/cwt	9.31	9.31	9.31	9.31	9.31	9.31	9.31	9.31	9.31	$9.31	
Ins Pmt		7.29	7.29	7.29	7.29	7.29	7.29	7.29	7.29	7.29	$7.29	
Dis Pmt		4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26	$4.26	
Total Revenue		97.02	93.16	102.86	50.54	56.83	76.40	99.87	131.22	128.45	110.53	134,472,540
Variable Expenses												
Seed		8.97	9.60	9.60	8.00	8.00	9.09	9.60	9.60	9.56	9.51	11,568,849
Herbicide		8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	8.32	10,122,667
Insecticide		6.06	6.06	6.06	6.06	6.06	6.06	6.06	6.06	6.06	6.06	7,373,000
Fertilizer		4.84	4.87	6.03	2.21	2.21	4.16	6.90	7.29	7.25	6.44	7,832,833
Crop Insurance		3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	4,647,667
Fuel & Lubrication		7.22	7.17	7.30	6.98	6.98	7.15	7.44	7.47	7.48	7.38	8,976,086
Repairs		9.28	9.20	9.35	9.18	9.18	9.19	9.36	9.37	9.38	9.34	11,358,421
Drying		1.84	1.75	1.97	0.88	2.52	1.46	1.99	2.70	2.64	2.23	2,712,308
Miscellaneous		4.30	4.30	4.30	4.30	4.30	4.30	4.30	4.30	4.30	4.30	5,231,667
Operating Interest		1.23	1.24	1.28	1.12	1.16	1.20	1.30	1.33	1.32	1.29	1,571,029
Total Variable		55.88	56.33	58.02	50.87	52.55	54.76	59.09	60.26	60.13	58.68	71,394,526
Fixed Expenses												
Misc. Overhead		4.32	4.34	4.34	4.24	4.24	4.31	4.44	4.42	4.44	4.40	5,350,406
Machinery Depr.		16.95	17.02	16.85	16.74	16.74	16.94	17.30	17.09	17.22	17.11	20,815,850
Mach Int Payment		4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.79	4.90	4.88	5,934,900
Land Taxes		2.55	2.89	4.66	2.16	2.16	2.65	3.26	4.36	4.13	3.75	4,556,602
Land Interest Pmt		9.06	10.30	9.08	7.36	7.16	7.26	8.28	14.64	11.62	10.63	12,932,835
Total Fixed		37.78	39.45	39.83	35.40	35.20	36.06	38.18	45.30	42.31	40.76	49,590,593
Returns to Unpaid Labor, Management, and Equity		3.37	-2.63	5.01	-35.73	-30.92	-14.41	2.61	25.66	26.01	11.09	13,487,421

North Dakota--Production Expenses and Returns by Region

Confection Sunflower		NW	NC	NE	SW	SC	WC	C	EC	SE	Average	Total
	Acres	1,200	18,267	72,333	233	333	1,133	47,000	41,500	19,667		201,667
Yield	lbs	872.2	879.4	827.4	442.9	640.0	476.5	918.4	1,243.3	1,235.1	976.2	
Price	$/cwt	$12.69	$12.69	$12.69	$12.69	$12.69	$12.69	$12.69	$12.69	$12.69	$12.69	
Ins Pmt		$7.29	$7.29	$7.29	$7.29	$7.29	$7.29	$7.29	$7.29	$7.29	7.29	
Dis Pmt		$6.95	$6.95	$6.95	$6.95	$6.95	$6.95	$6.95	$6.95	$6.95	6.95	
Total Revenue		124.91	125.81	119.22	70.43	95.44	74.69	130.77	171.99	170.95	138.10	27,849,900
Variable Expenses												
Seed		16.25	16.25	16.25	16.25	16.25	16.25	16.25	16.25	16.25	16.25	3,277,083
Herbicide		6.80	6.80	6.80	6.80	6.80	6.80	6.80	6.80	6.80	6.80	1,371,333
Insecticide		3.30	3.30	3.30	3.30	3.30	3.30	3.30	3.30	3.30	3.30	665,500
Fertilizer		7.02	7.02	9.59	4.97	10.18	4.97	10.18	12.15	10.18	10.03	2,023,047
Crop Insurance		3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	770,367
Fuel & Lubrication		7.30	7.30	7.22	6.98	7.15	7.02	7.44	7.47	7.48	7.35	1,483,113
Repairs		9.25	9.27	9.19	9.18	9.18	9.24	9.36	9.28	9.33	9.27	1,869,379
Drying		1.83	1.85	1.74	0.93	1.34	1.00	1.93	2.61	2.59	2.05	413,420
Miscellaneous		4.30	4.30	4.30	4.30	4.30	4.30	4.30	4.30	4.30	4.30	867,167
Operating Interest		1.35	1.35	1.40	1.27	1.40	1.28	1.43	1.48	1.44	1.42	286,659
Total Variable		61.22	61.25	63.60	57.80	63.73	57.98	64.80	67.47	65.49	64.60	13,027,069
Fixed Expenses												
Misc. Overhead		4.32	4.34	4.36	4.24	4.24	4.28	4.45	4.38	4.43	4.39	885,131
Machinery Depr.		16.97	17.02	16.98	16.74	16.74	16.85	17.32	16.88	17.17	17.06	3,440,302
Mach Int Payment		4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.79	4.90	4.88	983,602
Land Taxes		2.65	2.89	4.36	2.16	2.16	2.44	3.29	5.18	4.42	4.12	831,860
Land Interest Pmt		9.06	10.30	9.08	7.36	7.16	7.26	8.28	14.64	11.62	10.38	2,093,149
Total Fixed		37.90	39.45	39.68	35.40	35.20	35.73	38.24	45.87	42.54	40.83	8,234,044
Returns to Unpaid Labor, Management, and Equity		25.79	25.11	15.93	-22.77	-3.48	-19.01	27.73	58.65	62.91	32.67	6,588,787

North Dakota Agricultural Statistics Districts



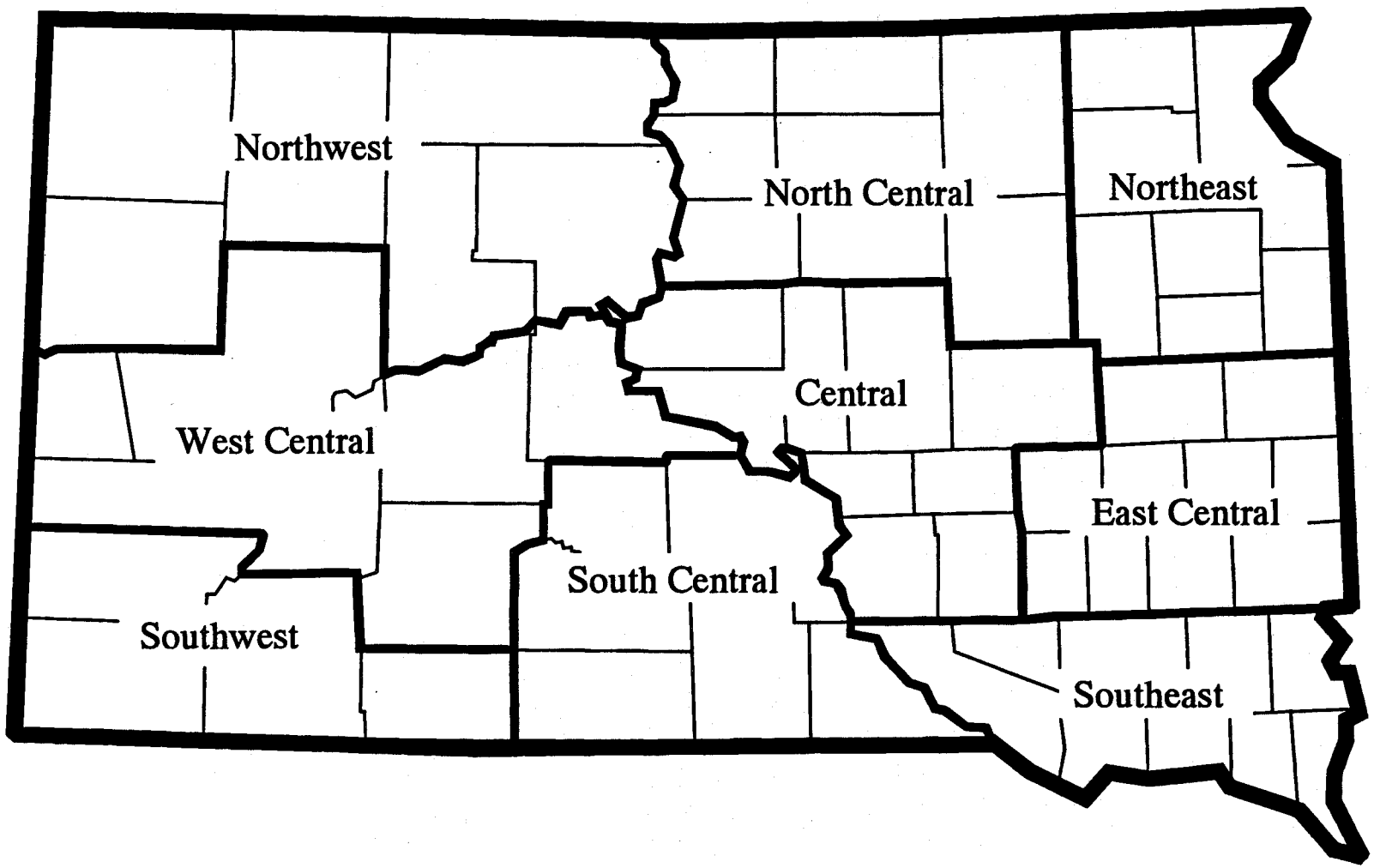
South Dakota--Production Expenses and Returns by Region

Oil Sunflower		NW	NC	NE	WC	C	EC	SW	SC	SE	Other	Average	Total
	Acres	6,000	175,633	55,200	833	175,900	36,200	1,033	23,567	12,033	267		486,667
Yield	lbs	875.7	1,276.2	1,176.7	647.6	1,246.2	1,174.9	869.7	1,269.2	1,540.1	1,087.5	1,245.8	
Price	$/cwt	$9.66	$9.66	$9.66	$9.66	$9.66	$9.66	$9.66	$9.66	$9.66	$9.66	$9.66	
Ins Pmt		$1.44	$1.44	$1.44	$1.44	$1.44	$1.44	$1.44	$1.44	$1.44	$1.44	1.44	
Dis Pmt		0	0	0	0	0	0	0	0	0	0	0.00	
Total Revenue		85.99	124.67	115.07	63.97	121.78	114.88	85.42	123.99	150.15	106.45	121.73	59,242,153
Variable Expenses													
Seed		7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82	3,805,733
Herbicide		6.45	6.45	7.24	6.45	6.45	7.24	6.45	6.45	7.24	6.62	6.62	3,220,758
Insecticide		4.42	4.42	4.42	4.42	4.42	4.42	4.42	4.42	4.42	4.42	4.42	2,151,067
Fertilizer		10.07	10.07	11.50	8.39	10.07	11.75	7.56	10.07	10.90	10.37	10.37	5,046,559
Hired Labor		4.82	6.04	6.04	4.82	6.04	6.04	4.07	6.04	6.04	6.02	6.02	2,929,089
Crop Insurance		1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	700,800
Fuel & Lubrication		3.26	4.09	4.20	3.08	4.43	4.20	2.95	4.40	4.11	4.23	4.23	2,060,911
Repairs		5.18	7.65	7.67	5.14	7.72	7.67	5.10	7.81	7.65	7.64	7.65	3,721,362
Drying		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
Miscellaneous		18.56	2.75	5.21	16.06	3.44	6.92	16.06	3.44	6.92	4.01	3.97	1,932,932
Operating Interest		1.40	1.14	1.25	1.30	1.17	1.29	1.26	1.17	1.27	1.18	1.18	575,307
Total Variable		63.42	51.87	56.79	58.92	53.00	58.79	57.13	53.06	57.81	53.75	53.72	26,144,518
Fixed Expenses													
Misc. Overhead		2.91	2.26	2.51	2.68	2.31	2.61	2.63	2.32	2.56	2.35	2.35	1,144,812
Machinery Depr.		9.03	16.41	16.47	9.03	16.59	16.47	8.44	16.78	16.42	16.36	16.38	7,972,165
Mach Int Payment		2.08	3.77	3.79	2.08	3.81	3.79	1.94	3.86	3.78	3.76	3.77	1,833,597
Land Taxes		1.95	3.91	5.83	1.95	3.66	7.14	2.37	3.63	7.86	4.32	4.33	2,107,859
Land Interest Pmt		4.25	8.26	11.60	4.25	7.28	11.95	4.35	7.28	15.28	8.60	8.62	4,195,458
Total Fixed		20.22	34.61	40.19	19.99	33.65	41.95	19.73	33.87	45.90	35.39	35.45	17,253,891
Returns to Unpaid Labor, Management, and Equity		2.36	38.19	18.08	-14.93	35.13	14.14	8.56	37.06	46.44	17.31	32.56	15,843,744

South Dakota

Confection Sunflower			Total
	Acres		13,333
Yield	lbs	1,285.0	
Price	$/cwt	$12.93	
Ins Pmt		$1.44	
Dis Pmt		0	
Total Revenue		167.56	2,234,100
Variable Expenses			
Seed		16.25	216,667
Herbicide		6.80	90,667
Insecticide		4.42	58,933
Fertilizer		10.37	138,267
Hired Labor		6.02	80,267
Crop Insurance		1.44	19,200
Fuel & Lubrication		7.10	94,667
Repairs		9.22	122,933
Drying		0.00	0
Miscellaneous		4.30	57,333
Operating Interest		1.48	19,776
Total Variable		67.40	898,709
Fixed Expenses			
Misc. Overhead		4.28	57,067
Machinery Depr.		16.36	218,133
Mach Int Payment		4.90	65,333
Land Taxes		2.02	26,933
Land Interest Pmt		9.06	120,800
Total Fixed		36.62	488,267
Returns to Unpaid Labor, Management, and Equity		63.53	847,124

South Dakota Agricultural Statistics Districts



Minnesota--Average Production Expenses and Returns

Oil Sunflower			Total	Confection	Total
	Acres		226,667		71,667
Yield	lbs	1,347.7		1,330.0	
Price	$/cwt	$10.15		$13.09	
Ins Pmt		$4.06		$4.06	
Dis Pmt		$7.97		$10.76	
Total Revenue		148.87	33,743,910	188.90	13,538,133
Variable Expenses					
Seed		9.00	2,040,000	16.25	1,164,583
Herbicide		18.50	4,193,333	18.50	1,325,833
Insecticide		6.40	1,450,667	6.40	458,667
Fertilizer		15.30	3,468,000	15.30	1,096,500
Crop Insurance		2.93	664,133	2.93	209,983
Fuel & Lubrication		8.49	1,924,400	8.49	608,450
Repairs		12.36	2,801,600	12.36	885,800
Drying		0.00	0	0.00	0
Miscellaneous		4.00	906,667	4.00	286,667
Operating Interest		1.73	392,598	1.90	135,821
Total Variable		78.71	17,841,398	86.13	6,172,304
Fixed Expenses					
Misc. Overhead		4.28	970,133	4.28	306,733
Machinery Depr.		16.50	3,740,000	16.50	1,182,500
Mach Int Payment		7.40	1,677,333	7.40	530,333
Land Taxes		7.00	1,586,667	7.00	501,667
Land Interest Pmt		23.00	5,213,333	23.00	1,648,333
Total Fixed		58.18	13,187,467	58.18	4,169,567
Returns to Unpaid Labor, Management, and Equity		11.98	2,715,045	44.60	3,196,262

Kansas--Average Production Expenses and Returns

Oil Sunflower				Confection	
Acres			118,000		30,333
Yield	lbs	1,255.8		1,175.4	
Price	$/cwt	$9.87		$10.61	
Ins Pmt		$2.07		$2.07	
Dis Pmt		0		0	
Total Revenue		126.07	14,876,236	126.77	3,845,304
Variable Expenses					
Seed		12.90	1,522,200	16.25	492,917
Herbicide		7.85	926,300	6.80	206,267
Insecticide		7.65	902,700	3.30	100,100
Fertilizer		4.80	566,400	2.14	64,913
Crop Insurance		1.71	201,780	1.71	51,870
Fuel & Lubrication		5.83	687,940	7.10	215,367
Repairs		11.90	1,404,200	9.22	279,673
Drying		2.51	296,380	2.47	74,872
Miscellaneous		4.00	472,000	4.30	130,433
Operating Interest		1.33	157,048	1.20	36,369
Total Variable		60.48	7,136,948	54.49	1,652,781
Fixed Expenses					
Misc. Overhead		4.28	505,040	4.28	129,827
Machinery Depr.		16.50	1,947,000	16.50	500,500
Mach Int Payment		7.40	873,200	7.40	224,467
Land Taxes		6.75	796,500	6.75	204,750
Land Interest Pmt		13.50	1,593,000	13.50	409,500
Total Fixed		48.43	5,714,740	48.43	1,469,043
Returns to Unpaid Labor, Management, and Equity		17.16	2,024,548	23.85	723,479

Colorado--Average Production Expenses and Returns

Oil Sunflower				Confection	
Acres			47,667		25,000
Yield	lbs	1,070.8		1,142.9	
Price	$/cwt	$9.99		$13.29	
Ins Pmt		$1.62		$1.62	
Dis Pmt		0		0	
Total Revenue		108.59	5,176,067	153.47	3,836,833
Variable Expenses					
Seed		10.40	495,733	16.25	406,250
Herbicide		7.38	351,780	7.38	184,500
Insecticide		0.00	0	3.30	82,500
Fertilizer		16.12	768,387	16.12	403,000
Crop Insurance		1.68	80,080	1.68	42,000
Fuel & Lubrication		5.86	279,327	7.10	177,500
Repairs		2.04	97,240	9.22	230,500
Drying		0.00	0	0.00	0
Miscellaneous		4.00	190,667	4.30	107,500
Operating Interest		1.07	50,922	1.47	36,759
Total Variable		48.55	2,314,136	66.82	1,670,509
Fixed Expenses					
Misc. Overhead		10.00	476,667	10.00	250,000
Machinery Depr.		17.48	833,213	17.48	437,000
Mach Int Payment		7.40	352,733	7.40	185,000
Land Taxes		4.50	214,500	4.50	112,500
Land Interest Pmt		16.40	781,733	16.50	412,500
Total Fixed		55.78	2,658,847	55.88	1,397,000
Returns to Unpaid Labor, Management, and Equity		4.26	203,084	30.77	769,324

Nebraska--Average Production Expenses and Returns

Oil Sunflower		Total	Confection	Total
Acres		33,333		17,333
Yield	lbs	1,033.5	1,147.3	
Price	$/cwt	$9.48	$13.01	
Ins Pmt		$3.12	$3.12	
Dis Pmt		0	0	
Total Revenue		101.05	3,368,467	152.42	2,641,920
Variable Expenses				
Seed		16.00	533,333	16.25	281,667
Herbicide		7.44	248,000	7.44	128,960
Insecticide		0.00	0	0.00	0
Fertilizer		4.80	160,000	4.80	83,200
Crop Insurance		2.48	82,667	2.48	42,987
Fuel & Lubrication		5.20	173,333	5.20	90,133
Repairs		9.89	329,667	9.89	171,427
Drying		0.00	0	0.00	0
Miscellaneous		1.70	56,667	1.70	29,467
Operating Interest		1.07	35,633	1.07	18,626
Total Variable		48.58	1,619,299	48.83	846,466
Fixed Expenses				
Misc. Overhead		4.28	142,667	4.28	74,187
Machinery Depr.		15.99	533,000	15.99	277,160
Mach Int Payment		4.90	163,333	4.90	84,933
Land Taxes		10.80	360,000	10.80	187,200
Land Interest Pmt		10.26	342,000	10.26	177,840
Total Fixed		46.23	1,541,000	46.23	801,320
Returns to Unpaid Labor, Management, and Equity		6.25	208,167	57.35	994,134

Texas--Average Production Expenses and Returns

Oil Sunflower			Total	Confection	Total
	Acres		17,333		17,000
Yield	lbs	1,225.4		1,238.8	
Price	$/cwt	$10.51		$12.61	
Ins Pmt		$1.02		$1.02	
Dis Pmt		0		0	
Total Revenue		129.84	2,250,640	157.30	2,674,020
Variable Expenses					
Seed		4.08	70,720	16.25	276,250
Herbicide		10.00	173,333	10.00	170,000
Insecticide		16.00	277,333	16.00	272,000
Fertilizer		10.50	182,000	10.50	178,500
Crop Insurance		0.37	6,413	0.37	6,290
Fuel & Lubrication		11.26	195,173	11.26	191,420
Repairs		3.23	55,987	3.23	54,910
Drying		0.00	0	0.00	0
Miscellaneous		13.75	238,333	13.75	233,750
Operating Interest		1.56	26,984	1.83	31,120
Total Variable		70.75	1,226,277	83.19	1,414,240
Fixed Expenses					
Misc. Overhead		4.28	74,187	4.28	72,760
Machinery Depr.		17.48	302,987	17.48	297,160
Mach Int Payment		7.40	128,267	7.40	125,800
Land Taxes		4.50	78,000	4.50	76,500
Land Interest Pmt		16.40	284,267	16.40	278,800
Total Fixed		50.06	867,707	50.06	851,020
Returns to Unpaid Labor, Management, and Equity		9.04	156,656	24.04	408,760

Other States--Average Production Expenses and Returns

Oil Sunflower		Total	Confection	Total
Acres		36,333		19,667
Yield	lbs	1,107.5	947.5	
Price	$/cwt	$11.48	$13.27	
Total Revenue		127.18	4,621,042	125.75	2,473,014
Variable Expenses				
Seed		4.08	148,240	16.25	319,583
Herbicide		10.00	363,333	10.00	196,667
Insecticide		16.00	581,333	16.00	314,667
Fertilizer		10.50	381,500	10.50	206,500
Crop Insurance		0.00	0	0.00	0
Fuel & Lubrication		11.26	409,113	11.26	221,447
Repairs		3.23	117,357	3.23	63,523
Drying		0.00	0	0.00	0
Miscellaneous		4.30	156,233	4.30	84,567
Operating Interest		1.34	48,535	1.61	31,656
Total Variable		60.71	2,205,645	73.15	1,438,610
Fixed Expenses				
Misc. Overhead		4.28	155,507	4.28	84,173
Machinery Depr.		17.48	635,107	17.48	343,773
Mach Int Payment		7.40	268,867	7.40	145,533
Land Taxes		4.50	163,500	4.50	88,500
Land Interest Pmt		16.40	595,867	16.40	322,533
Total Fixed		50.06	1,818,847	50.06	984,513
Returns to Unpaid Labor, Management, and Equity		16.42	596,550	2.54	49,891

Sunflower Crop Prices

	Dollars per Cwt			Weighted
	1991	1992	1993	Average*
Oil Sunflower				
ND	8.32	9.39	11.50	9.31
SD	7.86	9.10	11.30	9.66
MN	8.74	9.86	12.30	10.15
KS	7.40	9.14	11.80	9.87
CO	8.00	8.75	12.30	9.99
NE	7.75	8.50	11.60	9.48
TX	10.40	10.40	11.00	10.51
Other	11.70	10.80	12.20	11.48
U.S.	----	----	----	9.59
Confection Sunflower				
ND	11.20	13.30	15.50	12.69
SD	11.50	13.50	13.30	12.93
MN	11.20	12.60	15.90	13.09
KS	8.46	9.78	13.00	10.61
CO	11.70	13.00	15.00	13.29
NE	11.10	13.50	14.20	13.01
TX	11.80	12.60	13.30	12.61
Other	11.90	12.30	15.20	13.27
U.S.	----	----	----	12.69

* Weighted by state production in each year.

Crop Production--Direct Impacts by State, Crop, and Economic Sector

Sunflower Production-All Sunflower

I/O Sectors	North Dakota	South Dakota	Minnesota	Kansas	Colorado	Nebraska	Texas	Other	U.S.
Comm and Pub Util	2,494,215	480,751	510,747	253,947	290,667	86,741	58,779	95,872	4,271,718
Retail Trade	98,036,852	30,154,330	27,192,373	10,430,293	5,041,347	3,096,317	2,963,204	4,470,479	181,385,196
Fin, Ins, and R Estate	29,220,207	7,530,272	10,471,869	3,547,234	1,941,728	948,019	887,941	1,412,991	55,960,261
Bus and Pers Service	7,106,496	1,475,884	1,107,413	740,789	439,750	129,808	294,820	216,272	11,511,233
Households	20,076,208	19,700,224	5,911,308	2,748,028	972,408	1,202,301	565,416	646,441	51,822,333
Government	5,388,462	2,134,793	2,088,333	1,001,250	327,000	547,200	154,500	252,000	11,893,538
Total	162,322,440	61,476,253	47,282,043	18,721,540	9,012,900	6,010,387	4,924,660	7,094,056	316,844,279
Percent of U.S. Total	51.23%	19.40%	14.92%	5.91%	2.84%	1.90%	1.55%	2.24%	

Sunflower Production-Oil Sunflower

I/O Sectors	North Dakota	South Dakota	Minnesota	Kansas	Colorado	Nebraska	Texas	Other	U.S.
Comm and Pub Util	2,140,162	457,925	388,053	202,016	190,667	57,067	29,675	62,203	3,527,767
Retail Trade	83,089,775	29,173,983	20,265,360	8,441,938	3,016,347	2,034,200	1,391,537	2,745,201	150,158,341
Fin, Ins, and R Estate	25,086,430	7,305,162	7,947,398	2,825,028	1,265,469	623,633	445,931	913,268	46,412,319
Bus and Pers Service	6,112,150	1,424,391	841,387	586,206	286,000	85,400	148,841	140,319	9,624,694
Households	13,487,421	18,772,833	2,715,045	2,024,548	203,084	208,167	156,656	596,550	38,164,305
Government	4,556,602	2,107,859	1,586,667	796,500	214,500	360,000	78,000	163,500	9,863,628
Total	134,472,540	59,242,153	33,743,910	14,876,236	5,176,067	3,368,467	2,250,640	4,621,042	257,751,055
Percent of all oil sunfl.	52.17%	22.98%	13.09%	5.77%	2.01%	1.31%	0.87%	1.79%	
Percent of state total	82.84%	96.37%	71.37%	79.46%	57.43%	56.04%	45.70%	65.14%	81.35%

Sunflower Production-Confection Sunflower

I/O Sectors	North Dakota	South Dakota	Minnesota	Kansas	Colorado	Nebraska	Texas	Other	U.S.
Comm and Pub Util	354,053	22,827	122,693	51,931	100,000	29,675	29,104	33,669	743,951
Retail Trade	14,947,078	980,347	6,927,013	1,988,355	2,025,000	1,062,117	1,571,667	1,725,278	31,226,855
Fin, Ins, and R Estate	4,133,777	225,109	2,524,471	722,206	676,259	324,386	442,010	499,723	9,547,942
Bus and Pers Service	994,346	51,493	266,027	154,583	153,750	44,408	145,979	75,953	1,886,539
Households	6,588,787	927,391	3,196,262	723,479	769,324	994,134	408,760	49,891	13,658,028
Government	831,860	26,933	501,667	204,750	112,500	187,200	76,500	88,500	2,029,910
Total	27,849,900	2,234,100	13,538,133	3,845,304	3,836,833	2,641,920	2,674,020	2,473,014	59,093,225
Percent of all conf sunfl.	47.13%	3.78%	22.91%	6.51%	6.49%	4.47%	4.53%	4.18%	

APPENDIX C

U.S. Sunflower Oil Industry Impacts

Overall Strategy

The U.S. sunflower oil industry impacts were generally approached from two aspects: (1) exports and (2) domestic consumption. Exports consisted of oil sunflower, sunflower oil, and sunflower meal. Domestic consumption consisted of sunflower oil and sunflower meal.

Oil Sunflower Exports

The direct impact from the export of oil sunflower was estimated as the additional value added by exporting the seeds. Exported oil sunflower were assumed to be first delivered to a local grain elevator then transported to a port of export. Elevator handling margins and transportation costs were subtracted from the export value to estimate the net value added.

Sunflower Oil Exports

The value added to sunflower oil through the export process was estimated by subtracting an average domestic sunflower oil price from a combination of an average sunflower oil export price and an average Sunflower Oil Assistance Program (SOAP) payment. The difference in value between the export value (export price and SOAP payment) and the domestic price was considered the direct impact. The domestic price (f.o.b. Minneapolis) was used in determining the direct impact from crushing activities. Part of the direct impact from crushing activities would be partially attributable to export activities since the f.o.b. Minneapolis price contains a margin for transportation that the crushing plants would incur in delivering the oil to Minneapolis. Thus, to the extent of the transportation cost involved, some of the value of export activity is contained in the crushing impacts. Sunflower meal export impacts were determined in the same manner as sunflower oil exports. The difference between an average domestic meal price and an average export price was considered the direct impact from sunflower meal exports.

Sunflower Handling

Oil sunflower handling impacts were estimated separately for country and terminal elevators. Gross margins for sunflower at country and terminal elevators were estimated from industry contacts and from grain handling budgets developed by Bangsund et al. (1994). Other impacts from handling oil sunflower

were included in oil processing or birdfood impacts. Handling impacts for crude oil, refined oil, and sunflower meal were limited to activity at ports of export.

Transportation

Transportation issues involving movement of grain within the United States marketing system are complex. A substantial number of studies have been devoted to the subject, and a complete analysis of all transportation impacts is beyond the scope of this study. Shipping and hauling costs (i.e., money spent on transporting sunflower to market destinations) were included as separate measures and as components of the various sunflower industries.

To realistically estimate transportation costs for sunflower activities in the United States, transportation costs were analyzed on a site-to-site basis when actual quantities, origin and destination points, and transportation modes could be estimated. For example, transportation of oil sunflower to crushing plants could be estimated for several origins in North Dakota, since only a few destinations exist. However, transportation impacts in other aspects of the sunflower industry had to be estimated by applying general guidelines or what industry sources considered typical transportation costs for various products.

Country elevators were assumed to transport sunflower to market destinations by truck and/or railroad. Transportation costs of shipping sunflower from local elevators to market destinations required estimating (1) the amount of sunflower transported from origin points to market destinations by mode of transport, (2) expenses for truck and rail transportation, and (3) the distance from central locations to market destinations.

Central locations within Agricultural Statistics Districts for each state were used as origin points for transportation analyses. Central locations were selected based on the density of sunflower production within the district. For example, in some states, multiple counties within an Agricultural Statistics District did not produce sunflower. Also, in some cases only one or two counties within the district had a majority of the sunflower production.

The first step in determining the amount of sunflower shipped from each district to various destinations was to apply general industry disappearance data to overall production within the district. For example, in the East Central Agricultural Statistics District of North Dakota approximately 295 million pounds of oil sunflower were produced annually. If national disappearance information is applied to the East Central district, approximately 224 million pounds would be

used by oil crushing plants. Subsequently, the 224 million pounds of oil sunflower were allocated to the appropriate crushing plants (some plants were not considered viable destinations for various producing regions) after the tons of sunflower processed for each oil crushing plant were determined. Finally, after determining the amount shipped and the destination, the percentage shipped by mode of transportation was applied, along with rates for each mode of transport and distances to each destination. The allocation of truck and railroad transportation was patterned similar to information obtained from the Upper Great Plains Transportation Institute (Andreson et al. 1994). This process generated an estimate of total transportation costs to ship oil sunflower (for crushing) from each district to various crushing plants. Similar procedures were used to estimate transportation costs for oil seed exports from production districts; some transportation rates changed, along with different final destinations.

Transportation costs for shipping (1) crude oil from crushing plants to refiners and ports of export, (2) confection sunflower from primary processors to secondary confection processors, and (3) sunflower processed for birdfood to final destinations were estimated from survey information. Other areas of transportation, which were based on applying general industry guidelines, included the shipping of confection sunflower from secondary processors to retail distributors and refined sunflower oil to bottlers and retail distributors.

Truck Transportation

Trucking costs for sunflower and sunflower products were based on secondary information and industry contacts. Trucking rates were determined from industry contacts; however, truck operating expenses (percent of rate) were based on average load capacities, input prices, number of back hauls, and other coefficients (Bangsund et al. 1994).

Railroad Transportation

Generally, railroad shipments do not play a major role in delivering oil sunflower to crushing plants. Truck transportation, due to cost advantages with short hauls (production has historically been close to processing facilities), has been the primary mode of transportation. However, not all elevators rely entirely on truck transportation, and occasionally, depending upon a variety of factors, sunflower is shipped by rail to local crushing plants. Railroad transportation, however, has played major roles in the transportation of other sunflower products, primarily sunflower oil and meal.

Several steps were required to estimate railroad transportation costs. Specific procedures included estimating the railroad companies' costs of rail shipments, developing a railroad expense budget to allocate shipment costs to expense categories, and estimating charges levied by the railroad companies on elevators for rail car shipments (shipping tariffs).

Railroad companies' expenses incurred in rail transport were estimated using the Uniform Railroad Costing System (URCS), a microcomputer model developed by the Interstate Commerce Commission (1990). URCS estimates variable and total costs (i.e., expenses incurred by the railroad companies, not to be mistaken for the cost incurred by elevators) of railroad transportation based on a current data base of financial and rail shipment information obtained from major railroad companies. URCS required general shipment characteristics regarding length of hauls, number of cars, and so on.

URCS provides an accurate estimate of the total variable costs and total allocated costs for rail shipments; however, the model does not provide an adequate breakdown of the costs. Thus, a railroad budget developed by Bangsund et al. (1994) was used to allocate the variable and fixed costs obtained from URCS to various expense categories (Appendix C). Total costs for all rail shipments (i.e., shipments from all counties and terminal elevators to market destinations) were summed and allocated into expense categories. Due to the complexities involved with rail shipments, using a general budget to estimate railroad costs would be an inappropriate method of estimating the amount of expenditures incurred in rail shipments.

After estimating the expenses incurred by the railroad companies, the rates charged elevators for rail shipments were determined. Shipping tariffs are rates charged elevators per rail car to ship grain. Tariffs for rail shipments were obtained from the Upper Great Plains Transportation Institute (1994). Shipping tariffs vary by railroad company, distance, and number of cars.

Oil Crushing Impacts

Economic impacts from oil crushing were estimated by determining the quantity and average value of sunflower oil and meal produced and the quantity and average value of oil sunflower crushed. The difference between the value of oil crushing outputs (oil and meal) and the value of oil sunflower crushed represented the direct impact from oil crushing activities. A crushing impact margin was estimated per ton of sunflower crushed based on average crushing yields and values from 1991 through 1993.

The value of sunflower crushed was estimated from unpublished information obtained from the National Sunflower Association. Daily bid prices for sunflower at crushing plants were used to develop an average bid price for oil sunflower by the crushing industry from 1991 through 1993. The average bid price for oil sunflower was determined by (1) estimating an average monthly price from daily prices (both old crop and new crop), (2) weighing the purchase of sunflower by the portion purchased with new crop and old crop prices in each month, (3) averaging the weighted composite (new and old price) monthly price into a yearly average price, and (4) averaging the yearly prices by the amount of sunflower crushed each year. The overall average bid price was subsequently adjusted for oil content of sunflower crushed over the three year period. Yearly average values for sunflower oil and sunflower meal were obtained from secondary sources and averaged by the amount of product produced each year.

The total direct impacts for oil crushing were estimated by multiplying average tons of oil sunflower crushed by the direct impact per ton. Direct impacts were allocated to economic sectors based on information obtained from a survey of sunflower crushing firms.

Oil Refining Impacts

The amount of oil refined was determined by subtracting crude sunflower oil exports from crude sunflower oil production. The remaining balance was assumed to be consumed domestically and since virtually no uses of sunflower oil in its crude state exist in the United States, all of the crude oil consumed domestically was assumed also to be refined. A sunflower refining budget was estimated based on information obtained from industry sources. No documented historical price information was found on refined sunflower oil so the value of sunflower oil after refining was based on industry estimates of the value of refined oil over the value of crude oil. Thus, after converting for the yield loss resulting from the refining process, the value added from sunflower refining was estimated as the total value of refined oil less the total value of crude oil refined. The total direct impacts were then allocated to economic sectors based on the refining budget.

Domestic Sunflower Oil Consumption

The retail value of sunflower oil in the United States was obtained from a marketing research firm (Nielson Marketing Research 1994). The retail price of sunflower oil was based on point-of-sale information extracted from a cross

section of supermarkets throughout the United States for all reported brands, sizes, and sale volumes. A small quantity of sunflower oil was assumed to be used by food manufacturing firms and also used as a component in miscellaneous food products. This quantity was valued less than the retail value of sunflower oil.

The quantity of sunflower oil consumed in the U.S. was estimated by subtracting the amount of refined oil exported from the total amount of sunflower oil refined. The total direct impact from domestic sunflower oil consumption was estimated as the difference between retail sunflower oil values and values of oil after refining. Economic activities within the category of domestic consumption included transportation, bottling, distribution, and retailing. The direct impacts for the various components of the domestic consumption phase were based on industry information.

Domestic Sunflower Meal Consumption

The direct impact from the domestic consumption of sunflower meal was based on the additional economic activity created by moving sunflower meal from crushing plants to domestic feedlots. The quantity of sunflower meal consumed domestically was estimated by subtracting sunflower meal exports from total sunflower meal production.

Crushing Impact Margins--Oil Sunflower Processing
Industry averages 1991/92 through 1993/94

Method 1

0.4113 tons of oil per ton of sunflower crushed	(3-year average of oil production/oilseed crushings)
823 lbs of oil per ton of sunflower crushed	
0.4802 tons of meal per ton of sunflower crushed	(3-year average of meal production/oilseed crushings)
960 lbs of meal per ton of sunflower crushed	
$560.70 value of sunflower oil (mt ton)	(3-year weighted average for U.S.)
$508.66 value of sunflower oil (short ton)	(conversion to short tons)
$209.21 value of oil per ton of sunflower crushed	(0.4113 * $508.66)
$94.94 value per metric ton of sunflower meal	(3-year weighted average for U.S.)
$86.13 value per short ton of sunflower meal	(conversion to short tons)
$41.36 value of meal per ton of sunflower crushed	(0.4802 * $86.13)
$250.57 value of oil and meal per ton of sunflower crushed	($41.36 + $209.21)
$9.90 value per cwt of oil sunflower (purchased)	(3-year weighted average for U.S.)
$197.92 value per ton of purchased sunflower	(20 cwts * $9.90)
$52.65 Net added value per ton of crushed oil sunflower	($250.57 - $197.92)

Method 2

2.43 tons of sunflower per ton of oil	(3-year average of oilseed crushings/oil production)
4,863 lbs of sunflower per ton of oil	(conversion from tons)
$508.66 value of sunflower oil (short ton)	
$0.105 value of oil per lb of sunflower crushed	($508.66 / 4863)
2.08 tons of sunflower per ton of meal	(3-year average of meal production/oilseed crushings)
4,165 lbs of sunflower per ton of meal	(conversion to tons)
$86.13 value of sunflower meal (short ton)	
$0.021 value of meal per lb of sunflower crushed	($86.13 / 4165)
$0.125 value of oil and meal per lb of sunflower crushed	($0.125 + $0.021)
$250.57 value per ton of sunflower crushed	(conversion to tons)
$9.90 value per cwt of oil sunflower (purchased)	(3-year weighted average for U.S.)
$197.92 value per ton of purchased sunflower	
$52.64 Net added value per ton of crushed oil sunflower	($250.57 - $197.92)

Crushing Impact Margins--Oil Sunflower Processing
Supplemental Information 1991/92 through 1993/94

1991	1992	1993	
$477.00	$559.00	$692.00	Sunflower oil, Minneapolis, fob, yearly average
426	344	276	Sunflower oil produced (000s mt)
		$560.70	Weighted average $/mt for sunflower oil
$85.00	$99.00	$105.00	Sunflower meal (32%), Minneapolis, fob, yearly average
493	403	324	Sunflower meal produced (000s mt)
		$94.94	Weighted average $/mt for sunflower meal

$9.90 Average price per cwt paid for oil sunflower by crushing plants from 1991 through 1993

Oil Crushing

Oil sunflower crushed (avg tons 1991 through 1993)	933,648
Net value added ($/ton of sunflower crushed)	$52.65

I/O Sectors	Allocated Direct Impacts In-state	Outstate	Total All States
Construction	5.05%	0.08%	2,521,212
Transportation	38.26%	0.67%	19,136,065
Comm and Publ Utilities	6.83%	0.00%	3,359,373
Ag Proc and Misc Manuf	4.18%	0.03%	2,067,865
Retail Trade	3.69%	0.02%	1,820,717
FIRE	1.24%	0.00%	612,529
Bus and Pers Service	8.84%	0.12%	4,406,511
Prof and Soc Service	3.47%	0.02%	1,715,881
Households	24.28%	0.14%	12,004,946
Government	3.07%	0.00%	1,512,370
All seeds crushed	98.92%	1.08%	49,157,471
U.S. only			48,698,301
Imported sunflower			459,170

384,335 total tons of crude sunflower oil
$127.90 direct impact per ton of crude oil

Oil Refining

Refined sun oil premium over crude oil prices
122.10 $/mt 0.055 $/lb

$/mt crude, fob, Minneapolis
560.70

Oil Refining Budget	$/short ton	$/lb	Total
Revenue	619.57	0.3098	83,378,776
Expenses	95% yield		
Labor		0.0050	1,345,748
Materials		0.0034	915,109
Utilities		0.0033	888,194
Plant operations		0.0033	888,194
Oil purchase		0.2543	72,055,869
Total		0.2693	76,093,114
Returns		0.0405	7,285,662

Domestic crude refined 141,658 tons
Refined oil netted 134,575 tons

	Refined Sunflower Oil	
I/O Sectors	Total Direct Impact	$/ton
Construction	$444,097	$3.30
Transportation		
Comm and Publ Utilities	$888,194	$6.60
Ag Proc and Misc Manuf	$444,097	$3.30
Retail Trade	$915,109	$6.80
FIRE		
Bus and Pers Service		
Prof and Soc Service		
Households	$8,631,410	$64.14
Government		
Total Direct Impacts	$11,322,907	$84.14

Bottling, Distribution, Retailing

	short tons
Total refined oil	134,575
Refined oil exported	6,613
Refined oil consumed	127,962

Domestic Uses		Price/lb	Total Value
Retail--Blend & Pure	90%	0.83	191,174,613
Manufacture/Ingredients	10%	0.51	13,046,603
Total Value--All Domestic Uses			204,221,217

Direct Impact Calculations

Final use value		204,221,217
less Refined oil value		79,281,397
Net impact		124,939,820
	$/ton	976.39

Breakdown of Direct Impacts for Domestic Oil Consumption

	Sources	$/sh ton	Total
Transp. Cost (truck)	industry	50.00	6,398,079
Drumming Expense	industry	113.38	14,508,573
Bottling/Packaging	industry	100.00	12,796,159
Distr./Handling/Mkting	residual	436.34	55,834,303
Retail Margin	20% over cost	276.67	35,402,706
Totals		976.39	124,939,820

Direct Impacts	Domestic Consumption Breakdown				Total Direct Impacts
	Transp-ortation	Bottling	Distribution	Retail	
I/O Sectors					
Transportation			5,583,430		5,583,430
Comm and Pub Util			5,583,430		5,583,430
Ag Proc and Misc Mnfg		27,304,732			27,304,732
Retail Trade	3,945,696		16,750,291	35,402,706	56,098,693
FIRE	504,169		5,583,430		6,087,599
Bus and Pers Serv			5,583,430		5,583,430
Prof and Social Serv					0
Households	1,808,737		16,750,291		18,559,028
Government	139,478				139,478
Total	6,398,079	27,304,732	55,834,303	35,402,706	124,939,820

Oil Exports

Value of Oil

	short tons	FOB-New Orleans $/mt	SOAP Bonus $/mt	Value
Crude oil exported	242,678	558.24	78.23	140,122,292
Refined oil exported	6,613	758.57	0.00	4,551,054
Totals	249,291			144,673,346

Direct Impacts

	short tons	Export Value FOB NOLA & SOAP $/st	Domestic Value FOB Minneapolis $/st	Value Added $/st	Value Added total
Crude	242,678	577.40	508.66	68.74	16,681,495
Refined	6,613	688.17	619.57	68.60	453,674
		extra maritime activity		0.25	62,323
Transportation, Margins, Handling				$68.99	17,197,491
Harbor Activity		$5,000 per 20,000 tons		$0.25	62,323
Maritime Activity (loading, dock side activity, crew exp)				$5.00	1,246,454
Transportation charge (rail)				$50.00	12,464,540
Handling and Trader Margins			residual	$13.74	3,424,175

I/O Sectors	Oil Exports: Maritime Activities	Oil Exports: Transp-ortation	Oil Exports: Trader Margins & Handling
Transportation		7,518,195	
Comm and Pub Util	9,638		288,487
Ag Proc and Misc Mnfg			192,439
Retail Trade	559,941	3,125,137	288,658
FIRE		41,548	173,092
Bus and Pers Serv	370,081		
Prof and Social Serv	3,855		
Households	342,132	1,573,994	2,481,500
Government	23,130	205,665	
Total	1,308,777	12,464,540	3,424,175

Direct Impacts-Domestic & Export Oil, Domestic & Export Meal

Domestic Oil Consumption	Direct Impacts Total	tons	$/ton
Crushing	$17,228,018	134,696	$127.90
Refining	$10,766,479	127,962	$84.14
Bottle,Distrib,RSales	$124,939,820	127,962	$976.39
Total Direct Impact	$152,934,317	127,962	$1,195.16
Equivalent crude oil impact		134,696	$1,135.40

Oil Exports	Direct Impacts Total	tons	$/ton
Crushing-crude & refined	$31,929,453	249,639	$127.90
Refining	$556,428	6,613	$84.14
Export process-crude	$16,681,495	242,678	$68.74
Export process-refined	$453,674	6,613	$68.60
Extra Maritime Activity	$62,323	249,291	$0.25
Total Direct Impact	$49,683,372	crude oil	$196.64
		refined oil	$296.80
Total Oil	$202,617,689		

Domestic Meal Use	Direct Impacts Total	tons	$/ton
Domestic Sales	$35,231,073	406,122	$86.75
Transportation	$12,183,656	406,122	$30.00
Total Direct Impact	$12,183,656	406,122	$30.00

Meal Exports	Direct Impacts Total	tons	$/ton
Export sales	$4,002,923	42,147	$94.98
Value at Minneapolis	na	na	$86.75
Value added by export	$346,689	42,147	$8.23
Addit. Transp.	$210,734	42,147	$5.00
Handling/Trader Margins	$135,955	42,147	$3.23
Maritime Impacts	$10,537	42,147	$0.25
Total Direct Impact	$357,226	42,147	$8.48
Total Meal Impacts	$12,540,882		

Value of Oil Sunflower Exports

			U.S.
Oil seeds exported (lbs)			57,090,253
Oil seeds exported (tons)			28,545
Value of oil seeds at export ($/ton)			$260.71
Hybrid seed exports (tons)			13,726
Value of hybrid seeds at export ($/ton)			$612.56
Value of oil seed exports			15,849,942
less			
Value of grain at farm level--non hybrid seeds			$5,488,457
Local elevator margins			$114,181
Value of hybrid seeds			$2,674,686
Value added through export			$7,572,618
less			
Transportation costs (local elevator to port)			
Truck expense			$1,905,463
Rail expense			$190,994
Shrinkage/loss	2%		$148,838
Handling expenses at terminal elevators			$28,655
Maritime activity			$147,030
Trader margins/quality differences/seed premiums			$5,151,639
		$/cwt	$6

Direct Impacts from Oil Seed Exports

	tons	$/ton	Total
Transportation	42,271	$49.60	$2,096,456
Truck expense	39,583	$48.14	$1,905,463
Rail expense	2,688	$71.06	$190,994
Handling expenses (terminal elev)	15,776	$1.82	$28,655
Maritime activity	29,502	$4.98	$147,030
Trader margins	42,271	$121.87	$5,151,639
Total Direct Impact			$7,423,780
Total tons exported			42,271
		Average $/ton	$175.62

Direct Impacts from Oil Seed Exports

I/O Sectors	Transportation		Terminal	Trader	Maritime
	Truck	Rail	Handling	Margins	Activity
Transportation	0	54,567	0	0	0
Comm and Pub Util	0	0	4,828	0	1,083
Ag Proc and Misc Mnfg	0	0	3,221	5,151,639	0
Retail Trade	1,175,099	86,195	4,831	0	62,905
FIRE	150,150	1,146	2,897	0	0
Bus and Pers Serv	0	0	0	0	41,576
Prof and Social Serv	0	0	0	0	433
Households	538,674	43,413	12,878	0	38,436
Government	41,539	5,673	0	0	2,598
Total	1,905,463	190,994	28,655	5,151,639	147,030

I/O Sectors	U.S.	N. Dakota	S. Dakota	Minnesota	Kansas	Colorado	Nebraska	Texas	Other
Transportation	54,567	25,479	17,373	11,054	464	196	0	0	0
Comm and Pub Util	5,911	0	0	0	0	0	0	2,283	3,628
Ag Proc and Misc Mnfg	5,154,859	0	0	0	0	0	0	1,360	5,153,499
Retail Trade	1,329,030	633,020	299,579	144,397	85,730	31,544	22,756	35,535	76,470
FIRE	154,193	76,278	35,138	16,452	10,870	3,995	2,908	3,688	4,865
Bus and Pers Serv	41,576	0	0	0	0	0	0	9,388	32,188
Prof and Social Serv	433	0	0	0	0	0	0	98	335
Households	633,400	292,003	138,571	66,983	39,332	14,474	10,431	22,959	48,647
Government	49,810	23,603	11,426	5,636	3,053	1,124	804	1,269	2,895
Total	7,423,780	1,050,383	502,086	244,522	139,449	51,333	36,899	76,580	5,322,527
Total tons exported	42,271								
Direct Impact per ton	$175.62								

Value of Oil Sunflower Exports

	N. Dakota	S. Dakota	Minnesota	Kansas	Colorado	Nebraska	Texas	Other
Oil seeds exported (lbs)	28,648,882	13,425,874	6,764,904	3,281,656	1,725,703	1,164,706	718,094	1,360,435
Oil seeds exported (tons)	14,324	6,713	3,382	1,641	863	582	359	680
Value of oil seeds at export ($/ton)	$260.71	$260.71	$260.71	$260.71	$260.71	$260.71	$260.71	$260.71
Hybrid seed exports (tons)	7,545	3,536	1,782	864				
Value of hybrid seeds at export ($/ton)	$612.56	$612.56	$612.56	$612.56				
Value of oil seed exports	$8,356,019	$3,915,924	$1,973,119	$957,160	$224,952	$151,824	$93,606	$177,338
less								
Value of grain at farm level--non hybrid seeds	$2,666,692	$1,296,394	$686,871	$324,024	$172,385	$110,367	$75,493	$156,231
Local elevator margins	$57,298	$26,852	$13,530	$6,563	$3,451	$2,329	$1,436	$2,721
Value of hybrid seeds	$1,434,718	$696,950	$368,899	$174,119				
Value added through export	$4,197,311	$1,895,730	$903,819	$452,454	$49,115	$39,127	$16,677	$18,386
less								
Transportation costs (local elevator to port)								
Truck expense	$961,200	$441,279	$205,830	$137,824	$50,647	$36,899	$31,280	$40,504
Rail expense	$89,183	$60,808	$38,691	$1,626	$686	$0	$0	$0
Shrinkage/loss 2%								
Handling expenses at terminal elevators							$12,100	$16,555
Maritime activity							$33,200	$113,830

Sunflower Handling

		U.S.	N. Dakota	Minnesota	S. Dakota	Kansas	Nebraska	Texas	Colorado	Other
Pounds of Oil Seeds		2,500,619,333	1,293,700,000	305,483,333	606,273,333	148,190,000	34,450,000	21,240,000	51,043,333	40,239,333
Less--Hybrid Seed Production		10,439,600	5,400,946	1,275,334	2,531,074	618,664	143,822	88,673	213,096	167,991
Oil Sunflower for Birdfood		516,305,967	267,111,839	63,073,522	125,178,005	30,596,973	7,112,934	4,385,449	10,538,980	8,308,265
Less--Birdfood not handled	50%	258,152,983	133,555,920	31,536,761	62,589,003	15,298,486	3,556,467	2,192,725	5,269,490	4,154,132
Sub total (no seed or direct birdfood)		2,232,026,749	1,154,743,134	272,671,239	541,153,257	132,272,849	30,749,711	18,958,603	45,560,747	35,917,209
Oilseeds Crushed		1,849,853,883	957,025,300	225,983,828	448,495,725	109,624,781	25,484,673	15,712,466	37,759,729	29,767,380
Less--Oilseeds shipped direct	5%	92,492,694	47,851,265	11,299,191	22,424,786	5,481,239	1,274,234	785,623	1,887,986	1,488,369
Total Pounds in Elevator System		2,139,534,055	1,106,891,869	261,372,047	518,728,471	126,791,610	29,475,477	18,172,979	43,672,761	34,428,840

Country/Local Elevators		**Elevator Expenditures**							
Handling Budget	$/cwt	N. Dakota	Minnesota	S. Dakota	Kansas	Nebraska	Texas	Colorado	Other
Labor	$0.0714	$790,637	$186,694	$370,520	$90,565	$21,054	$12,981	$31,195	$24,592
Taxes & Licenses	$0.0102	$112,948	$26,671	$52,931	$12,938	$3,008	$1,854	$4,456	$3,513
Insurance	$0.0184	$203,307	$48,007	$95,277	$23,288	$5,414	$3,338	$8,022	$6,324
Utilities	$0.0122	$135,538	$32,005	$63,518	$15,526	$3,609	$2,225	$5,348	$4,216
Supplies	$0.0000	$0	$0	$0	$0	$0	$0	$0	$0
Services	$0.0082	$90,359	$21,336	$42,345	$10,350	$2,406	$1,484	$3,565	$2,811
Interest	$0.0204	$225,896	$53,341	$105,863	$25,876	$6,015	$3,709	$8,913	$7,026
Equipment Depr & Repairs	$0.0286	$316,255	$74,678	$148,208	$36,226	$8,422	$5,192	$12,478	$9,837
General Expense	$0.0306	$338,844	$80,012	$158,794	$38,814	$9,023	$5,563	$13,369	$10,539
Total	$0.2000	$2,213,784	$522,744	$1,037,457	$253,583	$58,951	$36,346	$87,346	$68,858
Overhead charge on seeds delivered direct to crushing plants by producers	$0.0500	$23,926	$5,650	$11,212	$2,741	$637	$393	$944	$744
Total		$2,237,709	$528,394	$1,048,669	$256,324	$59,588	$36,739	$88,290	$69,602
Only oilseeds crushed	$3,560,969	$1,842,274	$435,019	$863,354	$211,028	$49,058	$30,246	$72,687	$57,302

0.1925 $/cwt average for oilseeds crushed

	Direct Impacts								
I/O Sectors	U.S.	N. Dakota	Minnesota	S. Dakota	Kansas	Nebraska	Texas	Colorado	Other
Comm and Pub Util	261,984	135,538	32,005	63,518	15,526	3,609	2,225	5,348	4,216
Retail Trade	1,266,255	655,099	154,690	307,003	75,040	17,445	10,755	25,847	20,376
FIRE	829,615	429,203	101,348	201,140	49,164	11,429	7,047	16,934	13,350
Bus and Pers Service	220,902	114,284	26,986	53,558	13,091	3,043	1,876	4,509	3,555
Households	1,528,239	790,637	186,694	370,520	90,565	21,054	12,981	31,195	24,592
Government	218,320	112,948	26,671	52,931	12,938	3,008	1,854	4,456	3,513
Total	4,325,314	2,237,709	528,394	1,048,669	256,324	59,588	36,739	88,290	69,602

Retail Sunflower Oil Information

	Year 1991				Year 1992				Year 1993			
Month	Total Ounce	Total Value	Value/Oz $/ounce	Value/lb $/lb	Total Ounce	Total Value	Value/Oz $/ounce	Value/lb $/lb	Total Ounce	Total Value	Value/Oz $/ounce	Value/lb $/lb
JAN	23,945,742	1,438,018	0.06005	0.96	18,591,913	979,216	0.05267	0.84	15,273,958	748,014	0.04897	0.78
FEB	24,693,171	1,449,338	0.05869	0.94	17,376,113	912,876	0.05254	0.84	15,680,751	759,547	0.04844	0.78
MAR	25,182,259	1,493,926	0.05932	0.95	20,936,103	1,080,061	0.05159	0.83	18,060,153	877,127	0.04857	0.78
APR	17,621,490	1,034,027	0.05868	0.94	18,406,456	920,488	0.05001	0.80	15,749,600	732,112	0.04648	0.74
MAY	17,378,036	996,139	0.05732	0.92	17,668,770	904,158	0.05117	0.82	14,840,212	675,071	0.04549	0.73
JUN	21,888,577	1,211,716	0.05536	0.89	20,248,600	1,046,944	0.05170	0.83	16,773,389	798,384	0.04760	0.76
JUL	21,080,712	1,133,544	0.05377	0.86	16,486,636	850,772	0.05160	0.83	14,495,149	675,262	0.04659	0.75
AUG	21,523,611	1,136,310	0.05279	0.84	17,898,873	903,988	0.05051	0.81	16,406,686	750,157	0.04572	0.73
SEP	22,925,555	1,236,328	0.05393	0.86	20,520,845	1,059,012	0.05161	0.83	20,280,404	914,019	0.04507	0.72
OCT	17,337,729	922,017	0.05318	0.85	15,267,867	788,884	0.05167	0.83	15,736,626	724,221	0.04602	0.74
NOV	17,322,186	931,169	0.05376	0.86	17,163,702	845,122	0.04924	0.79	15,652,258	732,110	0.04677	0.75
DEC	24,177,751	1,259,516	0.05209	0.83	20,174,126	998,031	0.04947	0.79	18,575,922	880,582	0.04740	0.76
Total/Average	255,076,820	14,242,048	0.05583	0.89	220,740,001	11,289,552	0.05114	0.82	197,525,107	9,266,606	0.04691	0.75

1991	255,076,820	14,242,048		
1992	220,740,001	11,289,552		
1993	197,525,107	9,266,606		
Total/Avg	673,341,929	34,798,206	0.05168	0.827

Three-year weighted average value for retail sunflower oil: $0.83 per pound

Crude Sunflower Oil Export Price

	Years		
	1991	1992	1993
$/mt--crude sunflower oil FOB-New Orleans	$537.51	$512.57	$616.91
Tons Exported (000s mt)	154.5	253.8	252.1

558.24 Weighted average export price of crude sunflower oil ($/mt)
506.43 $/short ton

Sunflower Oil Assistance Program (SOAP)

Fiscal Year*	Quantity mt	SOAP Bonus $/mt
1992	241,760	87.72
1993	129,540	126.41
1994*	100,535	109.38
Weighted Average		$102.96

Percent of all crude sunflower oil exports in SOAP program**	75.98%
Average SOAP payment ($/mt) for all crude sunflower oil exports	$78.23

* Fiscal years were from October to September. Sales in 1994 reflect only sales from October 1993 through December 1993.

** Total SOAP tons divided by total crude sunflower oil exports. SOAP sales prior to September, 1991 were not included.

Oil Sunflower-Handling (country elevators)

I/O Sectors	North Dakota	South Dakota	Minnesota	Kansas	Colorado	Nebraska	Texas	Other	U.S.
Comm and Pub Util	135,538	32,005	63,518	15,526	3,609	2,225	5,348	4,216	261,984
Retail Trade	655,099	154,690	307,003	75,040	17,445	10,755	25,847	20,376	1,266,255
Fin, Ins, and R Estate	429,203	101,348	201,140	49,164	11,429	7,047	16,934	13,350	829,615
Bus and Pers Service	114,284	26,986	53,558	13,091	3,043	1,876	4,509	3,555	220,902
Households	790,637	186,694	370,520	90,565	21,054	12,981	31,195	24,592	1,528,239
Government	112,948	26,671	52,931	12,938	3,008	1,854	4,456	3,513	218,320
Total	2,237,709	528,394	1,048,669	256,324	59,588	36,739	88,290	69,602	4,325,314

Oil Sunflower-Transportation--Country elevators to crushing plants

	North Dakota	South Dakota	Minnesota	Kansas	Colorado	Nebraska	Texas	Other	U.S.
Construction	0	0	0	0	0	0	0	0	0
Transportation	77,980	263,553	155,116	101,783	46,314	46,768	4,602	65,060	761,177
Comm and Publ Utilities	0	0	0	0	0	0	0	0	0
Ag Proc and Misc Manuf	0	0	0	0	0	0	0	0	0
Retail Trade	3,011,504	2,724,309	1,089,741	535,942	289,803	220,414	128,070	372,626	8,372,410
FIRE	370,699	300,443	111,193	50,075	28,655	19,706	15,532	35,848	932,150
Bus and Pers Service	0	0	0	0	0	0	0	0	0
Prof and Soc Service	0	0	0	0	0	0	0	0	0
Households	1,386,070	1,267,682	510,633	252,955	136,158	104,382	59,037	175,465	3,892,382
Government	110,207	108,984	45,985	23,843	12,473	10,042	4,749	16,303	332,585
Totals	4,956,461	4,664,972	1,912,669	964,597	513,403	401,313	211,990	665,301	14,290,704

Transportation of Sunflower from Elevators to Crushing Plants

	Truck	Railroad
Percent of transportation costs	81.4	18.6
Percent of sunflower shipped	88.2	11.8

Sunflower Oil Industry--Direct Impacts by State and Economic Sector

Oil Sunflower-Summary by State

I/O Sectors	North Dakota	South Dakota	Minnesota	Kansas	Colorado	Nebraska	Texas	Other	U.S.
Construction	1,981,983	0	450,827	174,398	0	0	0	358,102	2,965,309
Transportation	19,209,437	280,926	4,844,766	2,099,651	46,510	46,768	4,602	6,530,488	33,063,149
Comm and Publ Utilities	2,935,465	32,005	673,854	251,627	3,609	2,225	7,631	6,492,417	10,398,833
Ag Proc and Misc Manuf	1,672,246	0	373,311	144,411	0	0	1,360	33,544,753	35,736,081
Retail Trade	11,424,331	3,178,578	3,088,344	1,367,050	338,791	253,925	189,451	61,030,619	80,871,090
FIRE	1,754,764	436,929	535,325	190,259	44,079	29,661	36,155	7,160,167	10,187,338
Bus and Pers Service	3,270,709	26,986	843,501	318,672	3,043	1,876	13,897	5,777,620	10,256,305
Prof and Soc Service	1,238,046	0	309,840	119,858	0	0	98	393,359	2,061,201
Households	17,236,886	1,592,947	3,698,339	1,483,189	171,686	127,794	113,191	28,506,603	52,930,637
Government	1,604,675	147,080	438,043	173,754	16,605	12,701	10,474	325,094	2,728,426
Total	62,328,543	5,695,452	15,256,148	6,322,871	624,324	474,951	376,859	150,119,222	241,198,370

Oil Sunflower-Summary by Industry Activity

I/O Sectors	Oil Seed Handling	Transportation Elev to Crsh	Crushing	Refining	Domestic Use Oil	Domestic Use Meal	Exports Oil	Exports Meal	Exports Seeds	All Industry Activities
Construction	0	0	2,521,212	444,097	0	0	0	0	0	2,965,309
Transportation	0	761,177	19,136,065	0	5,583,430	0	7,527,832	127,185	54,567	33,190,257
Comm and Publ Utilities	261,984	0	3,359,373	888,194	5,583,430	0	288,487	11,454	5,911	10,398,833
Ag Proc and Misc Manuf	0	0	2,067,865	444,097	27,304,732	0	752,379	12,149	5,154,859	35,736,081
Retail Trade	1,266,255	8,372,410	1,820,717	915,109	56,098,693	7,513,661	3,413,795	64,297	1,329,030	80,793,966
FIRE	829,615	932,150	612,529	0	6,087,599	960,072	584,722	10,554	154,193	10,171,435
Bus and Pers Service	220,902	0	4,406,511	0	5,583,430	0	3,855	31	41,576	10,256,305
Prof and Soc Service	0	0	1,715,881	0	0	0	342,132	2,754	433	2,061,201
Households	1,528,239	3,892,382	12,004,946	8,631,410	18,559,028	3,444,320	4,078,624	125,324	633,400	52,897,673
Government	218,320	332,585	1,512,370	0	139,478	265,604	205,665	3,477	49,810	2,727,309
Total	4,325,314	14,290,704	49,157,471	11,322,907	124,939,820	12,183,656	17,197,491	357,226	7,423,780	241,198,370

Direct Impacts--Domestic Consumption Activity--sunflower oil and meal

	Sunflower Oil				Sunflower Meal
	Transp-ortation	Bottling	Distribution	Retailing	Transp-ortation
Construction	0	0	0	0	0
Transportation	0	0	5,583,430	0	0
Comm and Pub Util	0	0	5,583,430	0	0
Ag Proc and Misc Mnfg	0	27,304,732	0	0	0
Retail Trade	3,945,696	0	16,750,291	35,402,706	7,513,661
FIRE	504,169	0	5,583,430	0	960,072
Bus and Pers Serv	0	0	5,583,430	0	0
Prof and Social Serv	0	0	0	0	0
Households	1,808,737	0	16,750,291	0	3,444,320
Government	139,478	0	0	0	265,604
Total	6,398,079	27,304,732	55,834,303	35,402,706	12,183,656

Direct Impacts--Exports--oil sunflower, sunflower oil, and sunflower meal

	All Export Activities				Oil Exports			Meal Exports			Seed Exports		
	Maritime Activity	Transp-ortation	Trdr Margins & Handling	Total	Maritime Activity	Transp-ortation	Trdr Margins & Handling	Maritime Activity	Transp-ortation	Trdr Margins & Handling	Maritime Activity	Transp-ortation	Trdr Margins & Handling
Construction	0	0	0	0	0	0	0	0	0	0	0	0	0
Transportation	9,715	7,699,869	0	7,709,584	9,638	7,518,195	0	78	127,108	0	0	54,567	0
Comm and Pub Util	1,083	0	304,769	305,852	0	0	288,487	0	0	11,454	1,083	0	4,828
Ag Proc and Misc Mnfg	564,448	0	5,354,939	5,919,387	559,941	0	192,439	4,508	0	7,641	0	0	5,154,859
Retail Trade	62,905	4,439,267	304,950	4,807,122	0	3,125,137	288,658	0	52,836	11,461	62,905	1,261,294	4,831
FIRE	373,061	193,547	182,862	749,470	370,081	41,548	173,092	2,979	702	6,873	0	151,296	2,897
Bus and Pers Serv	45,462	0	0	45,462	3,855	0	0	31	0	0	41,576	0	0
Prof and Social Serv	345,320	0	0	345,320	342,132	0	0	2,754	0	0	433	0	0
Households	61,752	2,182,693	2,592,904	4,837,349	23,130	1,573,994	2,481,500	186	26,611	98,527	38,436	582,087	12,878
Government	2,598	256,354	0	258,952	0	205,665	0	0	3,477	0	2,598	47,212	0
Total	1,466,343	14,771,730	8,740,424	24,978,497	1,308,777	12,464,540	3,424,175	10,537	210,734	135,955	147,030	2,096,456	5,180,294

APPENDIX D

U.S. Confection Sunflower Industry Impacts

Overall Strategy

The impacts from the U.S. confection sunflower industry were based on impacts from exports and domestic consumption of sunflower products. The confection portion of the U.S. sunflower industry presented unique problems since virtually no documented quantities or prices for the various confection products were found. Thus, nearly all information used to estimate the direct impact from the confection industry, especially those products consumed domestically, came from industry sources. Generally, the impacts from the industry were determined by placing values on confection products in their final use and then subtracting the value of unprocessed confection sunflower.

A critical part of the analysis of the confection industry was estimating quantities of confection products. The process of estimating the quantities of confection products in their final use was explained in Appendix A.

Primary Processing

All confection sunflower, except hybrid seed, was assumed to undergo some initial processing. The direct impact associated with the primary processing stage of the confection industry was estimated from industry information and from a survey of confection processors (Appendix F). The proportion of confection sunflower processed into kernel, whole seed, and birdfood was estimated to be about 55, 30, and 15 percent, respectively. The proportion of confection products produced, along with adjustments for shrink and in-shell to kernel yield, were combined with industry estimates of prices to estimate gross revenue. Prices for kernel, whole seed, and birdfood were based on average crop quality, sunflower quantity, and typical market and industry forces during 1991 through 1993. The average cost of sunflower purchases, obtained from a survey of processors, was subtracted from the estimated gross revenue to determine an average direct impact for primary processing.

The direct impact from primary processing was allocated to economic sectors according to information obtained from a survey of confection processors. Expenditures that were reported to be purchased from out-of-state entities were allocated to the 'other states' category, even though some of the inputs for a North Dakota firm may be purchased from firms in Minnesota or South Dakota. The same situation exists for processors in the neighboring states. Thus, the state-by-state impact for confection processing may be understated by the amount of the expenditures reported as out-of-state expenditures that actually were spent in neighboring states.

Secondary Processing

Secondary processing in the confection industry included salting, roasting, and some consumer packaging. The amount of confection products (whole seed and kernel) that underwent secondary processing was determined by applying industry information to the amount of whole seed and kernel consumed domestically. All of the whole seed consumed domestically were assumed to undergo secondary processing. About 90 percent of the kernels was assumed to be secondary processed. The value of whole seed and kernel that underwent secondary processing was determined from industry information. The direct impact was estimated by subtracting the purchasing value of whole seed and kernel (selling values for primary processing) from the selling value of secondary processing. Although whole seed and kernel may not be actually purchased by another firm before being salted and roasted, the term (purchased) is used to distinguish the beginning value of the products as they enter the next processing stage.

Direct impacts were allocated to economic sectors based on a processing budget developed from industry sources. State-by-state impacts also were allocated based on industry information (i.e., the portion of secondary processing occurring in the various sunflower-producing states).

Domestic Consumption

Domestic consumption was defined to include transportation, additional retail packaging, retail margins, and distribution and marketing activity. Transportation expenses were for product movement from the secondary processing phase to the first phase of product distribution and were estimated based on industry information. Additional retail packaging was considered packaging that occurred beyond the packaging that occurred at the secondary processing stage. Retail margin was the amount of product value that retail establishments receive from selling the product, usually based on a percentage of the retail price. Distribution and marketing impacts were the residual of the direct impact from domestic consumption less the direct impacts from the other components of domestic consumption. Direct impact from domestic consumption was equal to the retail price less the value of the product after secondary processing.

Retail prices of sunflower products (kernel and whole seed packaged in a variety of containers for different uses) were estimated from information obtained from a marketing research firm (Nielson Marketing Research 1994). Three years

(1991 through 1993) of point-of-sale information were gathered for whole seed, kernel, and meats sold by the bag, jar, and can for numerous brands from grocery stores and supermarkets throughout the United States. Price, container size, and units sold were used to determine an average monthly price for whole seed and kernel by container type. Monthly prices were then averaged for each year, and subsequently averaged across all container types to arrive at an overall weighted average value for whole seed and kernel. The average price of meats was included in the calculations for kernel values.

Kernels that went into the baking industry were assumed to only incur primary processing. The direct impact from kernels used for baking was equal to the impacts from primary processing plus additional transportation charges to move the product from the plant to the baker. Other kernel use, (i.e., granola bars, breakfast cereal, and miscellaneous uses) was not estimated as a separate domestic use since estimates of kernels in the other uses were not available. Thus, their use was inherently included within the quantities for kernel used for baking and direct consumption.

Exports

The direct impacts from exports of confection sunflower products were estimated as the difference in the value of the confection product at the point of export and the value of the product at the primary processing phase. According to industry information, an extremely small amount of confection exports incurs any secondary processing, thus, all confection exports were assumed to only go through the primary processing stage before being exported.

Confection export values at point of export were assumed to represent f.o.b. values. Extra maritime activity (i.e., the amount not represented by f.o.b. values) was added to the direct impact of the product. Industry sources suggested that about $5,000 of maritime activity would be incurred for every 20,000-short tons of cargo. Separate impacts were generated for all classes of confection exports. Transportation expenses to move products from the processing plant to ports of export were based on typical expenses reported by industry contacts.

Primary and Secondary Confection Processing--Direct Impact Margins

Primary Processing Impact Margin*

Products	Selling Price $/lb	Selling Price $/ton	Allocation of outputs (in-shell basis)
kernel	0.430	$860	(0.55 x 0.40 x 0.98 x $860)
whole seed	0.220	$440	(0.3 x 0.98 x $440)
birdfood	0.145	$290	(0.15 x 0.98 x $290)

Weighted Averages ($/ton)	
Total Revenue	$357.41
Seed Cost	$237.97
Direct Impact	$119.44 (in-shell basis)

*assuming 2% shrink and 40% in-shell to kernel yield

Secondary Processing Impact Margin

	Input Price $/lb	Input Price $/ton	Selling Price $/lb	Selling Price $/ton
kernel	0.43	$860	0.56	$1,120
whole seed	0.22	$440	0.34	$685

	Direct Impacts $/lb	Direct Impacts $/ton
kernel	0.1300	$260
whole seed	0.1225	$245

Exports	Total Tons Available	Quantity Secondary Processed Percent	Quantity Secondary Processed Tons
kernel	33,640	0%	0
whole seed	32,485	0%	0
Domestic Consumption			
whole seed	45,351	100%	45,351
kernel	23,439	90%	21,095
		Total	66,446

Domestic Allocation of Kernel

retail uses	90%	(salted and roasted)
baking uses	10%	(not salted or roasted)

Allocation of Direct Impacts--Primary Processing

266,105 tons of confection sunflower--primary processed

I/O Sectors	Direct Impacts (in-shell basis) In-state	Outstate	U.S.
Construction	8.14%	1.05%	2,213,953
Transportation	23.22%	86.52%	10,719,201
Comm and Publ Utilities	2.50%	0.02%	664,142
Ag Proc and Misc Mnfg	5.79%	6.58%	1,882,346
Retail Trade	3.06%	0.10%	817,079
FIRE	4.46%	2.37%	1,306,320
Bus and Pers Service	3.46%	0.44%	939,073
Prof and Soc Service	1.46%	0.05%	388,490
Households	45.77%	2.81%	12,279,843
Government	2.14%	0.07%	572,032
Sub-total	100.00%	100.00%	31,782,479
% in-state vs outstate impacts	83.40%	16.60%	U.S. production only
$/ton in-state vs outstate	$99.61	$19.83	25,638,611
Total Direct Impact--$/ton	$119.44		

Allocation of Direct Impacts--Secondary Processing

Value of Seed Inputs		Purchase Value	Component Value ($/ton)		
kernel contribution	31.75%	$860	$273		
whole seed contribution	68.25%	$440	$300		$/ton
				composite value	$573.34

Value of Seed Outputs		Selling Value	Component Value ($/ton)		
kernel contribution	31.75%	$1,120	$356		
whole seed contribution	68.25%	$685	$468		
				composite value	$823.10
				composite direct impact	$249.76

Secondary Processing Budget (composite values for kernel and whole seed)

	$/ton
Total Revenue	823.10
Expenses	
Vegetable oil	32.00
Salary/benefits	104.00
Energy	24.00
Supplies	32.00
Maintenance	8.00
Depreciation	12.00
Communications	4.00
Interest	0.80
Property Tax	0.20
Purchase of Seeds	573.34
Total (excldng seed)	217.00
Total Expenses	790.34
Returns	32.76
Direct Impact*	$249.76

*net returns plus expenses (less seed purchases)

Total product processed (tons) 66,446

Allocation of Direct Impacts		Total Impact
I/O Sectors	$/ton	U.S.
Construction	$4.00	265,785
Transportation	$0.00	0
Comm and Publ Utilities	$28.00	1,860,495
Ag Proc and Misc Mnfg	$0.00	0
Retail Trade	$80.00	5,315,701
FIRE	$0.80	53,157
Bus and Pers Service	$0.00	0
Prof and Soc Service	$0.00	0
Households	$136.76	9,087,337
Government	$0.20	13,289
Total Direct Impact	$249.76	16,595,765

Supplemental Information--Confection Industry

Domestic Information

68,790	kernel and whole seed for domestic consumption (tons)	
45,351	whole seed (tons)	
23,439	kernel (tons)	
whole seed		kernal
100%	retail	90%
0%	baking	10%
45,351	whole seed--secondary processed (tons)	
21,095	kernel--secondary processed (tons)	
2,344	kernel--not secondary processed (tons)	
$1.87	retail value of whole seed ($/lb)	
$2.42	retail value of kernel ($/lb)	
$0.45	baking value of kernel ($/lb)	
$357.41	average value of primary processing ($/ton--in-shell basis)	
$95,107,409	gross revenue--primary processing (kernel, whole seed, birdfood)	
$823.10	average value of secondary processing ($/ton)	
$54,692,165	gross revenue--secondary processing (kernel & whole seed)	
$169,612,435	gross revenue--whole seed (retail)	
$102,101,468	gross revenue--kernel (retail)	
$2,109,534	gross revenue--kernel (baking)	
$273,823,438	final value/gross revenue--all domestic products	
0.05	value of additional packaging--whole seed and kernel ($/lb)	
70%	amount of kernel and whole seed incurring additional packaging	
45%	retail margin as a % of retail selling price	
$1.09	retail margin on kernel ($/lb)	
$0.84	retail margin on whole seed ($/lb)	

Export Information

33,640	kernel (tons)
32,485	whole seed (tons)
719	hybrid seed (tons)
1,509	other confection exports (tons)
$566.47	$/ton at export--whole seed
$1,007.58	$/ton at export--kernel
$1,696.63	$/ton at export--hybrid seed
$300.61	$/ton at export--other confection exports
$33,895,177	gross revenue--exports of kernel
$18,401,719	gross revenue--exports of whole seed
$1,219,557	gross revenue--exports of hybrid seed
$453,589	gross revenue--exports of other confection exports
$53,970,043	gross revenue--all confection exports

Total Direct Impacts

Whole seed-Retail

		Total $	$/ton
Primary Processing		9,162,246	202.03
Secondary Processing		11,110,975	245.00
Retail		138,547,056	3,055.00
transportation		2,267,546	50.00
additional retail packaging		3,174,564	70.00
retail margin		76,325,596	1,683.00
wholesale distribution/marketing		56,779,350	1,252.00
Total Direct Impacts		158,820,277	3,502.03
Total Tons	45,351		
		$/lb	1.75

Kernel-Retail

		Total $	$/ton
Primary Processing		5,591,849	265.07
Secondary Processing		5,484,790	260.00
Retail		78,474,682	3,720.00
transportation		1,054,767	50.00
additional retail packaging		1,476,674	70.00
retail margin		45,945,661	2,178.00
wholesale distribution/marketing		29,997,580	1,422.00
Total Direct Impacts		89,551,320	4,245.08
Total Tons	21,095		
		$/lb	2.12

Kernel-Baking

		Total $	$/ton
Primary Processing		621,317	265.07
Transportation		70,318	30.00
Total Direct Impacts		691,634	295.08
Total Tons	2,344		
		$/lb	0.15

Total Direct Impacts

Whole seed & Kernel-Exported

		Total $	$/ton
Primary Processing		15,480,055	234.10
Secondary Processing		0	0.00
Transportation/Handling/Margins		9,073,072	137.21
Total Direct Impact		24,553,127	371.31
Total Tons	66,125		
Maritime Activity		16,531	0.25
		$/lb	0.19

Other Nonoils-Exported

		Total $	$/ton
Primary Processing		35,927	23.81
Transportation/Handling/Margins		58,591	38.83
Total Direct Impact		94,518	62.64
Total tons	1,509		
Maritime Activity		377	0.25
		$/lb	0.03

Hybrid Seed-Exported

Transportation/Handling		98,629	137.21
Distribution/Marketing/Margins		949,872	1,321.45
Total Direct Impact		1,048,502	1,458.66
Total Tons	719		
Maritime Activity		180	0.25
		$/lb	0.73

Direct Impacts by Product Category---Confection Industry

	Total Direct Impacts
Domestic Consumption	$249,063,232
Exports	$25,713,235
Primary Processing (brdfd)	$891,086
Grand Total	$275,667,552

Sunflower Product	Gross Revenue of Sunflower Product	Value of Seeds in Previous Stage	Direct Impacts
Whole seed--retail	$169,612,435	$10,792,158	$158,820,277
Kernel--retail	$102,101,468	$12,550,148	$89,551,320
Kernel--baking	$2,086,095	$1,394,461	$691,634
Kernel--export	$33,895,177	$20,013,385	$13,881,792
Whole seed--export	$18,401,719	$7,730,384	$10,671,335
Hybrid Seed--export	$1,219,557	$171,056	$1,048,502
Other confection--export	$453,589	$359,071	$94,518
Birdfood processing	na	na	$891,086
Maritime activity	na	na	$17,088
Gross Revenue All Conf	$327,770,041	$53,010,663	$275,667,552

Total Direct Impacts, by Industry Activity and Product Category

	Primary Processing	Tonnage		Average Impact
		Actual	In-shell equiv	
Whole seed--retail	$9,162,246	45,351	45,351	$202.03
Kernel--retail	$5,591,849	21,095	52,738	$265.07
Kernel--baking	$621,317	2,344	5,860	$265.07
Kernel--export	$8,917,171	33,640	84,100	$265.07
Whole seed--export	$6,562,884	32,485	32,485	$202.03
Hybrid seed--export	not part of the primary processing stage			
Other conf--export	$35,927	1,509	1,509	$23.81
Confection Total	$30,891,393		222,043	$139.12
Grand Total*	$31,782,479		266,105	$119.44
* includes conf birdfood	$891,086		37,409	$23.82

	Secondary Processing	Tons	Average Impact
Whole seed--retail	$11,110,975	45,351	$245.00
Kernel--retail	$5,484,790	21,095	$260.00
Kernel--baking	---		
Kernel--export	---		
Whole seed--export	---		
Hybrid seed--export	---		
Other conf--export	---		
Total	$16,595,765	66,446	$249.76

	Transportation	Tons	Average Impact
Whole seed--retail	$2,267,546	45,351	$50.00
Kernel--retail	$1,054,767	21,095	$50.00
Kernel--baking	$70,318	2,344	$30.00
Kernel--export	$4,964,621	66,125	$75.08
Whole seed--export	$4,108,451	32,485	$126.47
Hybrid seed--export	$98,629	719	$137.21
Other conf--export	$58,591	1,509	$38.83
Total	$12,622,923	169,627	$74.42

Total Direct Impacts, by Industry Activity and Product Category

	Marketing/Distribution Margins	Tons	Average Impact
Whole seed--retail	$56,779,350	45,351	$1,252.00
Kernel--retail	$29,997,580	21,095	$1,422.00
Kernel--baking	---		
Kernel--export	---		
Whole seed--export	---		
Hybrid seed--export	$949,872	719	$1,321.45
Other conf--export	---		
Total	$87,726,803	67,165	$1,306.14

	Additional Retail Packaging	Tons	Average Impact
Whole seed--retail	$3,174,564	45,351	$70.00
Kernel--retail	$1,476,674	21,095	$70.00
Kernel--baking	---		
Kernel--export	---		
Whole seed--export	---		
Hybrid seed--export	---		
Other conf--export	---		
Total	$4,651,238	66,446	$70.00

	Retail Margins	Tons	Average Impact
Whole seed--retail	$76,325,596	45,351	$1,683.00
Kernel--retail	$45,945,661	21,095	$2,178.00
Kernel--baking	---		
Kernel--export	---		
Whole seed--export	---		
Hybrid seed--export	---		
Other conf--export	---		
Total	$122,271,257	66,446	$1,840.15

	Maritime Activity	Tons	Average Impact
Whole seed--retail	---		
Kernel--retail	---		
Kernel--baking	---		
Whl. seed/kernel--export	$16,531	66,125	$0.25
Hybrid seed--export	$180	719	$0.25
Other conf--export	$377	1,509	$0.25
Total	$17,088	68,353	$0.25

Allocation of Direct Impacts--Industry Activities

I/O Sectors	Transportation		Marketing/Distribution		Additional	Retail	Maritime
	Domestic	Export	Domestic	Export	Packaging	Margins	Activity
Construction							
Transportation			8,677,693	94,987			
Comm and Publ Utilities			8,677,693	94,987			126
Ag Proc and Misc Mftrg					4,651,238		
Retail Trade	2,092,236	5,692,321	26,033,079	284,962		122,271,257	7,311
FIRE	267,339	727,347	8,677,693	94,987			
Bus and Pers Service			8,677,693	94,987			4,832
Prof and Soc Service							50
Households	959,097	2,609,404	26,033,079	284,962			4,467
Government	73,959	201,220					302
Total Direct Impact	3,392,631	9,230,292	86,776,930	949,872	4,651,238	122,271,257	17,088

Confection Industry--Summary of Direct Impacts

Confection Sunflower-Summary by State

I/O Sectors	North Dakota	Minnesota	Kansas	Other States	U.S.
Construction	1,401,328	632,614	323,754	122,042	2,479,738
Transportation	3,723,579	1,569,776	923,058	13,275,467	19,491,881
Comm and Publ Utilities	1,173,525	848,345	99,495	9,176,077	11,297,443
Ag Proc and Misc Manuf	920,946	383,728	230,237	4,998,675	6,533,585
Retail Trade	4,415,188	2,869,062	548,717	154,680,978	162,513,945
FIRE	979,687	436,233	231,770	9,479,153	11,126,843
Bus and Pers Service	580,835	260,300	137,372	8,738,078	9,716,585
Prof and Soc Service	231,495	96,456	57,874	2,716	388,540
Households	11,790,831	6,633,713	2,015,465	30,818,180	51,258,188
Government	406,697	171,894	100,345	181,867	860,803
Total	25,624,112	13,902,121	4,668,087	231,473,232	275,667,552

Confection Sunflower-Summary by Industry Activity

I/O Sectors	Primary Processing	Secondary Processing	Exports	Domestic Consumption	U.S.
Construction	2,213,953	265,785	0	0	2,479,738
Transportation	10,719,201	0	94,987	8,677,693	19,491,881
Comm and Publ Utilities	664,142	1,860,495	95,113	8,677,693	11,297,443
Ag Proc and Misc Manuf	1,882,346	0	0	4,651,238	6,533,585
Retail Trade	817,079	5,315,701	5,984,594	150,396,571	162,513,945
FIRE	1,306,320	53,157	822,334	8,945,032	11,126,843
Bus and Pers Service	939,073	0	99,819	8,677,693	9,716,585
Prof and Soc Service	388,490	0	50	0	388,540
Households	12,279,843	9,087,337	2,898,832	26,992,176	51,258,188
Government	572,032	13,289	201,522	73,959	860,803
Total	31,782,479	16,595,765	10,197,253	217,092,056	275,667,552

Retail Price Information--Confection Sunflower Products

Kernel--Cans

1991	Total oz	Total Value	$/oz	$/lb	1992	Total oz	Total Value	$/oz	$/lb	1993	Total oz	Total Value	$/oz	$/lb
Jan	2,538	514	0.203	3.24	Jan	2,163	473	0.219	3.50	Jan	43,775	6,247	0.143	2.28
h	2,600	532	0.205	3.27	Feb	2,888	621	0.215	3.44	Feb	41,218	5,940	0.144	2.31
Mar	3,363	692	0.206	3.29	Mar	3,513	760	0.216	3.46	Mar	61,812	8,676	0.140	2.25
Apr	4,494	950	0.211	3.38	Apr	5,655	1,054	0.186	2.98	Apr	48,933	7,000	0.143	2.29
May	5,106	1,095	0.214	3.43	May	6,344	1,150	0.181	2.90	May	43,559	6,159	0.141	2.26
Jun	3,594	773	0.215	3.44	Jun	17,002	2,907	0.171	2.74	Jun	66,709	9,286	0.139	2.23
Jul	2,731	606	0.222	3.55	Jul	10,636	1,812	0.170	2.73	Jul	54,970	7,745	0.141	2.25
Aug	3,000	662	0.221	3.53	Aug	26,392	4,043	0.153	2.45	Aug	49,996	7,165	0.143	2.29
Sept *	0	0	0.000	0.00	Sept	46,623	7,137	0.153	2.45	Sept	56,784	7,867	0.139	2.22
Oct	3,188	697	0.219	3.50	Oct	39,850	5,928	0.149	2.38	Oct	33,728	4,692	0.139	2.23
Nov	3,100	678	0.219	3.50	Nov	43,623	6,363	0.146	2.33	Nov	26,652	3,701	0.139	2.22
Dec	3,263	708	0.217	3.47	Dec	52,457	7,685	0.147	2.34	Dec	30,612	4,276	0.140	2.23
Year	36,975	7,907	0.214	3.42	Year	257,144	39,933	0.155	2.48	Year	558,748	78,754	0.141	2.26

Whole seed--Cans

1991	Total oz	Total Value	$/oz	$/lb	1992	Total oz	Total Value	$/oz	$/lb	1993	Total oz	Total Value	$/oz	$/lb
Jan	10,726	1,475	0.138	2.20	Jan	7,665	1,069	0.139	2.23	Jan	10,457	1,445	0.138	2.21
Feb	9,594	1,290	0.134	2.15	Feb	5,205	728	0.140	2.24	Feb	11,933	1,621	0.136	2.17
Mar	13,094	1,759	0.134	2.15	Mar	11,544	1,651	0.143	2.29	Mar	10,350	1,435	0.139	2.22
Apr	8,036	1,163	0.145	2.32	Apr	5,789	822	0.142	2.27	Apr	6,086	848	0.139	2.23
May	7,958	1,177	0.148	2.37	May	4,782	685	0.143	2.29	May	7,299	1,007	0.138	2.21
Jun	12,406	1,873	0.151	2.42	Jun	7,373	1,052	0.143	2.28	Jun	10,803	1,490	0.138	2.21
Jul	7,379	1,088	0.147	2.36	Jul	5,560	785	0.141	2.26	Jul	12,418	1,698	0.137	2.19
Aug	7,464	1,051	0.141	2.25	Aug	7,542	1,078	0.143	2.29	Aug	24,361	3,357	0.138	2.20
Sept	0	0	0.000	0.00	Sept	8,612	1,216	0.141	2.26	Sept	30,835	4,267	0.138	2.21
Oct #	151,467	14,935	0.099	1.58	Oct	8,194	1,146	0.140	2.24	Oct	26,876	3,746	0.139	2.23
Nov	8,195	1,123	0.137	2.19	Nov	7,696	1,053	0.137	2.19	Nov	29,169	4,098	0.140	2.25
Dec	8,119	1,154	0.142	2.27	Dec	11,903	1,630	0.137	2.19	Dec	29,069	4,351	0.150	2.39
Year	92,968	13,153	0.141	2.26	Year	91,861	12,915	0.141	2.25	Year	209,653	29,363	0.140	2.24

Retail Price Information--Confection Sunflower Products (continued)

Kernel--Jars

1991	Total oz	Total Value	$/oz	$/lb	1992	Total oz	Total Value	$/oz	$/lb	1993	Total oz	Total Value	$/oz	$/lb
Jan	1,591,944	279,837	0.176	2.81	Jan	1,523,642	279,787	0.184	2.94	Jan	1,467,695	271,970	0.185	2.96
Feb	1,773,399	318,833	0.180	2.88	Feb	1,684,368	310,421	0.184	2.95	Feb	1,620,408	300,651	0.186	2.97
Mar	2,352,961	426,979	0.181	2.90	Mar	2,281,216	417,366	0.183	2.93	Mar	2,137,864	392,862	0.184	2.94
Apr	1,943,528	354,950	0.183	2.92	Apr	1,856,542	338,451	0.182	2.92	Apr	1,773,687	323,836	0.183	2.92
May	1,994,130	367,984	0.185	2.95	May	1,791,703	332,596	0.186	2.97	May	1,690,025	314,293	0.186	2.98
Jun	2,545,134	467,813	0.184	2.94	Jun	2,298,571	426,230	0.185	2.97	Jun	2,230,983	416,223	0.187	2.99
Jul	2,031,387	374,860	0.185	2.95	Jul	1,818,900	337,748	0.186	2.97	Jul	1,799,825	333,364	0.185	2.96
Aug	1,978,186	367,006	0.186	2.97	Aug	1,888,443	350,953	0.186	2.97	Aug	1,789,695	328,215	0.183	2.93
Sept	0	0	0.000	0.00	Sept	2,371,493	436,912	0.184	2.95	Sept	2,166,186	397,616	0.184	2.94
Oct	1,943,488	359,051	0.185	2.96	Oct	1,806,656	333,277	0.184	2.95	Oct	1,650,138	304,084	0.184	2.95
Nov	1,897,578	346,683	0.183	2.92	Nov	1,777,954	327,640	0.184	2.95	Nov	1,580,429	291,205	0.184	2.95
Dec	2,118,230	385,434	0.182	2.91	Dec	2,023,687	375,268	0.185	2.97	Dec	1,874,228	343,401	0.183	2.93
Year	22,169,963	4,049,430	0.183	2.92	Year	23,123,176	4,266,649	0.185	2.95	Year	21,781,161	4,017,720	0.184	2.95

Whole seed--Jars

1991	Total oz	Total Value	$/oz	$/lb	1992	Total oz	Total Value	$/oz	$/lb	1993	Total oz	Total Value	$/oz	$/lb
Jan	337,275	55,086	0.163	2.61	Jan	281,920	47,219	0.167	2.68	Jan	246,405	39,792	0.161	2.58
Feb	371,402	60,480	0.163	2.61	Feb	321,989	53,052	0.165	2.64	Feb	261,170	43,441	0.166	2.66
Mar	489,948	78,679	0.161	2.57	Mar	414,730	66,999	0.162	2.58	Mar	355,014	58,903	0.166	2.65
Apr	369,855	60,290	0.163	2.61	Apr	337,304	55,374	0.164	2.63	Apr	288,309	48,299	0.168	2.68
May	395,980	64,210	0.162	2.59	May	331,222	54,503	0.165	2.63	May	281,803	46,836	0.166	2.66
Jun	516,518	83,034	0.161	2.57	Jun	442,610	72,027	0.163	2.60	Jun	375,672	61,835	0.165	2.63
Jul	424,339	66,791	0.157	2.52	Jul	338,677	54,981	0.162	2.60	Jul	297,221	48,795	0.164	2.63
Aug	405,052	64,316	0.159	2.54	Aug	302,196	49,522	0.164	2.62	Aug	297,735	50,273	0.169	2.70
Sept	0	0	0.000	0.00	Sept	341,039	56,097	0.164	2.63	Sept	380,653	63,557	0.167	2.67
Oct	411,270	66,196	0.161	2.58	Oct	268,222	43,978	0.164	2.62	Oct	302,595	51,367	0.170	2.72
Nov	386,536	61,962	0.160	2.56	Nov	276,661	45,126	0.163	2.61	Nov	304,817	52,563	0.172	2.76
Dec	396,700	65,732	0.166	2.65	Dec	327,964	53,132	0.162	2.59	Dec	356,652	61,731	0.173	2.77
Year	4,504,872	726,776	0.161	2.58	Year	3,984,532	652,010	0.164	2.62	Year	3,748,045	627,392	0.167	2.68

Retail Price Information--Confection Sunflower Products (continued)

Whole seed--Bags

1991	Total oz	Total Value	$/oz	$/lb	1992	Total oz	Total Value	$/oz	$/lb	1993	Total oz	Total Value	$/oz	$/lb
Jan	11,260,810	1,325,044	0.118	1.88	Jan	12,091,074	1,434,830	0.119	1.90	Jan	13,445,866	1,590,868	0.118	1.89
Feb	12,633,018	1,484,013	0.117	1.88	Feb	13,608,819	1,599,443	0.118	1.88	Feb	15,633,407	1,830,137	0.117	1.87
Mar	16,780,564	1,979,623	0.118	1.89	Mar	18,330,885	2,150,771	0.117	1.88	Mar	20,263,133	2,384,519	0.118	1.88
Apr	14,751,018	1,722,232	0.117	1.87	Apr	17,253,207	1,974,140	0.114	1.83	Apr	17,764,812	2,108,007	0.119	1.90
May	16,403,675	1,904,173	0.116	1.86	May	18,305,835	2,089,832	0.114	1.83	May	20,141,509	2,330,949	0.116	1.85
Jun	22,133,946	2,518,484	0.114	1.82	Jun	25,118,865	2,866,920	0.114	1.83	Jun	27,960,564	3,169,109	0.113	1.81
Jul	18,083,641	2,061,727	0.114	1.82	Jul	20,358,035	2,325,218	0.114	1.83	Jul	21,915,598	2,500,543	0.114	1.83
Aug	17,305,099	1,991,695	0.115	1.84	Aug	19,787,404	2,286,911	0.116	1.85	Aug	21,480,730	2,464,526	0.115	1.84
Sept	0	0	0.000	0.00	Sept	22,979,234	2,659,224	0.116	1.85	Sept	24,652,439	2,855,454	0.116	1.85
Oct	15,594,254	1,818,995	0.117	1.87	Oct	17,576,264	2,033,470	0.116	1.85	Oct	18,623,689	2,186,525	0.117	1.88
Nov	15,133,447	1,780,652	0.118	1.88	Nov	18,142,809	2,059,713	0.114	1.82	Nov	18,727,619	2,206,147	0.118	1.88
Dec	17,297,293	2,045,851	0.118	1.89	Dec	19,988,755	2,330,897	0.117	1.87	Dec	20,516,289	2,464,340	0.120	1.92
Year	177,376,766	20,632,489	0.116	1.86	Year	223,541,185	25,811,369	0.115	1.85	Year	241,125,654	28,091,124	0.116	1.86

Kernel--Bags

1991	Total oz	Total Value	$/oz	$/lb	1992	Total oz	Total Value	$/oz	$/lb	1993	Total oz	Total Value	$/oz	$/lb
Jan	2,940,998	436,230	0.148	2.37	Jan	4,020,352	586,688	0.146	2.33	Jan	4,747,859	666,896	0.140	2.25
Feb	3,383,075	493,021	0.146	2.33	Feb	4,639,419	673,110	0.145	2.32	Feb	5,531,149	739,068	0.134	2.14
Mar	4,594,191	676,280	0.147	2.36	Mar	6,481,276	925,861	0.143	2.29	Mar	7,311,751	982,951	0.134	2.15
Apr	3,982,889	584,444	0.147	2.35	Apr	5,490,586	779,682	0.142	2.27	Apr	5,953,609	814,987	0.137	2.19
May	4,409,062	638,418	0.145	2.32	May	5,874,056	825,780	0.141	2.25	May	6,012,730	820,941	0.137	2.18
Jun	5,254,286	772,577	0.147	2.35	Jun	7,656,481	1,064,257	0.139	2.22	Jun	8,673,886	1,148,711	0.132	2.12
Jul	4,224,537	626,662	0.148	2.37	Jul	6,039,474	837,373	0.139	2.22	Jul	6,578,507	885,851	0.135	2.15
Aug	4,181,958	619,750	0.148	2.37	Aug	5,825,339	805,605	0.138	2.21	Aug	6,280,640	842,721	0.134	2.15
Sept	0	0	0.000	0.00	Sept	7,219,750	1,000,498	0.139	2.22	Sept	7,756,183	1,042,559	0.134	2.15
Oct	4,152,775	609,432	0.147	2.35	Oct	5,935,392	808,605	0.136	2.18	Oct	5,999,920	815,521	0.136	2.17
Nov	4,370,574	634,267	0.145	2.32	Nov	5,786,448	792,600	0.137	2.19	Nov	5,568,521	770,445	0.138	2.21
Dec	5,239,418	761,426	0.145	2.33	Dec	6,623,715	920,505	0.139	2.22	Dec	6,464,523	900,608	0.139	2.23
Year	46,733,763	6,852,507	0.147	2.35	Year	71,592,286	10,020,564	0.140	2.24	Year	76,879,277	10,431,259	0.136	2.17

Retail Price Information--Confection Sunflower Products (continued)

Meats--Bags

1991	Total oz	Total Value	$/oz	$/lb	1992	Total oz	Total Value	$/oz	$/lb	1993	Total oz	Total Value	$/oz	$/lb
Jan	0	0	0.000	0.00	Jan	0	0	0.000	0.00	Jan	16,594	2,370	0.143	2.29
Feb	110	20	0.182	2.91	Feb	0	0	0.000	0.00	Feb	20,535	2,933	0.143	2.29
Mar	0	0	0.000	0.00	Mar	1,330	190	0.143	2.29	Mar	29,057	4,151	0.143	2.29
Apr	803	146	0.182	2.91	Apr	2,258	322	0.143	2.28	Apr	28,676	4,096	0.143	2.29
May	132	27	0.205	3.27	May	3,409	487	0.143	2.29	May	25,567	3,647	0.143	2.28
Jun	0	0	0.000	0.00	Jun	8,407	1,201	0.143	2.29	Jun	47,052	6,475	0.138	2.20
Jul	0	0	0.000	0.00	Jul	7,515	1,073	0.143	2.28	Jul	48,951	6,633	0.136	2.17
Aug	0	0	0.000	0.00	Aug	13,797	1,971	0.143	2.29	Aug	40,501	5,556	0.137	2.19
Sept	0	0	0.000	0.00	Sept	16,041	2,291	0.143	2.29	Sept	55,149	7,552	0.137	2.19
Oct	0	0	0.000	0.00	Oct	13,829	1,939	0.140	2.24	Oct	46,028	6,226	0.135	2.16
Nov	0	0	0.000	0.00	Nov	13,251	1,871	0.141	2.26	Nov	42,728	5,747	0.135	2.15
Dec	0	0	0.000	0.00	Dec	21,312	2,937	0.138	2.21	Dec	49,050	6,767	0.138	2.21
Year	1,045	193	0.185	2.96	Year	101,147	14,282	0.141	2.26	Year	449,885	62,153	0.138	2.21

* Information on confection sales for September, 1991 was not available.

\# Information on kernels sold in cans for October, 1991 was excluded as an outlier in the data.

Average Whole Seed and Kernel Product Prices

			Total		
KERNEL		Total oz	Value	$/oz	$/lb
	Cans				
	1991	36,975	7,907	$0.21	$3.42
	1992	257,144	39,933	$0.16	$2.48
	1993	558,748	78,754	$0.14	$2.26
	Jars				
	1991	22,169,963	4,049,430	$0.18	$2.92
	1992	23,123,176	4,266,649	$0.18	$2.95
	1993	21,781,161	4,017,720	$0.18	$2.95
	Bags				
	1991	46,733,763	6,852,507	$0.15	$2.35
	1992	71,592,286	10,020,564	$0.14	$2.24
	1993	76,879,277	10,431,259	$0.14	$2.17
	average	263,132,493	39,764,723	$0.151	$2.42
WHOLE SEED					
	Cans				
	1991	92,968	13,153	$0.14	$2.26
	1992	91,861	12,915	$0.14	$2.25
	1993	209,653	29,363	$0.14	$2.24
	Jars				
	1991	4,504,872	726,776	$0.16	$2.58
	1992	3,984,532	652,010	$0.16	$2.62
	1993	3,748,045	627,392	$0.17	$2.68
	Bags				
	1991	177,376,766	20,632,489	$0.12	$1.86
	1992	223,541,185	25,811,369	$0.12	$1.85
	1993	241,125,654	28,091,124	$0.12	$1.86
	average	654,675,535	76,596,591	$0.117	$1.87
MEATS					
	Bags				
	1991	1,045	193	$0.18	$2.96
	1992	101,147	14,282	$0.14	$2.26
	1993	449,885	62,153	$0.14	$2.21
	average	552,076	76,628	$0.139	$2.22
	Kernel	263,132,493	39,764,723	$0.15112	$2.4179
Kernel and Meats Avg		263,684,569	39,841,351	$0.15109	$2.4175

APPENDIX E

U.S. Sunflower Birdfood Industry Impacts

Overall Strategy

Like many areas of the sunflower industry, the quantity and value of the birdfood sector has not been documented. Many of the birdfood activities are well understood by those involved in the industry; however, little secondary information exists about the industry. As a result of little information on sunflower-related birdfood sales, quantities of sunflower for use as birdfood had to be estimated by first estimating other uses of sunflower. Thus, after the amount of sunflower used for birdfood was determined, the direct impacts for birdfood activities in the sunflower industry were estimated similar to the other sunflower industries. The key components in the birdfood industry centered around determining how much sunflower was used for birdfood and what was the value of sunflower for birdfood.

Primary Processing

The quantity of oil sunflower for birdfood was estimated in Appendix A. The quantity of confection sunflower was estimated indirectly as result of estimating the other confection sunflower products. Thus, only the primary processing of oil sunflower for birdfood needed to be determined. A survey of birdfood processors was conducted to determine the direct impact of processing oil sunflower for birdfood. The survey determined the selling value of processed oil sunflower, the average purchase price of oil sunflower, the resulting direct impact, and the economic sectors affected by the processing activity. The impacts from primary processing of confection sunflower that result in birdfood were included in the confection industry. However, economic activity from the subsequent use of confection sunflower as birdfood was included in the birdfood industry.

Domestic Consumption

Domestic consumption was divided into transportation, retail packaging, retail margins, and distribution and marketing activity. Transportation expenses were for product movement from the primary processing phase to the distribution/packaging phase and were estimated based on industry information. Retail packaging was considered the packaging that takes place beyond the packaging that occurs at the primary processing stage (some birdfood in the primary processing stage is bagged for further use by rebaggers or distributors, but not bagged for retail distribution). Retail margin was the amount of product value that retail establishments receive from selling the product, usually based on

a percentage of the retail price. Distribution and marketing impacts were the residual of the direct impact from domestic consumption less the direct impacts from the other components of domestic consumption. The retail price of oil and confection sunflower was based on industry information. The overall average retail price was based on average values and normal retail conditions from 1991 through 1993, averaged across different bag sizes and brand names. Sunflower sold in birdfood mixes was valued the same as pure sunflower sold as birdfood.

Birdfood Industry--General Information

tons of birdfood
260,644 oil sunflower
37,409 confection sunflower

298,053 total tons of birdfood

Birdfood Prices at Retail

Retail price of oil seed in $/lb	Percent of product priced	
0.30	70%	Confection birdfood sell for about 10% over oil seed birdfood
0.40	30%	

0.330 oil seed--retail ($/lb)
0.363 conf seed--retail ($/lb)

$172,025,323 Gross revenue--oil seed birdfood (sales)
$27,158,874 Gross revenue--confection birdfood (sales)
$199,184,197 Gross revenue--all birdfood (sales)

Direct Impact for Birdfood Sales

$/lb
0.330 oil seed--retail price
0.098 oil seed--purchase price
0.232 net value added

0.363 conf seed--retail price
0.145 conf seed--selling price for prim proc in conf industry
0.218 net value added--birdfood industry only

0.230 weighted average direct impact--oil and conf seeds

45% Retail margin--portion of retail price
40 Consumer packaging ($/ton)

Allocation of Direct Impacts--Primary Birdfood Processing

I/O Sectors	Direct Impacts ($/ton) In-state	Outstate	U.S.	North Dakota	South Dakota	Minnesota	Kansas	Other States
Construction	4.62	0.01	1,208,293	481,821	180,683	180,683	120,455	244,651
Transportation	36.59	3.95	10,565,670	3,814,504	1,430,439	1,430,439	953,626	2,936,661
Comm and Public Utilities	4.00	0.00	1,043,255	417,302	156,488	156,488	104,326	208,651
Ag Proc and Misc Mnfg	9.10	0.17	2,415,513	948,431	355,662	355,662	237,108	518,651
Retail Trade	4.54	0.02	1,188,738	473,831	177,686	177,686	118,458	241,077
FIRE	8.35	0.18	2,223,160	870,717	326,519	326,519	217,679	481,725
Bus and Pers Service	3.18	0.01	831,541	331,395	124,273	124,273	82,849	168,751
Prof and Soc Service	2.14	0.00	558,609	223,061	83,648	83,648	55,765	112,486
Households	94.96	0.12	24,781,825	9,900,075	3,712,528	3,712,528	2,475,019	4,981,675
Government	2.18	0.00	567,617	226,928	85,098	85,098	56,732	113,760
Sunflower Seeds	172.08	23.74	51,039,531	17,940,935	6,727,850	6,727,850	4,485,234	15,157,662
Total Direct Impacts	169.66	4.47	45,384,222	17,688,067	6,633,025	6,633,025	4,422,017	10,008,088
Direct impact ($/ton)	174.12							

Birdfood Activities--Direct Impact Margins

Oil Seeds	Direct Impacts		
	$/lb	$/ton	Total
Primary Processing	0.0871	174.12	45,384,222
Retail	0.1450	290.06	75,601,570
Transportation	0.0250	50.00	13,032,221
Packaging	0.0200	40.00	10,425,777
Distribution/Handling	0.0348	69.53	18,122,865
Retail margin	0.0653	130.53	34,020,707
Total Direct Impact	0.2321	464.18	120,985,931
Total Tons 260,644			

Confection Seeds	Direct Impacts		
	$/lb	$/ton	Total
Primary Processing	0.0119	23.82	allocated to conf industry
Retail	0.2180	436.00	16,310,288
Transportation	0.0250	50.00	1,870,446
Packaging	0.0200	40.00	1,496,357
Distribution/Handling	0.0749	149.80	5,603,856
Retail margin	0.0981	196.20	7,339,630
Total Direct--Birdfood	0.2180	436.00	16,310,288
Total Tons 37,409			

Allocation of Direct Impacts--Industry Activities

I/O Sectors	Transportation		Packaging	Dist/ Marketing	Retail Margin
	Rail	Truck			
Construction	0	0	0	0	0
Transportation	1,064,423	0	0	0	0
Comm and Public Util	0	0	0	0	0
Ag Proc and Misc Mnfg	0	0	11,922,134	23,726,721	0
Retail Trade	1,681,393	6,892,856	0	0	41,360,336
FIRE	22,354	880,748	0	0	0
Bus and Pers Service	0	0	0	0	0
Prof and Soc Service	0	0	0	0	0
Households	846,844	3,159,738	0	0	0
Government	110,652	243,659	0	0	0
Total	3,725,667	11,177,000	11,922,134	23,726,721	41,360,336

Birdfood Industry--Summary of Direct Impacts

Birdfood-Primary Processing--oil seed only

I/O Sectors	U.S.	North Dakota	South Dakota	Minnesota	Kansas	Other States
Construction	1,208,293	481,821	180,683	180,683	120,455	244,651
Transportation	10,565,670	3,814,504	1,430,439	1,430,439	953,626	2,936,661
Comm and Publ Utilities	1,043,255	417,302	156,488	156,488	104,326	208,651
Ag Proc and Misc Manuf	2,415,513	948,431	355,662	355,662	237,108	518,651
Retail Trade	1,188,738	473,831	177,686	177,686	118,458	241,077
FIRE	2,223,160	870,717	326,519	326,519	217,679	481,725
Bus and Pers Service	831,541	331,395	124,273	124,273	82,849	168,751
Prof and Soc Service	558,609	223,061	83,648	83,648	55,765	112,486
Households	24,781,825	9,900,075	3,712,528	3,712,528	2,475,019	4,981,675
Government	567,617	226,928	85,098	85,098	56,732	113,760
Total	45,384,222	17,688,067	6,633,025	6,633,025	4,422,017	10,008,088

Birdfood--Domestic Activity--all seeds

I/O Sectors	U.S.	Transp-ortation	Packaging	Distribution & Marketing	Retail Margin
Construction	0	0	0	0	0
Transportation	1,064,423	1,064,423	0	0	0
Comm and Publ Utilities	0	0	0	0	0
Ag Proc and Misc Manuf	35,648,855	0	11,922,134	23,726,721	0
Retail Trade	49,934,586	8,574,250	0	0	41,360,336
FIRE	903,102	903,102	0	0	0
Bus and Pers Service	0	0	0	0	0
Prof and Soc Service	0	0	0	0	0
Households	4,006,582	4,006,582	0	0	0
Government	354,311	354,311	0	0	0
Total	91,911,858	14,902,667	11,922,134	23,726,721	41,360,336

Birdfood Industry--Summary of Direct Impacts

Birdfood-Summary by State

I/O Sectors	North Dakota	South Dakota	Minnesota	Kansas	Other States	U.S.
Construction	481,821	180,683	180,683	120,455	244,651	1,208,293
Transportation	3,814,504	1,430,439	1,430,439	953,626	4,001,084	11,630,093
Comm and Publ Utilities	417,302	156,488	156,488	104,326	208,651	1,043,255
Ag Proc and Misc Manuf	948,431	355,662	355,662	237,108	36,167,506	38,064,368
Retail Trade	473,831	177,686	177,686	118,458	50,175,663	51,123,324
FIRE	870,717	326,519	326,519	217,679	1,384,827	3,126,261
Bus and Pers Service	331,395	124,273	124,273	82,849	168,751	831,541
Prof and Soc Service	223,061	83,648	83,648	55,765	112,486	558,609
Households	9,900,075	3,712,528	3,712,528	2,475,019	8,988,257	28,788,407
Government	226,928	85,098	85,098	56,732	468,071	921,928
Total	17,688,067	6,633,025	6,633,025	4,422,017	101,919,946	137,296,080

Birdfood-Summary by Industry Activity

I/O Sectors	Primary Processing	Domestic Activity	U.S.
Construction	1,208,293	0	1,208,293
Transportation	10,565,670	1,064,423	11,630,093
Comm and Publ Utilities	1,043,255	0	1,043,255
Ag Proc and Misc Manuf	2,415,513	35,648,855	38,064,368
Retail Trade	1,188,738	49,934,586	51,123,324
FIRE	2,223,160	903,102	3,126,261
Bus and Pers Service	831,541	0	831,541
Prof and Soc Service	558,609	0	558,609
Households	24,781,825	4,006,582	28,788,407
Government	567,617	354,311	921,928
Total	45,384,222	91,911,858	137,296,080

APPENDIX F

U.S. Sunflower Industry Questionnaires

April #, 1994

Mr./Ms. Contact Person
Sun Seeds Forever
Address
Town, St, #####

Dear Contact:

The National Sunflower Association has contracted with the Department of Agricultural Economics at North Dakota State University to conduct a nation-wide economic impact assessment of the sunflower industry. One of the primary goals of the study is to estimate the economic impact of the sunflower industry in the major sunflower producing states, as well as nationwide. This study will provide valuable information for educational, promotional, and defensive purposes that are in the best interest of the sunflower industry.

A critical component of the study includes the economic activity created by sunflower processing. Obviously, processing activities are a major component of the sunflower industry. We are asking for your cooperation in supplying financial information which will help us estimate the economic impact of your industry. Attached is a questionnaire outlining the information we are requesting.

As research professionals, we treat all information obtained in strict confidence and the following steps are always taken to insure participant confidence: (1) only research personnel directly involved in the study see the material (in this study only Dean Bangsund and myself will work with the information), (2) results are only published in a manner such that information from participants cannot be determined by extrapolating or interpolating the results, and (3) the information remains protected after the study. Please keep in mind that NDSU depends upon cooperation from private constituents and clients, and as a research institution, it cannot afford to jeopardize that relationship.

Included in the attached questionnaire are instructions describing the information requested. We greatly appreciate your cooperation in contributing to the study. If you have any questions about the study or the information requested, please do hesitate to call me (701/237-7455) or Dean Bangsund (7471).

Sincerely,

F. Larry Leistritz
Professor

INSTRUCTIONS

Data provided from this survey will be used to estimate the economic contribution of the sunflower industry in your state's economy and in the U.S. All information you provide will be kept strictly confidential. The following general instructions are suggested in completing the questionnaire.

1. Use your records from the most recently completed fiscal year.
2. Information should be recorded in dollar terms.
3. Include only expenditures made, or expenses incurred, as result of sunflower activity. For example, if your plant operates 50 percent of the time processing sunflowers, include half of that year's plant maintenance.
4. If the firm you process for operates more than one plant, please include the information for all your sunflower processing plants on this questionnaire.
5. Please identify expenditures that were made to entities within your state, and all expenditures made to entities outside of your state. If you cannot determine if expenditures were made to entities within your state, please indicate this on the form.
6. When exact information is not available, please estimate.
7. Definitions for selected expenditure items and their corresponding Standard Industrial Classification (SIC) code listing are included to help in determining allocation of expenditures.
8. If you have questions, please contact:

Larry Leistritz (701-237-7455)
or Dean Bangsund (701-237-7471)
Department of Agricultural Economics
North Dakota State University
Fargo, ND 58105-5636

DEFINITIONS FOR EXPENDITURE ITEMS

(According to the Standard Industrial Classification Manual)

Construction: Includes building construction--general contractors engaged in construction of residential, farm, industrial, public, and other buildings. (Major Groups 15, 16, and 17)

Transportation: Includes railroad, motor freight, water transportation, air transportation, pipeline transportation of petroleum, and other transportation to include packing and crating services, and rental of transportation equipment. (Major Groups 40, 41, 42, 43, 44, 45, 46, and 47)

Communications: Includes establishments engaged in telephone, telegraph, radio, television, and other communication services. (Major Group 48)

Public Utilities: Includes natural gas companies engaged in the transmission, storage, or distribution of natural gas. Also, water supply and sanitary services are included. (Major Group 49 except Group 491)

Wholesale Trade: Includes establishments primarily engaged in selling merchandise to retailers; to industrial, commercial, institutional, or professional users; or to other wholesalers, or acting as agents in buying merchandise for or selling merchandise to such persons or companies. (Major Groups 50 and 51)

Retail Trade: Includes establishments engaged in selling merchandise for personal, household, or farm consumption, and rendering services incidental to the sale of goods. (Major Groups 52, 53, 54, 55, 56, 57, 58, and 59)

Finance, Insurance, and Real Estate: Includes institutions engaged in banking or other financial institutions, insurance, and real estate. (Major Groups 60, 61, 62, 63, 64, 65, 66, and 67)

Business and Personal Services: Includes firms operating lodging services, repair, laundry, entertainment, other personal services predominantly to private individuals, credit collecting, janitorial, and stenographic services. (Major Groups 70, 72, 73, 75, 76, 78 and 79)

Professional and Social Services: Includes establishments engaged in furnishing health, medical, legal, educational, research and development, and other professional services. (Major Groups 80, 81, 82, 83, 84, 86, 88, and 89)

SUNFLOWER OIL PROCESSOR EXPENDITURES SURVEY

Firm: _____

Location: _____

I. Expenditures for (_____ year).

Items For Which Expenditures Are Made	Annual Expenditures	
	Within Your State	Outside of Your State
	dollars	
Purchases of sunflower seeds		
Contract construction		
Plant maintenance and overhaul		
Transportation-sunflower seeds only		
Transp-crude oil to final markets		
Transportation-all other items		
Communications		
Public utilities		
Miscellaneous manufacturing		
Wholesale trade		
Retail trade		
Finance, insurance, and real estate		
Business and personal services		
Professional and social services		
Coal		
Electricity		
Petroleum/natural gas		
Wages and salaries		
Benefits		
Sunflower research funded		
Property taxes		
Sales and use taxes		
Workman's compensation		
Unemployment		
Other taxes (please specify)		
Other Expenses (please specify)		

II. Total annual revenue attributable to sunflower activities: $_____

III. Number of workers in full-time equivalents (amount of labor attributable only to sunflower activities): _____

IV. Sunflowers processed: _____ tons

V. Crude sunflower oil produced: _____ tons

VI. Comments:

CONFECTION SUNFLOWER/BIRDFOOD PROCESSOR EXPENDITURES SURVEY

Firm: _____

Location: _____

I. Expenditures for (_____ year).

Items For Which Expenditures Are Made	Annual Expenditures	
	Within Your State	Outside of Your State
	dollars	
Purchases of sunflower seeds		
Contract construction		
Plant maintenance and overhaul		
Transportation-sunflower seeds only		
Transp-final product to market		
Transportation-all other items		
Communications		
Public utilities		
Miscellaneous manufacturing		
Wholesale trade		
Retail trade		
Finance, insurance, and real estate		
Business and personal services		
Professional and social services		
Coal		
Electricity		
Petroleum/natural gas		
Wages and salaries		
Benefits		
Sunflower research funded		
Property taxes		
Sales and use taxes		
Workman's compensation		
Unemployment		
Other taxes (please specify)		
Other Expenses (please specify)		

Please include information for the processing activity pertinent to your company. If your company processes sunflowers for confection and birdfood markets, please include estimates for both activities.

II. Annual revenue attributable to:

confection activities: $_____

birdfood activities: $_____

III. Number of workers in full-time equivalents (amount of labor attributable only to sunflower activities):

confection _____ (full-time workers)

birdfood _____ (full-time workers)

IV. Sunflowers processed:

_____ tons (confection)

_____ tons (birdfood)

VI. Comments: (please add any other information which may be helpful in generating a sunflower industry impact study)

HYBRID SUNFLOWER SEED INDUSTRY QUESTIONNAIRE

Data provided from this survey will be used to estimate overall employment associated with hybrid sunflower seed production. The following general instructions are suggested:

-) Use your records from the most recently completed fiscal year.

-) Employment estimates should be in full-time equivalents devoted to sunflower seed activities. For example, if your company has three sales managers, each spending about one-third of their time with sunflower seed sales, employment from those three positions would equal one full-time worker.

-) Include employment estimates for all positions associated with hybrid sunflower seed development, production, marketing, sales, and delivery. For example, include full-time estimates of workers involved with plant genetics, field production, warehouse operations, sales and their support staff, transportation, record keeping, and administration.

-) Please provide a physical measure (i.e., lbs, cwt., or tons) of the amount of hybrid sunflower seed produced annually by your company. This figure should include oil and confection seed produced for domestic and export sales and seed produced for strategic carryover stocks.

I. **Annual employment associated with hybrid sunflower seed activities:**

_____ (full-time workers)

II. **Annual hybrid sunflower seed production:** **(domestic sales, exports, carryover stocks)**

_____ (lbs, cwt, or tons -- circle one)

-) If you have questions or additional comments, please contact:

Dean Bangsund (701-237-7471)
or Larry Leistritz (701-237-7455)
Department of Agricultural Economics
North Dakota State University
Fargo, ND 58105-5636