

# Production

## World Production

(John Sandbakken and Larry Kleingartner)

The sunflower is native to North America but commercialization of the plant took place in Russia. Sunflower oil is the preferred oil in most of Europe, Mexico and several South American countries. Major producing countries or areas are the former Soviet Union, Argentina, Eastern Europe, U.S., China, France and Spain (Table 2). These seven countries/areas of the world produce about 80 percent of the world's oilseed and nonoilseed sunflower. Historically, the former Soviet Union has been the No. 1 producer of sunflower, producing about 35 percent of the world's production annually. During much of the 1970s, the U.S. was the world's second largest producer, but in the 1980s, Argentina became firmly entrenched in second place.

## U.S. Production

### Acreage

The first sustained commercial production of oilseed sunflower in the U.S. occurred in 1966, when about 6,000 acres were grown. Total combined acreage of oilseed and nonoilseed sunflower increased gradually in the late 1960s and expanded rapidly in the 1970s, reaching a peak in 1979 at 5.5 million acres. The U.S. share of world production has declined in recent years as production in Argentina and other countries has increased. During the peak period of U.S. production, the U.S. produced about 15 percent of the world's sunflower production. In 2005, the U.S. market share was only 6 percent.

The rapid acreage increase in the late 1970s was stimulated by a variety of factors. Favorable yields in 1977 and 1978 brought about by improved hybrids and favorable weather conditions were key factors, along with excellent prices when compared with competitive crops.

Table 2. World Production of All Sunflower

	1996- 1997	1997- 1998	1998- 1999	1999- 2000	2000- 2001	2001- 2002	2002- 2003	2003- 2004	2004- 2005	2005- 2006	2006- 2007 Forecast
Argentina	5.45	5.68	7.13	5.80	2.94	3.73	3.34	2.98	3.75	3.82	4.20
Eastern Europe	2.92	2.18	2.59	2.75	1.67	1.86	2.02	2.67	2.27	2.11	2.17
European Union	3.87	4.08	3.44	3.10	3.27	3.03	3.72	4.07	4.07	3.72	4.06
China, Peoples Republic of	1.42	1.17	1.46	1.77	1.95	1.75	1.95	1.82	1.70	1.83	1.85
former USSR	5.37	5.41	5.74	6.89	7.27	4.94	7.19	9.35	8.00	11.32	11.20
United States	1.60	1.67	2.39	1.97	1.61	1.55	1.11	1.21	.93	1.82	.92
India	1.30	1.16	1.17	.87	.81	.73	1.06	1.16	1.45	1.50	1.43
Turkey	.67	.67	.85	.82	.63	.53	.83	.56	.64	.80	.90
Other	1.99	1.87	2.83	2.98	3.01	3.55	2.74	3.07	3.58	3.25	3.77
<b>World Sunflower Production (million metric tons)</b>	<b>24.63</b>	<b>23.89</b>	<b>27.60</b>	<b>26.95</b>	<b>23.16</b>	<b>21.80</b>	<b>23.95</b>	<b>26.88</b>	<b>26.39</b>	<b>30.16</b>	<b>30.49</b>

Changes in the 1990 government farm program, which allowed planting flexibility while providing price support, led to an increase in sunflower acreage in 1991 relative to 1990. The government program established a marketing loan and a loan deficiency payment for sunflower and other oilseed crops.

The bulk of U.S. sunflower production occurs in North Dakota, South Dakota, Minnesota, Kansas, Colorado, Nebraska and Texas. Small acreages are grown in several other states (Table 3). The majority of the acreage harvested is for oil production versus nonoil uses. In 2005, the USDA reported that 2,032,000 acres of oil sunflower and 578,000 of nonoil sunflower were harvested (Table 4).

### Seed Yield/Acre

Annual average sunflower yields from 1996 to 2005 ranged from 1,140 to 1,564 pounds per acre for oilseed and from 997 to 1,455 pounds per acre for

nonoilseed sunflower. Average yields per acre during the 1996-2005 period were 1,349 pounds for oilseeds and 1,220 pounds for nonoilseed sunflower (Figure 5).

### Pounds of Production

U.S. production of oilseed sunflower ranged from 1,763 million pounds (799,700 metric tons) in 2004 to 4,486 million pounds (2,035,000 metric tons) in 1998 (Table 5). Nonoilseed production ranged from 286 million pounds (130,000 metric tons) in 2004 to 844 million pounds (383,000 metric tons) in 1999.

### Processing Plants

Four oil extraction plants in North Dakota, Minnesota and Kansas process oilseed sunflower. These four plants have a combined crushing capacity of 1,900,000 metric tons per year, according to industry estimates. Several smaller plants are located throughout the main sunflower production region.

**Table 3. Total Planted Sunflower Acreage by States 1994-2006**

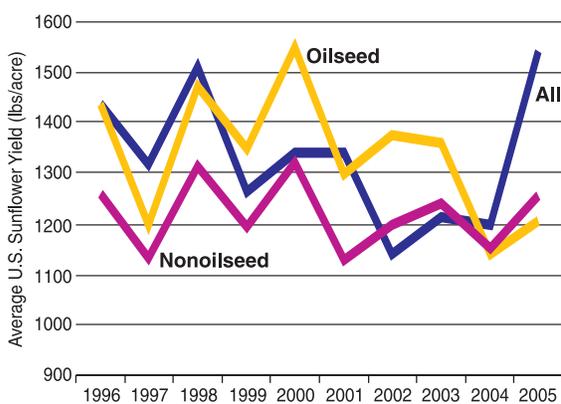
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
North Dakota	1,590	1,450	1,180	1,470	1,990	1,700	1,330	1,070	1,370	1,210	880	1,140	900
South Dakota	940	960	700	825	940	920	720	715	640	505	435	550	535
Kansas	260	300	265	200	180	280	250	335	193	215	171	300	152
Minnesota	500	440	150	105	130	130	95	60	70	90	60	135	90
Colorado	100	115	110	85	160	270	220	195	130	130	135	215	100
Texas	34	44	31	88	47	75	60	108	35	59	41	145	54
Nebraska	75	90	47	55	70	101	90	82	60	66	56	99	53
Other States	68	79	53	60	51	77	75	68	60	91	95	125	100
<b>Total U.S.</b>	<b>3,567</b>	<b>3,478</b>	<b>2,536</b>	<b>2,888</b>	<b>3,568</b>	<b>3,553</b>	<b>2,840</b>	<b>2,633</b>	<b>2,580</b>	<b>2,344</b>	<b>1,873</b>	<b>2,709</b>	<b>1,984</b>
<b>Thousand Acres</b>													

**Table 4. Harvested USA Sunflower Acreage 1994-2006**

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Oilseed	2,943	2,829	1,934	2,212	2,897	2,695	2,116	2,060	1,815	1,874	1,424	2,032	1,587
Nonoilseed	487	539	545	580	595	746	531	495	365	323	287	578	277
<b>Total</b>	<b>3,430</b>	<b>3,368</b>	<b>2,479</b>	<b>2,792</b>	<b>3,492</b>	<b>3,441</b>	<b>2,647</b>	<b>2,555</b>	<b>2,180</b>	<b>2,197</b>	<b>1,711</b>	<b>2,610</b>	<b>1,864</b>
<b>Thousand Acres</b>													

**Table 5. U.S. Sunflower Production 1994-2006**

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
	----- Million Pounds -----												
Oilseed	4,223	3,398	2,844	2,986	4,486	3,498	2,910	2,804	2,070	2,260	1,763	3,178	1818
Nonoilseed	612	611	716	691	787	844	635	615	420	406	286	841	295
<b>Total</b>	<b>4,835</b>	<b>4,009</b>	<b>3,560</b>	<b>3,677</b>	<b>5,273</b>	<b>4,342</b>	<b>3,545</b>	<b>3,419</b>	<b>2,490</b>	<b>2,666</b>	<b>2,049</b>	<b>4,018</b>	<b>2113</b>



**Figure 5. Average U.S. Sunflower Yield 1996-2005 in Pounds Per Acre.**

## Prices

Historically, sunflower depended heavily on the export market for either seed or oil. With the advent of NuSun and high oleic sunflower, the market has switched almost exclusively to a U.S. and Canadian market. Both of these oils are very stable and do not require hydrogenation as do competitive oils, such as traditional soybean and canola oils, when used in a frying application. Sunflower prices now are more determined by their relationship to corn oil prices. Large domestic users tend to buy in advance, thus prices are not directly affected by the Chicago soybean oil contract and are not as likely to be as volatile.

More opportunities are available to presell a portion of the crop well before planting begins. This ensures a domestic user of a supply and allows a producer to “lock in” a price for a portion of his production. Storage of sunflower is necessary. The domestic market needs a 12-month supply of oil and crushers will need a steady supply of seed. Crushers likely will have to provide producers with storage premiums for delivery in the out-of-harvest months. Oilseed sunflower producers have the advantage of multiple market options: the hulling market, the crush market or the bird food market. Supply and demand drive prices in all three markets. These markets are very specific and unique, with different values associated with them. Farmers should have samples of their crop graded to determine quality and talk directly to buyers to find out what they want in terms of seed specifications.

Nonoilseed (confection) sunflower production is geared to the “in-shell” markets. Today’s confection hybrids produce a significant level of large seeds. Growers often are paid on a percentage of large seed. Quality standards for confection sunflower are high and allow little tolerance for off-color and insect damage. Most confection sunflower is produced on a contract basis. The seasonal average price during the 1994/95 to 2002/03 period ranged from \$5.89 to \$12.30 per hundredweight for oilseed sunflower and from \$11.90 to \$15.20 per hundredweight for nonoilseed sunflower. During that period, the nonoilseed price exceeded the oilseed price by \$3.85 per hundredweight on average.

## Sunflower Marketing Strategy

(George Flaskerud)

Sunflower marketing strategies usually use the cash forward contract for locking in a price prior to harvest. Use of this contract may be appropriate on a portion of the sunflower crop, but so may the use of other marketing tools, such as hedging with futures or use of options (puts or calls). The best marketing alternative depends in part on the basis, which is the relationship between a cash and futures price.

Since a sunflower futures market does not exist, relationships between the sunflower cash price and other closely related futures markets need to be considered. Using the futures market of a different commodity for hedging is cross-hedging, while the cash and futures price relationship is the cross-basis. Two futures contracts are examined: soybean oil futures, which are traded on the Chicago Board of Trade, and canola futures, which are traded on the Winnipeg Commodity Exchange.

Historic prices were analyzed during 1997 through April 2004 to identify patterns and relationships useful for developing marketing strategies. Prices were standardized in U.S. dollars per hundredweight (US\$/cwt).

Correlations indicate that changes in NuSun prices (40 percent oil) at Enderlin, N. D., are the most closely correlated with canola futures (correlation = .91). Soybean oil futures were a distant, second-best correlation (.75). These correlations suggest that canola futures should provide the most risk reduction for cross-hedging cash sunflower prices. However, with the current situation for sunflowers, soybean oil and canola need to be evaluated to determine which futures contract likely is to be the most profitable.

Price quotations for canola futures are in Canadian dollars (C\$) per metric ton. The price quotation for November canola was C\$352 on August 25, 2003, and the exchange rate was 1.41 C\$/US\$. In U.S. dollars per hundredweight, this quotation would be US\$11.32 (C\$352 divided by 1.41 divided by 22.046 = US\$11.32).

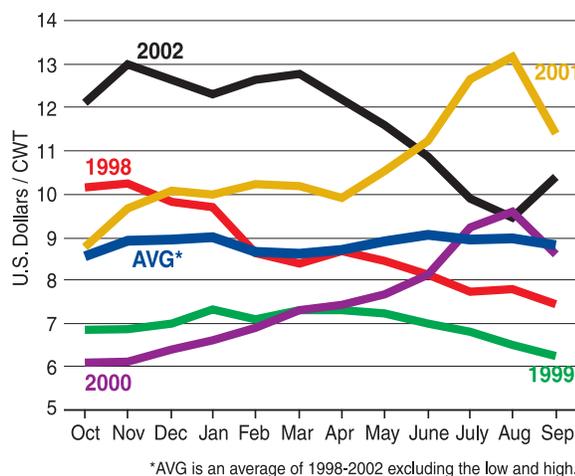
Seasonal patterns for Enderlin NuSun prices (Figure 6) revealed a broad range of price behavior during individual marketing years (October-September). Highs

occurred during August in 2000-01 and 2001-02, April in 1999-00, October in 1998-99 and November in 2002-03. The distribution of prices reveals that the pattern, on average, is to decline to lows in October and then increase to a peak in June before declining into the next marketing year.

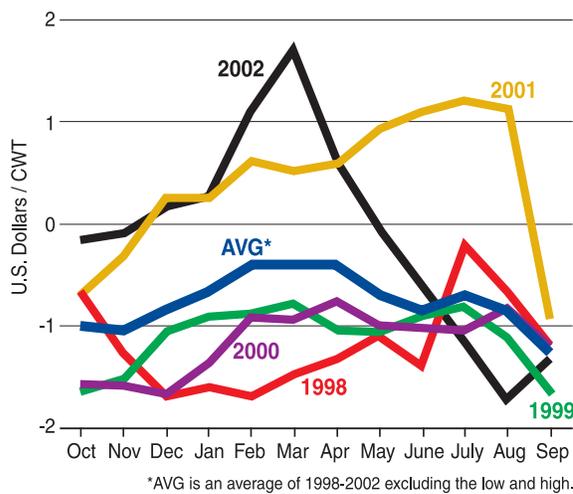
The range in the monthly average, excluding the low and the high, was only \$.53 per cwt. The within-year variations were considerably greater. The average within-year range was \$3.07. During 2000-01 and 2001-02, when prices trended up, the average within-year range was \$3.98. During the other years, the average within-year range was \$2.47.

The tendency for the Enderlin NuSun cross-basis relative to canola futures (Figure 7) was to decline to a low in September and to remain nearly as low during October and November, and then to increase to a high in February-April before generally declining into the end of the marketing year. During three of the five years, the cross-basis was near its low in October. The range of the cross-basis was the narrowest during September and the widest during May. During October, the average cross-basis per cwt ranged from -\$1.64 to -\$0.16 and averaged -\$0.99.

Relative to soybean oil futures, the Enderlin average cross-basis showed a pattern of marketing year lows per cwt in November (-\$9.15), April (-\$9.25) and September (-\$9.16) and highs in February (-\$8.08) and July (-\$8.30). During October, the average cross-basis ranged from -\$14.47 to -\$6.59 and averaged -\$8.95.



■ Figure 6. Seasonal Behavior of NuSun Prices at Enderlin, ND.



■ Figure 7. NuSun Cross-Basis at Enderlin, ND Relative to Nearby WCE Canola Futures.

Variability, as measured by the standard deviation, was greater for the cross-basis relative to soybean oil futures than for the cross-basis relative to canola futures. This suggests lower basis risk when cross-hedging with canola futures than with soybean oil futures.

From this information, marketing strategies can be developed. The seasonal pattern for Enderlin NuSun prices suggests that preharvest sales should be considered when prices are above the five-year average price. Prices declined into harvest during two of three years that prices were above the average early in the marketing year.

Use of the cash forward contract or cross-hedge would be appropriate on that portion of the sunflower crop that can be safely produced, i.e., on 20 percent to 40 percent of the crop. The cash forward contract would be preferred if it reflects an average or better cross-basis relative to sunflower oil futures or canola futures. A greater portion of the crop could be sold on a cash forward contract if it includes an act-of-God clause.

In addition to the cash forward contract or cross-hedge, a call option could be purchased to preserve upside potential. In the case of the cross-hedge, the call option would be purchased in the same futures contract. In the case of the cash forward contract, the call option could be purchased in either the soybean oil futures or canola futures. The put option is an alternative to using a cash forward contract or cross-hedge in combination with a call option.

For sunflowers that are not cash forward contracted, storage is an alternative. On average, storage was profitable during the 1998-99 to 2002-03 marketing years. However, the most profitable period of storage varied considerably. The most profitable sell or store strategy was to sell the 1998 crop at harvest, store the 1999 crop until January, store the 2000 and 2001 crops until August and store the 2002 crop for one month. Sell or store decisions are difficult and require frequent evaluation of fundamentals, cash prices, futures prices, basis and storage costs.

Additional marketing alternatives are available but beyond the scope of this article. Further information can be found in NDSU Extension publication EC-1270, "Managing Sunflower Price Risk."