

Economic Analysis, Impact and Agronomic Profile of Sod Production in Texas



Final Report to the Turfgrass Producers of Texas

By:

Lawrence Falconer

Professor and Extension Economist – Texas Cooperative Extension

And

Michelle Niemeyer

Graduate Assistant-Department of Agricultural Economics-Texas A&M University

July 24, 2006



Table of Contents

| | |
|--|----|
| Executive Summary | 3 |
| Economic Analysis, Impact and Agronomic Profile of Sod Production in Texas | 5 |
| Introduction | 5 |
| Methodology | 5 |
| Section I: Survey Results and Discussion..... | 6 |
| Sod Production by Species and Varieties | 9 |
| Production Characteristics Related to Soil Type, Labor, and Mechanization | 12 |
| Costs and Sales Characteristics | 13 |
| Individual Farm and Industry Concerns | 23 |
| Section II. Cost of Production Estimates | 26 |
| Section III: Estimated Industry Sales and Impact Multipliers | 33 |
| References..... | 36 |

Acknowledgments

The authors would like to thank Dr. J.J. Haydu, University of Florida, Institute of Food and Agricultural Sciences for his help in developing the survey instrument used in this study, and for allowing us to use a format consistent with the work done at the University of Florida. The authors would also like to thank Mr. John Cosper, Executive Director of the Turfgrass Producers of Texas, Mr. Glen Rod, Mr. Chance Stone, Mr. Boston Brown and Mr. Peter McGill, Wharton TCE CEA-Ag for their help in developing this report.

Economic Analysis, Impact and Agronomic Profile of Sod Production in Texas

Executive Summary

Based on survey results, the Texas sod production industry generated \$178 million in farm gate sales during 2005. This impressive total was enough to rank the sod production industry as the ninth largest agricultural cropping activity in Texas for 2005. Survey results indicate that the Texas sod producing industry is expanding at a 7% annual rate since 2002. Survey results indicate that this increase in production is a response to strong demand for sod, as fifty-one percent of the respondents indicated that the market for sod in their area had increased by an average of 31% since 2002.

The total economic output of sod production on the Texas economy in 2005 was \$307 million based on this study. Total economic output is an estimation of total business sales for the sod sector and all supporting sectors. The farm gate sales of sod in 2005 were estimated at \$177.6 million and resulted in \$23.5 million of indirect economic output by the firms that directly support the sod industry such as input suppliers, and \$106 million in induced effects from household spending, that results from business profits and wages. The results of this study indicate that the sod industry generated \$231 million in value added to the state's economy in 2005. The sod production industry in Texas was estimated to employ 1,320 workers full-time, 235 part-time workers and 515 seasonal workers. In total, the sod production industry was estimated to support over 5,200 jobs in Texas.

Respondents to the survey indicated the costs of production were rising dramatically, with 82% reporting they had experienced a median increase in operating costs of 20% since 2002. The cost of production analysis developed in this study

indicated an estimate of \$2,304.50 per acre in direct and fixed costs per acre for sod production in 2006. Survey results indicate that sod producers in Texas are not highly diversified, with 83.3% of total sales being generated by sod production.

The most frequent problem mentioned by respondents as the highest priority for individual producers was the price of sod and competition, followed by cost of production and other financial concerns along with difficulty in collecting for sales. The most frequent problem mentioned as the highest priority for the industry was the impact on the price of sod from overproduction and competition.

Economic Analysis, Impact and Agronomic Profile of Sod Production in Texas

Introduction

Little formal applied research has been done on the structure of the sod producing industry in Texas. Sod producers have become concerned that increases in input prices and recent proposals at the state level related to changes in tax policy and water regulation will have an adverse impact on the industry. To address these problems, the industry feels the need to collect and analyze data to support sound policy decision and farm management decision making for Texas sod producers.

To help meet these needs, this study was developed with three components. The first component is a mail survey designed to provide baseline information on the sod production industry in Texas. The second component consists of a panel study to generate cost structure estimates for the sod production industry in Texas. The third component of this study includes the generation of economic impact multipliers for the sod-production industry in Texas.

Methodology

To complete the first component of this study, a mailing list for the survey was constructed with input from two sources. A list from the Turfgrass Producers of Texas Association of all known sod producers in Texas, including both members and non-members, was the primary source for developing the mailing list. Texas Cooperative Extension agents provided information on firms producing sod in the state to supplement the mailing list. Two mailings were made at a four week interval starting in November 2005, with a reminder sent to non-respondents two weeks after the first mailing (Dillman). The questionnaire was a modified version of the instrument used by Haydu et

al. and was divided into sections related to production, marketing, product quality, and firm and industry problems. The data from the returned questionnaires were entered into a Microsoft Access database for validation and compilation, and then exported to Microsoft Excel spreadsheets for analysis.

To complete the second part of this study, a three-member panel of producers who were willing to provide information on cost of production was identified by the Turfgrass Producers of Texas. Variable and fixed costs were estimated using data from these representative producers. Capital investment costs were estimated by obtaining asset complements and related prices for the different equipment items and facilities used by these representative turfgrass producers. Enterprise budgets were developed using the Mississippi State University Budget Generator (Laughlin and Spurlock). The Mississippi State Budget Generator is a computer program designed to calculate costs and returns for individual crop and livestock enterprises and whole farm plans on an annual basis.

Section I: Survey Results and Discussion

One hundred-forty-seven firms were identified and included in the initial mailing of the survey. Fifty surveys were returned, with two respondents indicating they were no longer in the sod-producing business for an adjusted response rate of 32.7%.

The methodology developed by Haydu et al. was used to estimate the size of the sod production industry in Texas. All farms that responded to the survey were grouped into four size categories based on acres in production. The Small category ranges from 0 to 499 acres, with Medium ranging from 500 to 999 acres, Large ranging from 1,000 to 1,999 acres and Very Large greater than or equal to 2,000 acres.

Results by size of operation are shown in Table 1. The forty-five useable responses indicated that 82% of Texas producers fall into the Small category, 9% fall in the Medium category, 7% of the Texas producers are in the Large category and 2% of Texas producers are in the Very Large category. The total acreage in production for 2005 reported by the participants in the survey was 18,144 acres. The total acreage harvested by the respondents in 2005 was reported to be 15,144 acres.

Table 1. Acreage reported and respondents with useable data by size of farm, 2005.

| Farm Size (acres) | Acreage Reported in Production - 2005 | Harvested Acres Reported - 2005 | Useable Responses | Percent By Size |
|---------------------|---------------------------------------|---------------------------------|-------------------|-----------------|
| Small (1-499) | 8,577 | 7,226 | 37 | 82% |
| Medium (500-999) | 2,625 | 2,385 | 4 | 9% |
| Large (1000-1999) | 4,142 | 2,833 | 3 | 7% |
| Very Large (=>2000) | 2,800 | 2,700 | 1 | 2% |
| Total | 18,144 | 15,144 | 45 | |

To estimate total acreage in sod production in Texas, the average acreage in production by size of farm was calculated, and shown in Table 2. The projected number of Texas sod farms by size was then calculated by multiplying the respective percentage of respondents by size shown in Table 2 times the total number of farms identified in Texas, including adjusting the initial estimate the sod producing firms in Texas by the number of respondents that indicated they were no longer involved in sod production. This adjustment would place the total number of sod producing firms in Texas at a total of 141. Total acreage estimated to be in sod production in Texas based on the 2005 survey is 56,247 acres, compared with 21,515 acres in 1993 (Lard, et al.). The total number of acres harvested for 2005 is estimated at 47,005 acres, based on the data provided by the survey respondents. This represents a 23% increase from the 38,341 harvested acres shown in the 2002 Census of Agriculture (NASS), which calculates to a 7.03% annual increase in harvested acres. This compares with a 6.43% annual increase in

harvested acres for the 1997 to 2002 period, based on the 28,083 acres estimated to have been harvested in 1997 by the Census of Agriculture (NASS). When asked how much they increased production over the past three years, twenty-two of the forty-five respondents indicated that they had increased acres in sod production since 2002 by an average of 75% per respondent. Two respondents indicated that they had increased production by over 500 acres since 2002, five respondents indicated that they had increased production between 200 and 500 acres since 2002, 2 respondents indicated that they had increased production between 100 and 200 acres since 2002, six respondents indicated that they had increased production between 50 and 100 acres since 2002, and six respondents indicated that they had increased production by less than 50 acres since 2002. The average increase was 164 acres per respondent that indicated that they had increased acres in sod production, with a median increase of 80 acres. Twenty-one respondents indicated that their acreage was unchanged since 2002, with one respondent indicating acreage had decreased by 50%. These results tend to support a strong increase in the acres in sod production over the past three years.

Table 2. Projected total acreage in sod production by size of farm in Texas, 2005.

| Farm Size (acres) | Farms | Average Acres | | Estimated Acres for 2005 | |
|---------------------|-------|---------------|-----------|--------------------------|-----------|
| | | In Production | Harvested | In Production | Harvested |
| Small (1-499) | 116 | 231.8 | 195.3 | 26,888.8 | 22,654.8 |
| Medium (500-999) | 13 | 656.3 | 596.3 | 8,531.9 | 7,751.9 |
| Large (1000-1999) | 19 | 1,380.7 | 944.3 | 12,426.3 | 8,498.7 |
| Very Large (>=2000) | 3 | 2,800.0 | 2,700.0 | 8,400.0 | 8,100.0 |
| Total | 141 | | | 56,247.0 | 47,005.4 |

Twenty-one of the respondents indicated that their harvested acreage had increased by 68.3% since 2002. Four respondents indicated that their harvested acreage had decreased since 2002, by an average of 20.5%. Nineteen of the respondents indicated that their harvested acreage was unchanged from 2002.

Sod Production by Species and Varieties

The major grasses grown by the respondents as a percent of total production is shown in Table 3. St. Augustinegrass and Bermudagrass are the dominant species produced in Texas, with 82% of the producers indicating that they had some production of St. Augustine and 64% of the producers indicating they had some Bermudagrass production during 2005. St. Augustinegrass made up all of production on 34% of the operations that responded to the survey, while Bermudagrass was all that was produced on 14% of the farms. Seventy percent of the farms indicated they had more than 50% of their production in St. Augustinegrass, while 30% of the respondents indicated they had more than 50% of their acres in Bermudagrass production for 2005.

Table 3. Major grasses grown as a percent of total production in Texas, 2005.

| Species | Some | All | >50% |
|-------------------|------|-----|------|
| Bermudagrass | 64 | 14 | 30 |
| Buffalo Grass | 7 | 0 | 2 |
| Centipede Grass | 7 | 0 | 0 |
| Paspalum | 2 | 0 | 2 |
| St Augustinegrass | 82 | 34 | 70 |
| Zoysia Grass | 14 | 0 | 0 |
| Other Grass | 2 | 0 | 0 |

The summary statistics for the sales price per square yard of major grasses grown in Texas is shown in Table 4. The survey results indicate that the average price for St. Augustinegrass received by the respondents was \$.93 per square yard, with a maximum of \$1.70 per square yard and a minimum price of \$.10 per square yard (it should be pointed out that the \$.10 price per square yard was a royalty per square yard harvested on leased land). The median price for St. Augustinegrass, the price at which half the observations were above and half the observations were below, was \$.90 per square yard. The average price for Bermudagrass was \$.96 per square yard, but from a maximum of

the \$1.79 per square yard and a minimum of \$.60 per square yard. The median price for Bermudagrass was \$.90 per square yard. Zoysia grass had the highest average price of \$1.42 per square yard and the highest median price at \$1.50 per square yard.

Table 4. Sales price per square yard for major grasses in Texas, 2005.

| Species | Average | Maximum | Minimum | Median |
|-------------------|---------|---------|---------|---------|
| Bermudagrass | \$ 0.96 | \$ 1.79 | \$ 0.60 | \$ 0.90 |
| Buffalo Grass | \$ 1.35 | \$ 1.35 | \$ 1.35 | \$ 1.35 |
| Centipede Grass | \$ 1.00 | \$ 1.25 | \$ 0.76 | \$ 1.00 |
| Paspalum | | \$ - | \$ - | |
| St Augustinegrass | \$ 0.93 | \$ 1.70 | \$ 0.10 | \$ 0.90 |
| Zoysia Grass | \$ 1.42 | \$ 1.90 | \$ 0.76 | \$ 1.50 |
| Other Grass | \$ 0.70 | \$ 0.70 | \$ 0.70 | \$ 0.70 |

As shown above in Table 3, St. Augustinegrass is the most widely grown grass species in Texas for sod production (Table 3). A varietal breakdown of St. Augustinegrass is presented in Table 5. Ninety-one percent of the respondents that grew St. Augustinegrass indicated that some of their St. Augustinegrass production was Raleigh, which made it the most popular variety by far with producers in the survey. Forty-two percent of the respondents indicated that all their St. Augustinegrass production in 2005 was Raleigh, and 79% percent of St. Augustinegrass producers indicated that over 50% of their production was Raleigh in 2005. Common St. Augustinegrass was the second-most popular variety among producers with 36% indicating that some of their production was Common St. Augustinegrass.

Table 5. Top five St. Augustinegrass varieties grown in Texas by percentage in 2002 and 2005.

| Variety | Year | Some | All | >50% |
|----------------|-------------|-------------|------------|----------------|
| Common | 2002 | 36 | 6 | 21 |
| Common | 2005 | 36 | 6 | 21 |
| Floratom | 2002 | 9 | 3 | 3 |
| Floratom | 2005 | 3 | 3 | 3 |
| Palmetto | 2002 | 15 | 0 | 0 |
| Palmetto | 2005 | 12 | 0 | 0 |
| Raleigh | 2002 | 91 | 48 | 79 |
| Raleigh | 2005 | 91 | 42 | 79 |
| Other | 2002 | 0 | 0 | 0 |
| Other | 2005 | 6 | 0 | 0 |

Bermudagrass is the second most common species grown for sod in Texas, and is grown by 64% of the survey respondents (Table 3). A listing of the top five varieties of Bermudagrass grown by sod producers in Texas is shown in Table 6. The most common variety grown by Texas producers is Tif-419 during 2005, with 81% of the producers reporting that they grew some Tif-419. The variety with the fastest growing production share was Celebration, a new variety, which was grown by 23% of respondents in 2005.

Table 6. Top five Bermudagrass varieties grown in Texas by percentage in 2002 and 2005.

| Variety | Year | Some | All | >50% |
|----------------|-------------|-------------|------------|----------------|
| Celebration | 2002 | 0 | 0 | 0 |
| Celebration | 2005 | 23 | 0 | 4 |
| Common | 2002 | 46 | 17 | 29 |
| Common | 2005 | 46 | 8 | 23 |
| TexasTurf10 | 2002 | 17 | 0 | 4 |
| TexasTurf10 | 2005 | 8 | 0 | 4 |
| Tif-419 | 2002 | 75 | 25 | 54 |
| Tif-419 | 2005 | 81 | 23 | 54 |
| Other | 2002 | 17 | 4 | 4 |
| Other | 2005 | 12 | 4 | 4 |

Production Characteristics Related to Soil Type, Labor, and Mechanization

The majority of respondents reported that they had both loam and clay type soils in their operations (Table 6). Forty-four percent of respondents indicated that a majority of the sod they grew was on clay soils, while 42% of respondents indicated that the majority of sod they grew was on loam type soils.

Table 6. Sod production operations by soil type in Texas, 2005.

| Soil Type | Some | All | >50% |
|------------------|-------------|------------|----------------|
| Loam | 67 | 14 | 42 |
| Sand | 47 | 2 | 12 |
| Clay | 56 | 12 | 44 |
| Other | 14 | 7 | 9 |

Survey results for average employment in sod production by size of farm are shown in Table 7. As would be expected, the average number of full-time employees increases across size of farm, with very large farms less dependent on part-time and seasonal labor.

Table 7. Average employment reported by size of farm in Texas, 2005.

| | Full Time | Part Time | Seasonal |
|-----------------|------------------|------------------|-----------------|
| Small | 5.2 | 0.9 | 2.8 |
| Medium | 14.0 | 3.8 | 7.3 |
| Large | 31.0 | 6.7 | 7.3 |
| Very Large | 64.0 | 2.0 | 0.0 |
| Overall Average | 9.2 | 1.6 | 3.5 |

To estimate total employment in the Texas sod production industry, the average employment required in production by size of farm was calculated, and as shown in Table 7. The projected number of Texas sod farms by size was then calculated by applying the respective percentage of respondents by size shown in Table 1 times the total number of farms identified in Texas. Total estimated employment involved in sod

production in Texas based on this 2005 survey is 1,320 full time workers, 235 part time worker and 515 seasonal workers, for total employment of 2, 070 workers.

Table 8. Total projected employment by type of labor and size of farm, Texas 2005.

| | Full Time | Part Time | Seasonal |
|-----------------------|------------------|------------------|-----------------|
| Small | 656 | 115 | 351 |
| Medium | 178 | 48 | 92 |
| Large | 306 | 66 | 72 |
| Very Large | 180 | 6 | 0 |
| Industry Total | 1,320 | 235 | 515 |

Twenty-nine percent of the respondents indicated that employment had increased at their farm. For those respondents with increased employment, the median increase was 25%. Seven percent of the respondents indicated employment had declined on their farm. For those farms, the median decline in employment was 3%. Thirty two percent of respondents indicated that their operations are becoming more mechanized over time, with 68% indicating that the level of mechanization of their operations was staying the same. Eighty two percent of the respondents indicated that they had experienced the median increase in operating expenses per acre of 20% since 2002. Four percent of the respondents reported they had experienced a median decrease in per acre operating expenses of 4.5% since 2002.

Costs and Sales Characteristics

The graph shown in Figure 1 provides an estimate of the breakdown of total cost per acre of sod growing in marketing based on survey results. Respondents were asked to estimate the percentage of total cost per acre attributable to various growing and marketing related activities. Growing activities accounted for 61% of total costs and included land preparation (9%), fumigation (4%), planting (13%), and production (35%). Marketing activities accounted for the remaining 39% of the total cost structure, with

harvest costs comprising almost half of all marketing activity expenses, at 17%. The responses shown in figure 1 are normalized to a base of 100% for ease of interpretation.

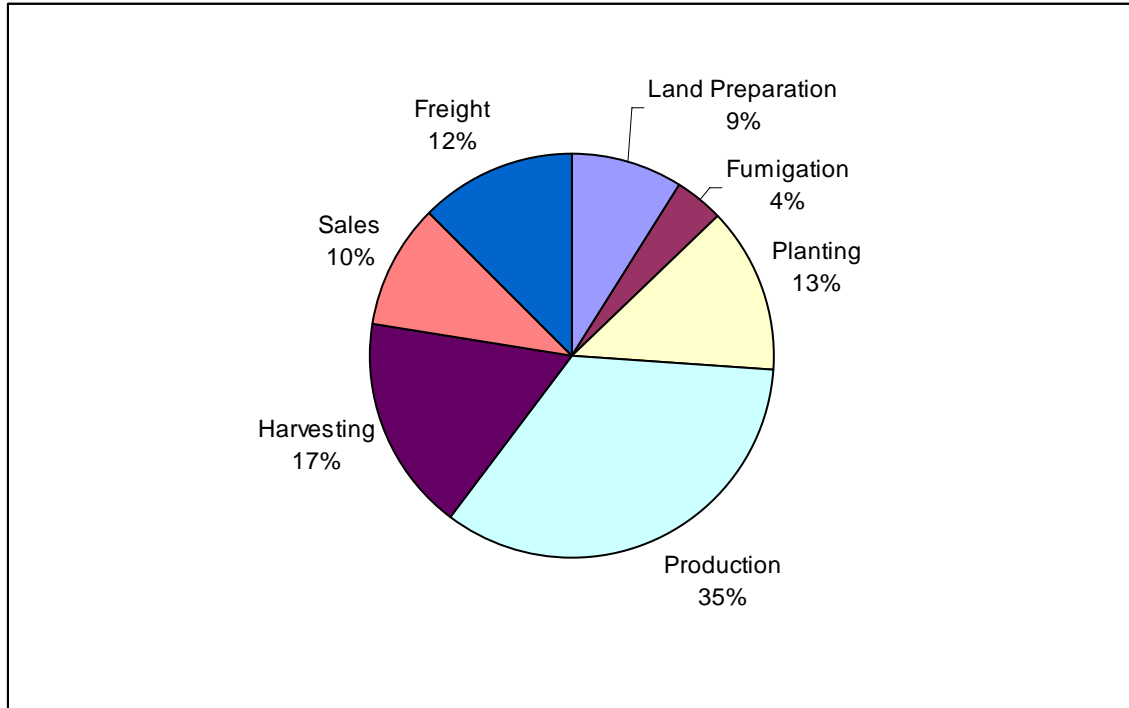


Figure 1. Normalized percentage of total costs attributable to sod growing and selling activities.

With respect to future production plans, 49% of the respondents indicated they plan to increase acreage by an average of 77% over the next three years. Two percent of the respondents indicated that they plan to get out of the sod production business within the next three years.

Forty percent of the respondents indicated they brokered sod during 2005. On average, respondents brokered 262,500 yards of sod during 2005 with a purchase value of \$210,876. The average sales value of brokered sod per respondent was \$320,358.

In this survey, 44% of respondents indicated that all their farm income was derived from sod sales. On average, over 83% of total sales for the farms that responded

to this survey were related to sod production (Table 9). Four percent of total sales came from sod related activities, with 3.1% attributed to distribution and shipping.

Respondents indicated that 5.3% of sales are from other sod-related activities, primarily from sales of plugs and other items. Respondents indicated that an average of 7.3% of total sales was generated from other crops and livestock. These results indicate that the farms involved in the sod production industry in Texas are not widely diversified with respect to crop mix.

Table 9. Components of sod farm income by percent, Texas 2005.

| Activity | Percentage of Total Sales |
|--------------------------------|----------------------------------|
| Sod Production | 83.3% |
| Distributor (shipping) | 3.1% |
| Custom Work/Supply Sales | 0.7% |
| Landscape Contract Services | 0.1% |
| Landscape Maintenance Services | 0.1% |
| Other Sod Related Sales | 5.3% |
| Livestock And Other Crop Sales | 7.3% |
| Ornamental Sales | 0.1% |

Like many other Southern states, the harvesting pattern for Texas sod is rather uniform throughout the year (Figure 2). Thirty five percent of the harvest occurs in the March-May time frame, with 21% in the June-August time period. During the September-November time period, 23% of the sod is harvested, followed by 21% in the December-February time period. This pattern is consistent with seasonal activity in the building construction industry, which is largest consumer of sod in Texas.

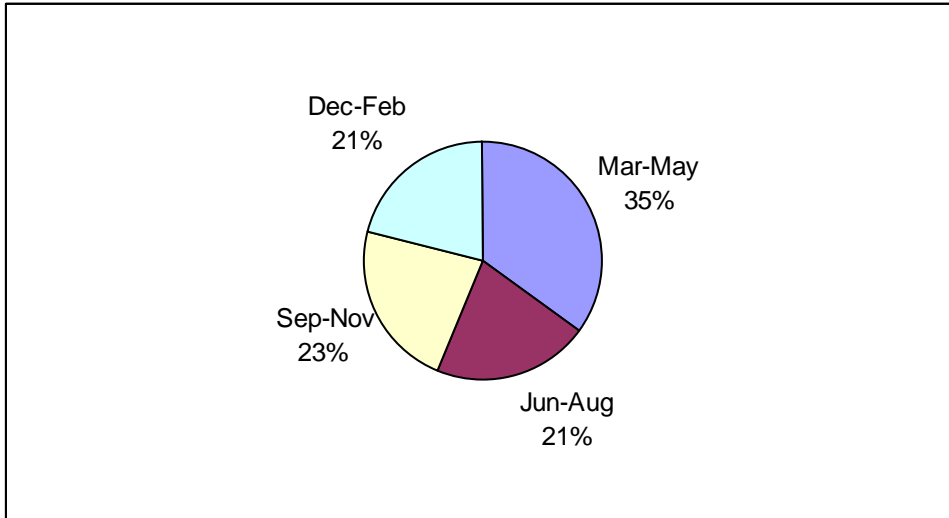


Figure 2. Seasonal harvesting pattern of Texas sod in 2005.

Most Texas sod producers employ strip cut harvesting techniques, with 95% of the respondents indicating that 83% of the acres of sod that they harvested in 2005 were strip cut. However, 32% of the producers responding to the survey indicated that they employed clear-cut harvest methods on 16% of the sod acreage they harvested in 2005.

Table 10. Percent acres harvested of each acre in production by species, Texas 2005.

| Variety | % Harvested |
|--------------------|--------------------|
| Bermudagrass | 86% |
| Buffalograss | 74% |
| Centipedegrass | 72% |
| St. Augustinegrass | 66% |
| Zoysiagrass | 67% |
| Other Grass | 93% |

To better understand the harvest levels producers are able to achieve, respondents were asked what percent of each acre of sod grown was harvested. For all grass species, growers indicated they harvested an average of 83% of all acres in sod production (Table 2). In terms of species, growers harvested 86% of Bermudagrass acres and 66% of St. Augustinegrass acres. The estimated 66% harvest efficiency for St. Augustinegrass is

problematic and would appear to be low given the responses in Table 2. This discrepancy will need to be addressed by further research.

Seventy nine percent of respondents indicated that they harvest their own sod. Sixteen percent of the respondents reported that they exclusively used custom harvesters. Five percent of the growers that completed the survey reported that they used both their own equipment and custom harvesters. Respondents indicated that 99% of the sod was shipped within one to two days of harvest.

In an attempt to better understand where sod is marketed in Texas, the survey asked respondents to indicate what percent of total sales in Texas were shipped to each major urban area. Table 11 presents a summary of the survey results that indicates the number of producers who market sod in a specific market area, and the percentage of sales by those producers into each market area. For example, 58% of the respondents indicated they sold some sod in the Houston area, with 15% of those producers reporting that they are sales to the Houston area comprise less than 10% of their total sales. However, 27% of the producers who sold sod in the Houston area indicated that those sales comprised over 90% of their total sales for 2005. The respondents to the survey indicated that the largest percentage of producers marketed in the Houston area, followed by the Dallas-Fort Worth-Arlington area with 44%, along with the San Antonio and Austin area with 31% of producers selling into both those areas. Thirteen percent of the respondents indicated that they sold sod outside Texas during 2005.

Table 11. Percentage of producer's sales by market area and as a percentage of respondent's sales, Texas 2005.

| Market Area | % of Producers | Percentage of Producer Sales by Market Area | | | | | | | | | | |
|-----------------------|----------------|---|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----|----|
| | | <10 | >10 & <20 | >20 & <30 | >30 & <40 | >40 & <50 | >50 & <60 | >60 & <70 | >70 & <80 | >80 & <90 | >90 | |
| Abilene | 7 | 100 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Amarillo | 4 | 100 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Austin | 31 | 29 | 36 | 21 | 0 | 0 | 7 | 7 | 0 | 0 | 0 | 0 |
| Beaumont | 11 | 40 | 40 | 0 | 0 | 20 | 0 | 0 | 0 | 0 | 0 | 0 |
| Brownsville | 2 | 0 | 0 | 100 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| College Station-Bryan | 4 | 50 | 0 | 50 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Corpus Christi | 11 | 40 | 40 | 0 | 20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Dallas-FW-Arlington | 44 | 30 | 5 | 10 | 15 | 5 | 0 | 20 | 0 | 0 | 0 | 15 |
| Denton-Lewisville | 11 | 0 | 60 | 20 | 0 | 0 | 20 | 0 | 0 | 0 | 0 | 0 |
| El Paso | 2 | 0 | 0 | 0 | 100 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Harlingen | 4 | 0 | 0 | 100 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Houston | 58 | 15 | 0 | 12 | 8 | 4 | 4 | 8 | 15 | 8 | 27 | 0 |
| Killeen | 9 | 75 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 25 | 0 | 0 |
| Laredo | 4 | 100 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lubbock | 7 | 33 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 33 | 33 | 0 |
| McAllen | 4 | 50 | 0 | 50 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Odessa | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Port Arthur | 7 | 67 | 0 | 33 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| San Antonio | 31 | 50 | 14 | 7 | 14 | 0 | 0 | 7 | 7 | 0 | 0 | 0 |
| Waco | 16 | 86 | 0 | 14 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| OtherTexas | 47 | 71 | 10 | 5 | 5 | 5 | 0 | 0 | 0 | 0 | 0 | 5 |
| OutsideTexas | 13 | 67 | 0 | 0 | 17 | 0 | 0 | 0 | 17 | 0 | 0 | 0 |

To better understand shipping costs in the sod industry, producers were asked what percentage of their total market was located less than 50 miles from their operation, 50 to 100 miles from their operation and what percentage of the market was located over 100 miles from their operation. Sixty seven percent of all the respondents indicated that some portion of their sales was shipped less than 50 miles. Sixty percent of these respondents also indicated that more than 50% of their sales were shipped less than 50 miles. Sixty nine percent of all the respondents indicated that some of their sales were shipped between 50 and 100 miles. Thirty five percent of these respondents indicated that more than half their production was shipped between 50 and 100 miles. Sixty seven percent of all the respondents indicated that some of their sales were shipped over 100 miles. Forty three percent of these respondents indicated that more than half their production was shipped more than 100 miles.

Twenty eight percent of respondents indicated that their markets were moving closer to their operations, while 63% reported that the distance to their markets is not changing significantly. Nine percent of respondents answered that the distance to their markets was increasing.

To estimate how sod is being used in Texas, producers were asked who the users of their sod were during 2005. As shown below in Figure 3, new developments were the major users of sod with 64% of sales being used by that sector. Commercial users were the second-largest market, consuming 14% of the sod produced during 2005. Highway use, resodding, and recreational complexes were destinations for 7%, 6% and 5% of shipments respectively during 2005.

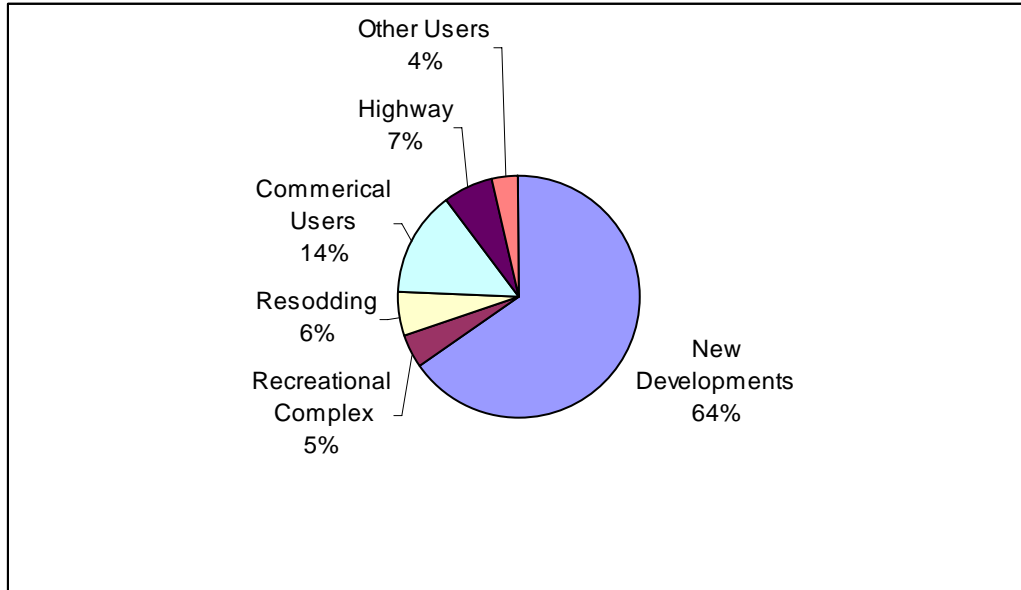


Figure 3. Percentage of sod sales by end use, Texas 2005.

The distribution sod buyers from the producers who responded to the survey is shown in Table 12. Landscape contractors were the principal buyers of sod, accounting for 54% of sales. Brokers or wholesalers were the second largest buyers of sod, buying 21% of the total. Homeowners accounted for 10% of sales, while retail or chain stores along with golf and other athletic buyers accounting for 4% of total sales each.

Table 12. Distribution of buyers of sod in Texas, 2005.

| Customer | Percent of Sales |
|------------------------|-------------------------|
| Retail Or Chain | 4% |
| Landscape Contractor | 54% |
| Broker/Wholesaler | 21% |
| Homeowner | 10% |
| Golf or Other Athletic | 4% |
| Other | 7% |

In the last three years, 51% of the respondents indicated that the market for sod in their area had increased by an average of 31%. Forty-seven percent of the respondents

indicated that there was no change in the size of their market in the last three years. Two percent of the producers indicated that their market had declined by 10% since 2002.

Producers that responded to the survey were fairly optimistic about future market growth. Thirty-six percent of the respondents expect their market to increase by 15% over the next three years, and 41% expect their market to stay the same. However, 23% the producers indicated they expect their market to decline by 11% over the next three years.

Although no aspect of the sod production and sales cycles is without potential quality reducing damage, in 2005 the respondents indicated that 75% of the damage to sod occurred during harvest, shipping and unloading, or after receipt by the buyer. As shown in Figure 4 below, producers indicated that 37% of the expected damage to sod occurred in the harvest and shipping phase of the sod production and marketing cycle. Producers also indicated that from their perspective, the 38% of sod damage occurred after receipt by buyers. These results would imply that there is significant room for producers to increase the quality of their sod by addressing quality issues not only before harvest, but through the harvest and loading periods.

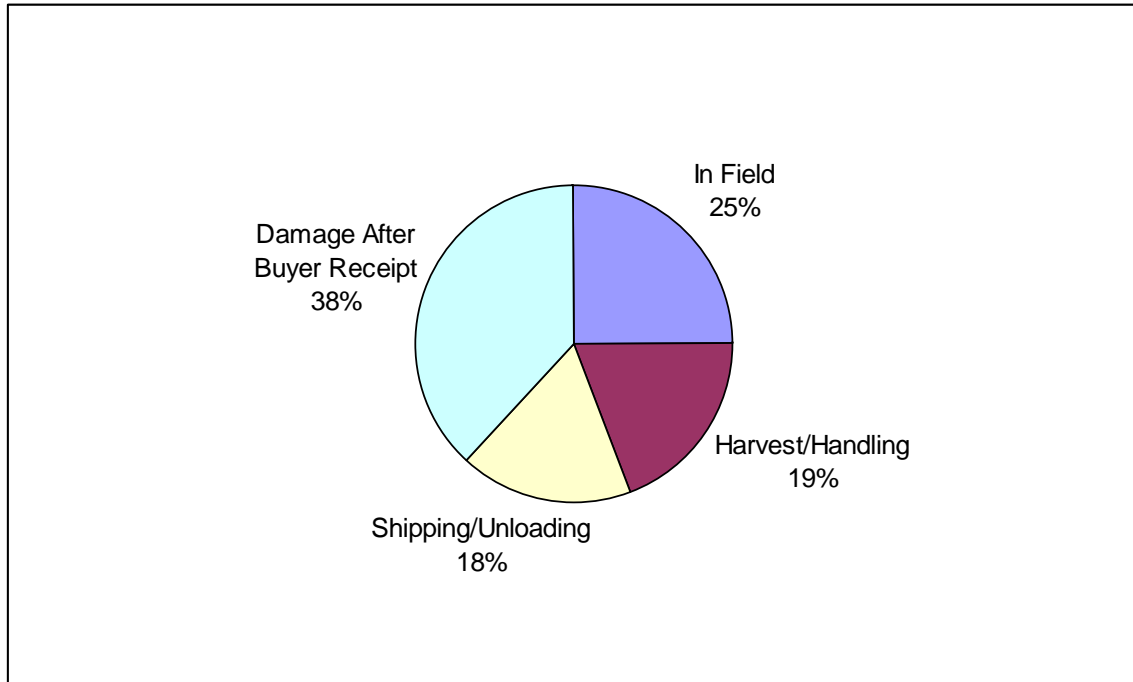


Figure 4. Respondent’s perspective on the source of the damage to sod, Texas 2005.

Producers were asked how they determine the price they charge for their product (Figure 5). They were given categories that included cost of production, others selling price, quality of sod plus an open-ended “other” category and asked to rank each selection in order of importance. Almost half the producers, 49%, said that the selling price of others was the most important factor they considered in pricing their sod, with 26% a producers indicating that that was the second-most important factor in pricing sod. Forty percent of producers indicated that their cost of production carried the most weight in their decision to price sod. The quality of sod being sold was ranked as the most important factor in pricing sod by 30% of the respondents. Other factors producers mentioned as being important in pricing sod was the distance to the customer and individual customer needs.

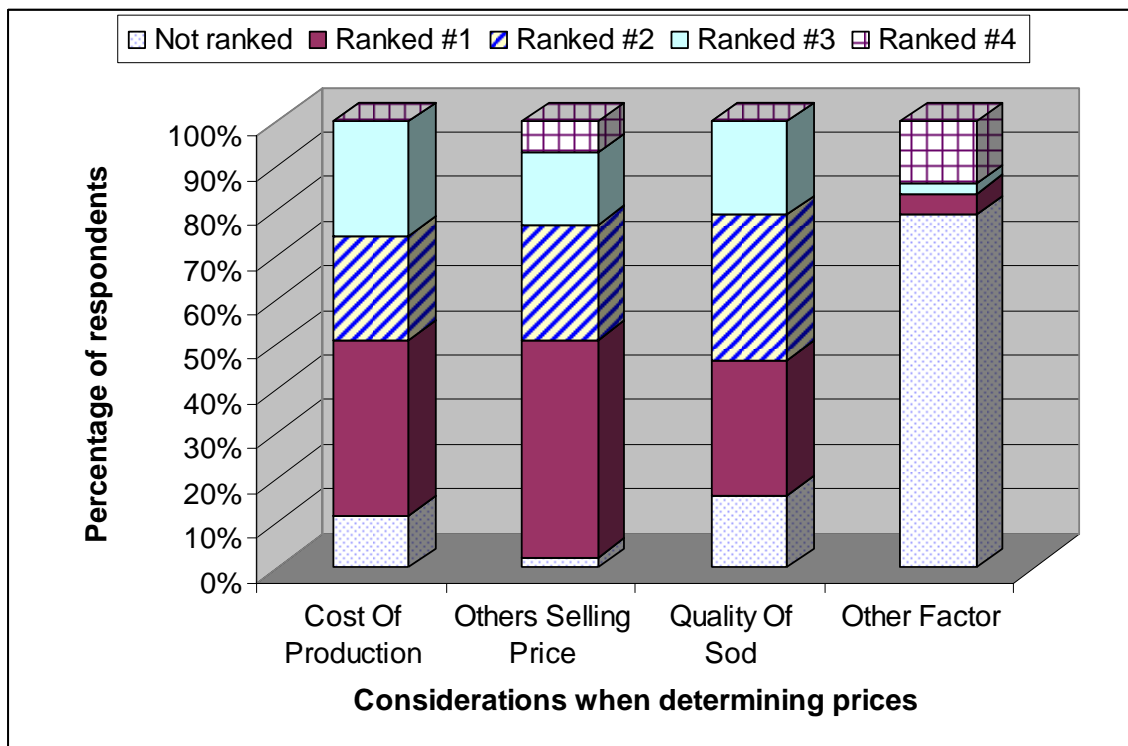


Figure 5. Considerations made by Texas sod producers in 2005 when determining the selling price of sod.

Individual Farm and Industry Concerns

In the last section of this survey, producers were asked to identify the three most serious problems they face from an individual business standpoint, as well as the three most challenging problems that the sod production industry faces in their viewpoint. The results for the most important problems from an individual standpoint were grouped into 11 major categories, and are shown in Table 13. Items related to cost of production, including high fuel, trucking and fertilizer prices appear to be the most pressing problems facing the individual producer. Problems related to the low price of sod and increased competition were the second most often cited problems by producers across all priorities. In addition, a large number of respondents indicated that bad debts and problems

collecting from customers was a serious problem for individual producers. Labor cost, quality and availability were listed as problems by nearly 10% of the respondents in all three priority categories. Other production problems, including the lack of time to adequately manage the sod operation, drought, damage from feral hogs, and problems finding pallets were problems mentioned as a third priority. A complete listing of individual responses sorted by category is contained in Appendix A.

Table 11. Responses of survey participants when asked about the three most important problems faced by their business, Texas 2005.

| Category | 1st Priority Problem | 2nd Priority Problem | 3rd Priority Problem |
|---|-----------------------------|-----------------------------|-----------------------------|
| Collections | 14% | 10% | 0% |
| High fuel, fertilizer and pesticide costs | 12% | 18% | 3% |
| Freight costs and trucking | 14% | 15% | 11% |
| Labor cost, quality and availability | 12% | 8% | 8% |
| Price of sod and competition | 23% | 20% | 24% |
| Weed control | 5% | 10% | 0% |
| Insect control | 0% | 3% | 0% |
| Government regulation | 2% | 3% | 5% |
| Other production problems | 5% | 5% | 24% |
| Cost of production and other financial | 14% | 8% | 22% |
| Water availability | 0% | 3% | 3% |

The producer responses to the question of what they think are the most important problems facing the Texas sod production industry are shown in Table 12. These responses also were broken down into 11 major categories. Problems that were related to the low price of sod, including overproduction and competition were identified as the number one problem facing the sod production industry by the producers who responded to the survey. Increasing cost of production and high input prices were the second major concern identified by the respondents. Other production problems that were identified by the respondents included lack of communication between producers and bias from the general public against the sod production industry on environmental matters. The complete listing of responses sorted by category is included in Appendix B.

Table 12. Responses of survey participants when asked about the three most important problems faced by the sod industry, Texas 2005.

| Category | 1st Priority Problem | 2nd Priority Problem | 3rd Priority Problem |
|--|-----------------------------|-----------------------------|-----------------------------|
| Collections | 2% | 8% | 0% |
| Cost of production, high input prices | 27% | 22% | 19% |
| Slow housing starts, weak demand | 7% | 14% | 9% |
| Labor cost, quality and availability | 2% | 8% | 3% |
| Price of sod, overproduction and competition | 34% | 27% | 28% |
| Pest control | 5% | 3% | 6% |
| Government regulation | 5% | 3% | 6% |
| Other production problems | 2% | 0% | 13% |
| Other financial problems | 2% | 8% | 3% |
| Water availability | 7% | 5% | 6% |
| Sod quality | 5% | 3% | 6% |



Section II. Cost of Production Estimates

These budgets are based on projections for input and output prices for the 2006 crop year. These budgets are intended to represent the cost structure for a hypothetical 500-acre sod operation. The cost of production estimates include one budget for first-year establishment costs, a second budget that contains pre-productive costs up to first harvest, and a third budget that contains harvest and maintenance costs.

The estimated purchase price, size, annual use, useful life, and direct and fixed cost per hour for the self-propelled machinery and tractors assumed to be used for the mid-size Bermuda sod farm are shown below in Table 13. Total direct costs include operator labor, fuel, lube and maintenance. Fixed costs represent the cost of owning machinery and equipment, and are the annualized capital recovery cost for owned durable items.

Table 13. Tractor and Self-propelled machines: estimated purchase price, size, annual use, useful life, and direct and fixed cost per hour for a mid-size Bermuda sod farm, Texas 2006.

| Item Name | Size | Purchase Price Dollars | Annual Use hours | Useful Life years | Total Direct \$/hour | Fixed \$/hour | Total Cost \$/hour |
|------------------|------|---------------------------|---------------------|----------------------|-------------------------|------------------|-----------------------|
| Large Tractor | 150 | 30,000 | 350 | 10 | 25.65 | 11.38 | 37.03 |
| Mid-Size Tractor | 80 | 28,000 | 800 | 14 | 16.30 | 3.82 | 20.12 |
| Small Tractor | 55 | 22,000 | 1000 | 14 | 13.19 | 2.61 | 15.80 |
| ATV | 20 | 5,000 | 600 | 5 | 12.99 | 3.00 | 15.99 |
| Fork Lift | 80 | 37,500 | 2200 | 10 | 237.73 | 30.12 | 267.85 |
| Fork Lift-2 | 80 | 37,500 | 2200 | 10 | 237.73 | 30.12 | 267.85 |
| Sod Harvester | | 45,000 | 1800 | 20 | 246.70 | 21.51 | 268.21 |

The total initial investment in durable inputs other than land for the 500 acre farm is estimated at \$396,800. The breakdown of this investment is shown in Table 14. Initial land cost is projected at \$1,500 per acre, with sales value at the end of a 15 year production life of \$900 per acre. This results in an annual land charge of \$155.43 per acre.

Table 14. Single durable inputs: estimated purchase price, useful life, total direct, fixed and total cost per year projected for the establishment of Bermuda sod for a mid-size farm, Texas 2006.

| Item Name | Unit of Measure | Purchase Price dollars | Useful Life years | Total Direct \$/yr | Fixed \$/yr | Total Cost \$/yr |
|----------------------|-----------------|------------------------|-------------------|--------------------|-------------|------------------|
| 1/4 Mile Wheel Move | each | 8,000 | 20 | 248 | 869 | 1,117 |
| Barn | each | 75,000 | 15 | 750 | 9,304 | 10,054 |
| Lay Down Pipe-3" | each | 28,800 | 30 | - | 2,761 | 2,761 |
| Linear Canal | each | 40,000 | 30 | - | 3,893 | 3,893 |
| Linear Irr System | acre | 85,000 | 20 | 1,063 | 9,062 | 10,125 |
| Main Line Pipe | each | 10,000 | 30 | 167 | 973 | 1,140 |
| Pump+Gearhead | ac-in | 15,000 | 20 | 11,250 | 1,643 | 12,893 |
| Relift Pump | ac-in | 15,000 | 20 | 750 | 1,629 | 2,379 |
| Reservoir - 2.5 acre | each | 20,000 | 30 | - | 1,947 | 1,947 |
| Road & Loading Pads | each | 15,000 | 15 | 150 | 1,861 | 2,011 |
| Well | each | 85,000 | 25 | 850 | 8,654 | 9,504 |

The initial investments in implements required for the farm is \$72,500 as shown in Table 15. The direct costs shown in Table 15 include maintenance and labor cost for the implement, along with fixed and direct costs for the associated power unit (P.U.). The total cost per acre covers both the implement and associated power unit cost of operation.



Table 15. Implements: estimated purchase price, annual use, useful life, and direct and fixed cost per acre for a mid-size Bermuda sod farm, Texas 2006.

| Item Name | Purchase Price Dollars | Annual Use hours | Useful Life years | Total Direct \$/acre | Fixed Implement \$/acre | P.U. \$/acre | Total Cost \$/acre |
|-------------------|---------------------------|---------------------|----------------------|-------------------------|----------------------------|-----------------|-----------------------|
| Aerator | 7,500 | 200 | 20 | 4.38 | 0.99 | 0.95 | 6.33 |
| Disc | 5,000 | 15 | 20 | 5.38 | 6.03 | 1.89 | 13.31 |
| Drag | 2,500 | 25 | 20 | 10.05 | 4.17 | 4.37 | 18.61 |
| Haul Out Trailer | 4,000 | 400 | 20 | 0.25 | 0.01 | 0.11 | 0.38 |
| Mower – Large | 17,000 | 800 | 7 | 1.22 | 0.32 | 0.21 | 1.76 |
| Mower – Small | 5,500 | 800 | 7 | 2.25 | 0.22 | 0.43 | 2.91 |
| Planter / Plugger | 20,000 | 20 | 30 | 46.88 | 64.89 | 7.58 | 119.35 |
| Roller | 3,500 | 800 | 20 | 27.16 | 0.79 | 6.37 | 34.33 |
| Shredder | 2,500 | 250 | 7 | 5.36 | 0.77 | 1.04 | 7.18 |
| Sprayer – Boom | 3,500 | 200 | 20 | 2.38 | 0.19 | 0.38 | 2.95 |
| Utility Trailer | 1,500 | 50 | 30 | 28.19 | 2.92 | 2.61 | 33.72 |

Table 16 shows the budgeted expenses by major category for the first year establishment of bermudagrass sod. Machine hire is comprised of the original dirt work related to drainage and shaping the sod fields, as well as custom application charges. Other expenses are comprised of miscellaneous supplies, vehicle related expenses, insurance, taxes, utilities and spot spraying. Repair and maintenance includes not only field equipment but the irrigation system as well. The costs shown in Table 17 represent the pre-productive expenses for the second year and are specified as an annual cost recovery item in the sod production expense budget shown in Table 18. The costs shown in Table 16 are amortized over a 15 year life and represented by the capital recovery factor shown in the fixed expense section of Table 18 at \$328.56 per acre. The estimated direct and fixed costs per acre are \$2,304.55 for this scenario. In addition to the direct and fixed expenses shown in Table 18, it is expected that residual expense items including \$55 per acre for workers compensation and general insurance, \$8 per acre for land taxes and \$35 per acre for utilities will also be incurred for a total production cost of \$2,402.55 per acre. This implies that at an annual yield of 4,000 square yards per acre an FOB price of \$0.60 per square yard must be obtained before all production expenses are covered.

An enterprise budget is a statement of what is expected if particular production practices are used to produce a specified amount of product, and is based on the economic and technological relationships between inputs and outputs. The scenarios shown in Tables 16, 17 and 18 represent a general guide and are not intended to predict the costs and returns from any particular farm's operation. For more details related to how enterprise budgets are constructed and used, contact your local county Extension office or go to the Extension budget web site maintained by the Department of Agricultural Economics at Texas A&M University at the following address (agecoext.tamu/budgets/list.htm) .

Table 16. Estimated costs per acre of Bermudagrass Establishment - Year 1, 2006.

| ITEM | UNIT | PRICE | QUANTITY | AMOUNT | YOUR FARM |
|--------------------------|-------|---------|----------|---------|-----------|
| | | dollars | | dollars | |
| DIRECT EXPENSES | | | | | |
| Fertilizer | | | | | |
| 13-13-13 | ton | 246.00 | 0.1500 | 36.90 | _____ |
| 21-0-0 | ton | 235.00 | 0.4000 | 94.00 | _____ |
| Herbicides | | | | | |
| Glyphosate | qt | 4.25 | 4.5000 | 19.13 | _____ |
| Pre-Emerge-Pennant | pt | 11.87 | 1.0000 | 11.87 | _____ |
| MSMA | qt | 3.74 | 3.0000 | 11.22 | _____ |
| Atrazine | lb | 2.50 | 1.0000 | 2.50 | _____ |
| Other | | | | | |
| Spot Spray - Walking | hr | 7.00 | 6.0000 | 42.00 | _____ |
| Pickup-Foreman | acre | 24.25 | 1.0000 | 24.25 | _____ |
| Pickups-General | acre | 29.10 | 1.0000 | 29.10 | _____ |
| Misc. Supplies | acre | 15.00 | 1.0000 | 15.00 | _____ |
| Insurance-1st Yr | acre | 55.00 | 1.0000 | 55.00 | _____ |
| Taxes-1st Yr | acre | 8.00 | 1.0000 | 8.00 | _____ |
| Utilities-1st Yr | acre | 35.00 | 1.0000 | 35.00 | _____ |
| Machine Hire | | | | | |
| Land Preparation | acre | 500.00 | 1.0000 | 500.00 | _____ |
| Spray - Granular | acre | 2.50 | 5.0000 | 12.50 | _____ |
| Spray - Liquid | acre | 4.50 | 2.0000 | 9.00 | _____ |
| Seed Stock | | | | | |
| Bermuda | yard | 1.30 | 300.0000 | 390.00 | _____ |
| MANUAL LABOR | | | | | |
| Implements | hour | 7.00 | 3.0666 | 21.47 | _____ |
| Tractors | hour | 7.00 | 13.8261 | 96.78 | _____ |
| Self-Propelled | hour | 7.00 | 4.4977 | 31.48 | _____ |
| Pump+Gearhead | hour | 7.00 | 3.7500 | 26.25 | _____ |
| FOREMAN | | | | | |
| Foreman | hour | 16.00 | 10.0000 | 160.00 | _____ |
| DIESEL FUEL | | | | | |
| Tractors | gal | 2.20 | 49.1961 | 108.24 | _____ |
| Pump+Gearhead | gal | 2.20 | 37.5000 | 82.50 | _____ |
| GASOLINE | | | | | |
| Self-Propelled | gal | 2.50 | 2.2488 | 5.62 | _____ |
| REPAIR & MAINTENANCE | | | | | |
| Implements | acre | 22.36 | 1.0000 | 22.36 | _____ |
| Tractors | acre | 9.47 | 1.0000 | 9.47 | _____ |
| Self-Propelled | acre | 1.87 | 1.0000 | 1.87 | _____ |
| Well | each | 850.00 | 0.0050 | 4.25 | _____ |
| Pump+Gearhead | ac-in | 0.12 | 15.0000 | 1.88 | _____ |
| Relift Pump | ac-in | 0.12 | 15.0000 | 1.88 | _____ |
| 1/4 Mile Wheel Move | each | 248.00 | 0.0666 | 16.53 | _____ |
| Barn | each | 750.00 | 0.0025 | 1.88 | _____ |
| Road & Loading Pads | each | 150.00 | 0.0025 | 0.38 | _____ |
| INTEREST ON OP. CAP. | acre | 110.92 | 1.0000 | 110.92 | _____ |
| TOTAL DIRECT EXPENSES | | | | 1999.24 | _____ |
| FIXED EXPENSES | | | | | |
| Implements | acre | 130.83 | 1.0000 | 130.83 | _____ |
| Tractors | acre | 60.71 | 1.0000 | 60.71 | _____ |
| Self-Propelled | acre | 9.01 | 1.0000 | 9.01 | _____ |
| Well | each | 8653.53 | 0.0050 | 43.27 | _____ |
| Pump+Gearhead | each | 1643.19 | 0.0050 | 8.22 | _____ |
| Relift Pump | each | 1628.53 | 0.0050 | 8.14 | _____ |
| 1/4 Mile Wheel Move | each | 868.55 | 0.0666 | 57.90 | _____ |
| Lay Down Pipe-3" | each | 2761.02 | 0.0500 | 138.05 | _____ |
| Reservoir - 2.5 acre | each | 1946.72 | 0.0050 | 9.73 | _____ |
| Land | each | 155.43 | 1.0000 | 155.44 | _____ |
| Barn | each | 9304.41 | 0.0025 | 23.26 | _____ |
| Road & Loading Pads | each | 1860.88 | 0.0025 | 4.65 | _____ |
| TOTAL FIXED EXPENSES | | | | 649.21 | _____ |
| TOTAL SPECIFIED EXPENSES | | | | 2648.45 | _____ |

Table 17. Estimated costs per acre Bermudagrass pre-productive expenses - Year 2, 2006.

| ITEM | UNIT | PRICE | QUANTITY | AMOUNT | YOUR FARM |
|--------------------------|-------|---------|----------|---------|-----------|
| | | dollars | | dollars | |
| DIRECT EXPENSES | | | | | |
| Fertilizer | | | | | |
| 13-13-13 | ton | 246.00 | 0.1500 | 36.90 | _____ |
| 21-0-0 | ton | 235.00 | 0.8000 | 188.00 | _____ |
| Herbicides | | | | | |
| Atrazine | lb | 2.50 | 2.0000 | 5.00 | _____ |
| Pre-Emerge-Pennant | pt | 11.87 | 2.0000 | 23.74 | _____ |
| MSMA | qt | 3.74 | 3.0000 | 11.22 | _____ |
| Sledgehammer | oz | 55.49 | 0.7500 | 41.62 | _____ |
| Other | | | | | |
| Spot Spray - Walking | hr | 7.00 | 7.0000 | 49.00 | _____ |
| Machine Hire | | | | | |
| Spray - Liquid | acre | 4.50 | 5.0000 | 22.50 | _____ |
| Spray - Granular | acre | 2.50 | 11.0000 | 27.50 | _____ |
| Insecticides | | | | | |
| Amdro | lb | 6.50 | 2.0000 | 13.00 | _____ |
| MANUAL LABOR | | | | | |
| Tractors | hour | 7.00 | 9.0999 | 63.70 | _____ |
| Self-Propelled | hour | 7.00 | 4.4977 | 31.48 | _____ |
| Pump+Gearhead | hour | 7.00 | 3.7500 | 26.25 | _____ |
| DIESEL FUEL | | | | | |
| Tractors | gal | 2.20 | 20.4166 | 44.92 | _____ |
| Pump+Gearhead | gal | 2.20 | 37.5000 | 82.50 | _____ |
| GASOLINE | | | | | |
| Self-Propelled | gal | 2.50 | 2.2488 | 5.62 | _____ |
| REPAIR & MAINTENANCE | | | | | |
| Implements | acre | 7.46 | 1.0000 | 7.46 | _____ |
| Tractors | acre | 3.59 | 1.0000 | 3.59 | _____ |
| Self-Propelled | acre | 1.87 | 1.0000 | 1.87 | _____ |
| Well | each | 850.00 | 0.0050 | 4.25 | _____ |
| Pump+Gearhead | ac-in | 0.12 | 15.0000 | 1.88 | _____ |
| Relift Pump | ac-in | 0.12 | 15.0000 | 1.88 | _____ |
| 1/4 Mile Wheel Move | each | 248.00 | 0.0666 | 16.53 | _____ |
| Main Line Pipe | each | 166.66 | 0.0050 | 0.83 | _____ |
| INTEREST ON OP. CAP. | acre | 53.72 | 1.0000 | 53.72 | _____ |
| TOTAL DIRECT EXPENSES | | | | 764.96 | _____ |
| FIXED EXPENSES | | | | | |
| Implements | acre | 20.94 | 1.0000 | 20.94 | _____ |
| Tractors | acre | 20.42 | 1.0000 | 20.42 | _____ |
| Self-Propelled | acre | 9.01 | 1.0000 | 9.01 | _____ |
| Well | each | 8653.53 | 0.0050 | 43.27 | _____ |
| Pump+Gearhead | each | 1643.19 | 0.0050 | 8.22 | _____ |
| Relift Pump | each | 1628.53 | 0.0050 | 8.14 | _____ |
| 1/4 Mile Wheel Move | each | 868.55 | 0.0666 | 57.90 | _____ |
| Main Line Pipe | each | 973.36 | 0.0050 | 4.87 | _____ |
| Reservoir - 2.5 acre | each | 1946.72 | 0.0050 | 9.73 | _____ |
| TOTAL FIXED EXPENSES | | | | 182.50 | _____ |
| TOTAL SPECIFIED EXPENSES | | | | 947.46 | _____ |

Table 18. Estimated costs per acre of Bermudagrass Production, 2006.

| ITEM | UNIT | PRICE | QUANTITY | AMOUNT | YOUR FARM |
|--------------------------|------|---------|----------|---------|-----------|
| | | dollars | | dollars | |
| DIRECT EXPENSES | | | | | |
| Fertilizer | | | | | |
| 13-13-13 | ton | 246.00 | 0.1000 | 24.60 | _____ |
| 21-0-0 | ton | 235.00 | 0.5333 | 125.33 | _____ |
| Herbicides | | | | | |
| Atrazine | lb | 2.50 | 1.3333 | 3.33 | _____ |
| Pre-Emerge-Pennant | pt | 11.87 | 1.3333 | 15.83 | _____ |
| MSMA | qt | 3.74 | 2.0000 | 7.48 | _____ |
| Sledgehammer | oz | 55.49 | 0.5000 | 27.75 | _____ |
| Pallets | | | | | |
| Pallets | each | 3.00 | 85.0000 | 255.00 | _____ |
| Other | | | | | |
| Pickup-Foreman | acre | 24.25 | 1.0000 | 24.25 | _____ |
| Pickups-General | acre | 29.10 | 1.0000 | 29.10 | _____ |
| Misc. Supplies | acre | 15.00 | 1.0000 | 15.00 | _____ |
| Advertising | acre | 20.00 | 1.0000 | 20.00 | _____ |
| Spot Spray - Walking | hr | 7.00 | 4.6666 | 32.67 | _____ |
| Machine Hire | | | | | |
| Spray - Liquid | acre | 4.50 | 3.3333 | 15.00 | _____ |
| Spray - Granular | acre | 2.50 | 7.3333 | 18.33 | _____ |
| Insecticides | | | | | |
| Amdro | lb | 6.50 | 1.3333 | 8.67 | _____ |
| MANUAL LABOR | | | | | |
| Tractors | hour | 7.00 | 8.0786 | 56.55 | _____ |
| Self-Propelled | hour | 7.00 | 66.9985 | 468.99 | _____ |
| Bermuda Est. 2nd Yr | hour | 7.00 | 2.5000 | 17.50 | _____ |
| FOREMAN | | | | | |
| Foreman | hour | 16.00 | 10.0000 | 160.00 | _____ |
| DIESEL FUEL | | | | | |
| Tractors | gal | 2.20 | 20.3547 | 44.79 | _____ |
| Self-Propelled | gal | 2.20 | 116.0000 | 255.20 | _____ |
| Bermuda Est. 2nd Yr | gal | 2.20 | 25.0000 | 55.00 | _____ |
| GASOLINE | | | | | |
| Self-Propelled | gal | 2.50 | 1.4992 | 3.75 | _____ |
| REPAIR & MAINTENANCE | | | | | |
| Implements | acre | 4.97 | 1.0000 | 4.97 | _____ |
| Tractors | acre | 3.24 | 1.0000 | 3.24 | _____ |
| Self-Propelled | acre | 20.23 | 1.0000 | 20.23 | _____ |
| Bermuda Est. 2nd Yr | acre | 16.90 | 1.0000 | 16.90 | _____ |
| INTEREST ON OP. CAP. | acre | 35.81 | 1.0000 | 35.81 | _____ |
| TOTAL DIRECT EXPENSES | | | | 1765.27 | _____ |
| FIXED EXPENSES | | | | | |
| Implements | acre | 14.77 | 1.0000 | 14.77 | _____ |
| Tractors | acre | 20.09 | 1.0000 | 20.09 | _____ |
| Self-Propelled | acre | 81.76 | 1.0000 | 81.76 | _____ |
| Bermuda Est. 1st Yr | acre | 328.56 | 1.0000 | 328.56 | _____ |
| Bermuda Est. 2nd Yr | acre | 88.10 | 1.0000 | 88.10 | _____ |
| TOTAL FIXED EXPENSES | | | | 539.28 | _____ |
| TOTAL SPECIFIED EXPENSES | | | | 2304.55 | _____ |

Section III: Estimated Industry Sales and Impact Multipliers

The estimated farm-gate value for total sod sales in Texas for 2005 based on the survey results is shown below in Table 19. The total estimated 2005 farm-gate sales value is \$177.6 million, and was developed by multiplying the reported harvested acres for each farm times the percent acres grown by species for each farm, and summing over all farms. This estimate of acres harvested was then multiplied by 4,000 yards per acre to generate the estimate for total yards harvested. The total yards harvested by species were then multiplied by the average price reported by the producers in the survey for each species to arrive the estimated farm-gate value of sod produced in Texas during 2005.

Table 19. Estimated yards sold and average price by species, Texas 2005.

| Species | Percent of Acres | Acres Harvested | Yards Harvested | Average Price | Estimated 2005 Farm Gate Value |
|--------------------|-------------------------|------------------------|------------------------|----------------------|---------------------------------------|
| Bermudagrass | 32.9% | 15,479 | 61,916,000 | \$ 0.96 | \$ 59,439,360 |
| Buffalo Grass | 0.3% | 160 | 640,000 | \$ 1.35 | \$ 864,000 |
| Centipede Grass | 1.8% | 855 | 3,420,000 | \$ 1.00 | \$ 3,420,000 |
| Paspalum* | 2.7% | 1,274 | 5,096,000 | \$ 0.76 | \$ 3,872,960 |
| St. Augustinegrass | 60.2% | 28,307 | 113,228,000 | \$ 0.93 | \$ 105,302,040 |
| Zoysia Grass | 1.6% | 743 | 2,972,000 | \$ 1.42 | \$ 4,220,240 |
| Other Grass | 0.4% | 188 | 752,000 | \$ 0.70 | \$ 526,400 |
| Total | 100.0% | 47,006 | 188,024,000 | | \$ 177,645,000 |

* Paspalum price based on one response only.

The economic impacts of the Texas sod industry were estimated using the input-output model Impact Analysis for Planning (IMPLAN). The 2002 IMPLAN data was used for the purpose of this study. The input-output analysis results from this study are shown below in Table 20. The total economic output of sod production on the Texas economy in 2005 was \$307 million based on this study. Total economic output is an estimation of total business sales for the sod sector and all supporting sectors. The farm gate sales of sod in 2005 resulted in \$23.5 million of indirect economic output by the firms that directly support the sod industry such as input suppliers, and \$106 million in induced effects from household spending, that result's from business profits and wages. The results of this study indicate that the sod industry generated \$231 million in value added to the state's economy in 2005. Value added is net income resulting from the production of sod and includes net proprietary income, wages, rents and local taxes. The sod production industry was estimated to support over 5,200 jobs in Texas. These jobs include full time, part time and self employed individuals.

Table 20. Estimated economic impact of the sod production industry in Texas for 2005.

| | Ouput | Value Added | Employment |
|----------|---------------|--------------------|-------------------|
| Direct | \$177,644,992 | \$152,168,944 | 3,926 |
| Indirect | \$23,473,659 | \$14,223,349 | 266 |
| Induced | \$105,802,209 | \$65,010,439 | 1,059 |
| Totals | \$306,920,860 | \$231,402,732 | 5,252 |



Sod production is a significant agricultural activity in Texas. As shown below in Table 21, the survey results indicate that sod production would be the ninth largest agricultural production activity in Texas based on estimated cash receipts for 2005 from the Texas Cooperative Extension Agricultural Increment Report (Medeiros, R.E. and C.G. Anderson).

Table 21. Top fifteen crops produced in Texas ranked by estimated cash receipts in for 2005 (Source: TCE Agricultural Increment Report).

| Commodity | 2005 Value in Million Dollars | |
|---------------------|--------------------------------------|--------------|
| Cotton & Cottonseed | \$ | 2,699.5 |
| Nursery | \$ | 1,820.2 |
| Hay | \$ | 584.2 |
| Corn | \$ | 471.8 |
| Wheat | \$ | 430.9 |
| Sorghum | \$ | 332.3 |
| Vegetables | \$ | 304.2 |
| Peanuts | \$ | 209.1 |
| Sod | \$ | 177.6 |
| Pecans | \$ | 135.2 |
| Rice | \$ | 122.7 |
| Ensilage | \$ | 101.1 |
| Watermelon | \$ | 67.7 |
| Alfalfa | \$ | 66.1 |
| Grapefruit | \$ | 33.4 |

References

- Beddow, J., E. Jones, D. Lamie, K. Mundy and D. Chalmers. "The Economics of Turfgrass Production in the Commonwealth of Virginia." Bulletin 01-2, Virginia Agricultural Experiment Station, Blacksburg, VA. December, 2001.
- Cain, J. J., J. L. Adrian, P. M. Duffy, and E. Guertal. "Turfgrass-Sod Production In Alabama: Economics And Marketing." Bulletin 653, Alabama Agricultural Experiment Station, Auburn, AL. October, 2003.
- Dillman, D.A. *Mail and Telephone Surveys*. New York, NY: John Wiley and Sons, 1978.
- Haydu, J.J., L.N. Satterthwaite and J.L. Cisar. "An Economic and Agronomic Profile of Florida's Sod Industry in 2003." Food & Resource Economics Department, Agricultural Experiment Stations and Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida, Gainesville 32611, April 2005.
- Lard, C.F., C.R. Hall and R.K. Berry. "The Economic Impact of the Texas Turfgrass Industry." Department of Agricultural Economics, Texas A&M University, College Station, TX. Horticultural Economics Research Report #96-9. September 1996.
- Laughlin, D.H. and S.R. Spurlock. "User's Guide for the Mississippi State Budget Generator Version 6.0 for Windows." Department of Agricultural Economics, Mississippi State University, Starkville, MS. March 2004.
- Medeiros, R.E. and C.G. Anderson. "Texas Estimated Value of Agricultural Production and Related Items – 2005." Texas Cooperative Extension, College Station, TX April, 2006.
- Minnesota IMPLAN Group (MIG), Stillwater, MN, 2002. www.implan.com
- White, Robert W., John L. Adrian, and Ray Dickens. 1991. "Alabama's Turfgrass-Sod Industry." Alabama Agricultural Experiment Station, Auburn University. Bulletin 610.

Appendix A

Individual Producer Concerns

Individual Producer Concerns

| Individual Problem 1 | Individual Problem 2 | Individual Problem 3 |
|---|--|--|
| collections | Collections | Fertilizer |
| Payments by landscapers | non-paying/dishonest customers | Trucking |
| Collecting | collect bad account | transportation |
| | | Finding reliable trucking companies |
| Fuel | Collections | Trucking |
| Collection | costs - direct & fertilizer, etc | labor |
| Getting people to pay their bill | Price of fertilizer & chemicals | Labor |
| Price of fuel & fertilizer | Fuels | Labor |
| Rising cost of fert, herbicides, fuel | Fertilizer | customer ignorance about sod varieties |
| | | Getting more money for our turf competition |
| Price of fuel | Production cost other than labor | cheap competition |
| Energy costs | Cost of fertilizer | Competition of large companies |
| cost of fuel | Increasing cost of inputs (fert, diesel) | Price |
| trucking | Trucking | Price cutting competitors |
| trucking | Trucking or delivery | Too much expansion (acres) |
| Rising freight/fuel prices | Freight | Market communication employees & government regulation |
| Trucking | Delivery of product | city cops- DOT - trucking traffic quality |
| Freight costs | Reliable freight contractors | wild hog damage |
| Freight | Transportation | quality grass consistency |
| | | Convincing other growers that they are not helping |
| labor | Labor | Time to get organized to expand |
| Quality foreman for installation projects | Labor | |
| Quality workers | Good labor | Droughts |
| Labor costs | Stagnant price of product | Maintaining a certain quality |
| Labor | sod prices increasing/market price not | Weather |
| | | Pallets |
| keeping price high enough to survive | Price | too small could grow 100A w/not much more labor |
| Price | Competition | Rising costs |
| | Explaining cost difference when other producers are priced lower | Cost of equipment, fuel etc. |
| Maintaining price for quality sod | too many acres planted | increase cost of production |
| Selling price | Cut throat competitors | Thinking better as a business rather than farmer |
| Price | Marketing | Greed of employees, family etc. |
| pricing | | High cost of production |
| | | Increasing input cost |
| Phone sales | Weed control | Quality & price of water |
| Low pricing of competitors | weed invasion (common Bermuda) | |
| Sod sold too cheap | Control of Bermudagrass | |
| Grass is too cheap | Weed control | |
| | | |
| Bermuda infestation | Grub infestation | |
| Weeds | Government paper work | |
| Government interference | Mother nature | |
| not enough land | Lack of technology | |
| Harvest | Costs | |
| cash flow | High production cost | |
| Raising cost of production | Unknown profits | |
| cost of production | not enough water | |
| Increasing costs | | |
| Rising cost of production | | |
| cost of production | | |

Appendix B
Industry Concerns

Industry Concerns

| Industry Problem 1 | Industry Problem 2 | Industry Problem 3 |
|---|---|--|
| Bad debt | Uncollectible accounts | Cost of production |
| Price hasn't changed yet fuel & farm materials have | insurance-hospitalization & liability | Fertilizer |
| cost of production | Collections - not getting paid | High cost |
| costs | energy costs | Input cost |
| Rising cost of production, harvesting, delivery | increasing costs | Expenses continue to rise |
| Rising costs of fuel | Curtailement of useable insecticides & herbicides | Cost of fertilizer |
| Increase cost of production | Material cost for production (fert, chem, fuel) | Cutback on commercial job costs |
| Cost of production & delivery | Trucking | Economy slowing down |
| High production cost | Fuels | Artificial turf competition |
| Rising interest rates (mortgages) | Prices of inputs | People |
| Rising input costs | Cost of fuel | competition |
| Energy costs | Decline in housing industry | Lack of rising prices for products |
| Cost of Production | Housing slump | Price |
| Too much sod if housing slows | Real estate bubble bursting | Too many producers not making their living in the business |
| New construction decline | Slow down in building industry | Over production |
| Labor, fuel & fertilizer cost compared to sell \$ | too many acres planted | Get more dollar for product |
| Prices inconsistent with production costs | availability of labor | Lower or stagnant pricing |
| farmer mentality selling to cheap | Labor | To many acres being put in production |
| Price | Workers | Too much expansion (acres) |
| EVERYBODY not charging premium \$ for their product | too much competition | pests |
| Sod prices | Competition | Ants |
| Get more for you product to cover increase cost of | Price | Not enough meetings |
| Our production | Perception of value-cost erosion | misunderstanding bureaucracy |
| Pricing in line w/costs | Over production causing low prices | Lack of cooperation among producers |
| Low pricing or price wars | Cut-throat Sales | not enough communication |
| Over production | Low pricing | Environmental bias (people not educated properly) |
| Grass is too cheap | Low prices | Lack of knowledge from consumer |
| Supply - too much new grass going in | Farms selling sod below market value | competition on freight charges |
| Over production | Low price | governmental-water limitations |
| too much grass being planted | Environmental impact of sod | Water |
| concerned w/sod webworms & the inability to kill | Government paperwork | Quality control standards |
| Weeds | Credit | Farms selling poor quality sod |
| regulation | No profit | |
| Government interference | Liability (chemicals, trucking, labor) | |
| Perception of importance | Water issue | |
| interest rates | Water for drought area in valley | |
| Water useage concerns | Wide range of quality | |
| Water availability | | |
| Water | | |
| Quality of production | | |
| Quality standards (mkt flooded w/low-grade sod) | | |