

# AgriProfit\$

## The Economics of Sugar Beet Production in Alberta 2010



**Government  
of Alberta** ■

AGDEX 171/821-5

February, 2012

THE ECONOMICS OF  
SUGAR BEET PRODUCTION  
IN ALBERTA  
2010

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February, 2012

Published by:

Alberta Agriculture and Rural Development  
Economics and Competitiveness Division  
Economics Branch  
7000 – 113 Street  
Canada T6H 5T6

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ISBN 978-0-7732-6092-4 (Print)

ISSN 0845-6003 (Print)

ISBN 978-0-7732-6094-8 (Electronic PDF)

ISSN 1927-9272 (Electronic PDF)

## **ACKNOWLEDGEMENTS**

We acknowledge and appreciate the participation of eleven (11) sugar beet producers who willingly provided detailed information on their operations. The support provided by the Board of Directors of the Alberta Sugar Beet Growers (ASBG) and Office Staff has also been very helpful towards the completion of this report. The producers' on-going cooperation is always appreciated. Assistance provided by Pauline VanBiert and Shukun Guan in entering and analyzing the data for this report is gratefully acknowledged.

**Emmanuel Anum Laate**

## TABLE OF CONTENTS

<b>SECTION I</b> .....	<b>1</b>
INTRODUCTION .....	1
<i>Objectives:</i> .....	2
<i>Study Sample</i> .....	2
<b>SECTION II</b> .....	<b>3</b>
METHOD OF ANALYSIS .....	3
<i>Fuel, Repairs and Machine Investment Allocations</i> .....	3
<b>SECTION III</b> .....	<b>5</b>
SUGAR BEET PRODUCTION IN ALBERTA, 1980-2011 .....	5
<b>SECTION IV</b> .....	<b>12</b>
SUGAR BEET PRODUCTION COSTS AND RETURNS, 2010 .....	12
<i>Gross Returns</i> .....	12
<i>Variable Costs</i> .....	12
<i>Total Cash Costs</i> .....	13
<i>Capital Costs</i> .....	13
<i>Total Production Costs</i> .....	16
<i>Net Returns</i> .....	18
<b>SECTION V</b> .....	<b>22</b>
SUGAR BEET PRODUCTION COSTS AND RETURNS BY SIZE OF OPERATION, 2010 .....	22
<i>Group I (Up to 50 Acres)</i> .....	22
<i>Group II (51 to 100 Acres)</i> .....	26
<i>Group III (Over 100 Acres)</i> .....	26
MANAGEMENT PROFILE.....	29
<b>SECTION VI</b> .....	<b>31</b>
COMPARISON OF COSTS AND RETURNS, 2001-2010.....	31
<b>SECTION VII</b> .....	<b>33</b>
SUMMARY .....	33
<b>APPENDIX</b> .....	<b>37</b>
SUGAR BEET PRODUCTION COSTS AND RETURNS USING PROVINCIAL YIELD, 2010 .....	37

## LIST OF TABLES

Table 1: Historical Data on Sugar Beet Production in Alberta, 1980-2011 .....	8
Table 2: Sugar Beet Production Costs and Returns, 2010 (22 Enterprises) .....	14
Table 3: Sugar Beet Production Costs and Returns, Owned Land, 2010 (16 Enterprises) .....	20
Table 4: Sugar Beet Production Costs and Returns, Rented Land, 2010 (6 Enterprises).....	21
Table 5: Sugar Beet Production Costs and Returns (Up to 50 Acres), 2010 (3 Enterprises) .....	23
Table 6: Sugar Beet Production Costs and Returns (51 to 100 Acres), 2010 (12 Enterprises) .....	27
Table 7: Sugar Beet Production Costs and Returns (Over 100 Acres), 2010 (7 Enterprises) .....	28
Table 8: Profile of Management Factors for Sugar Beet Production, 2010 .....	30
Table 9: Comparison of Costs and Returns 2001 - 2010 (\$ per acre) .....	32
Table 10: Summary of Sugar Beet Production Costs and Returns, 2010.....	36
Table 11: Sugar Beet Production Costs and Returns Based on Provincial Yield, 2010.....	38

## LIST OF FIGURES

Figure 1: Sugar Beet Acres Contracted in Alberta, 1980-2011 .....	9
Figure 2: Sugar Beet Acres Planted in Alberta, 1980-2011.....	9
Figure 3: Sugar Beet Acres Harvested in Alberta, 1980-2011 .....	10
Figure 4: Sugar Beet Tonnage Harvested in Alberta, 1980-2011.....	10
Figure 5: Sugar Beet Yield per Acre (Tonnes) in Alberta, 1980-2011.....	11
Figure 6: Sugar Beet Price per Tonne in Alberta, 1980-2010 .....	11
Figure 7: Variable Costs Breakdown for Sugar Beets, 2010.....	15
Figure 8: Breakdown of Total Production Costs for Sugar Beet Production, 2010 .....	17
Figure 9: Sugar Beet Costs and Returns by Size of Operation, 2010 (\$ per Acre) .....	24
Figure 10: Sugar Beet Costs and Returns by Size of Operation, 2010 (\$ per Tonne).....	25
Figure 11: Comparison of Costs and Returns for Sugar Beet Production, 2001-2010.....	32

## SECTION I

### INTRODUCTION

Sugar beets grow best in rich, deep soil and temperate climate. Sugar beet production is well suited for the irrigated land in southern Alberta. Sugar beets are a rotation crop, planted once every four years to minimize potential disease problems. Sugar beet seeding begins in early spring and continues from mid-April to the end of May. Sugar beets are land and labour intensive and grown with supplementary irrigation. Because of drought and anticipated shortage of water for irrigation purpose, sugar beet production in Alberta decreased during 2001 to 2003. Area contracted for beet production decreased by almost 36 percent from 1999 to 2003, i.e. from 45,000 acres to 28,800 acres. However in 2004, area contracted for sugar beet production rebounded back and increased by 23 percent to over 35,000 acres in 2004. Increase in area for sugar beet production was the result of a new agreement with the sugar factory and improved production conditions, e.g., water availability.

In 2005, area contracted for beet production decreased by three percent to 34,300 acres. Similarly area seeded and harvested also decreased by three and four percent, respectively to 34,100 and 33,500 acres. In 2006, area contracted for beets rebounded to just over 37,000 acres, thus increasing by about eight (8) percent, even in 2005. In 2007, area contracted for beet production in Alberta decreased by about eight (8) percent to 34,138 acres, close to area contracted in 2005. However, in 2008, area contracted for beet production decreased by over forty seven (47) percent to 18,400 acres; the lowest ever in sugar beet production history. In 2009, sugar beet area contracted increased by about sixty-one (61) percent to 29,653 acres, somewhat lower than average area prior to 2008. In 2010, area contracted to produce beets increased merely by 2.4 percent compared to 2009, however area harvested in 2010 was up by about 31 percent. This is due to improved weather and harvest conditions especially from the latter part of September and throughout October.

Alberta Agriculture and Rural Development (ARD) have been monitoring the costs and returns of livestock and crop production in the province in an extensive way since the 1960s. These studies have been viewed as an important tool for assisting producers in their cropping decisions as well as for developing policies and programs for the different farm enterprises in

the province and Canada. Where information gaps existed in other provinces, results from these studies have served as the basis to fill those gaps.

Sugar beet production costs and returns in Alberta have been monitored since the early 1970s. The 2010 cost and return study is a continuing effort to monitor changes in the sugar beet industry in the province. This year's information, like previous years, would be used for several purposes including policy and program development for the sugar beet industry. Results of the cost of production studies have been helpful in contract negotiations between the Sugar Beet Board and the sugar factory executives in Taber.

**Objectives:**

Major objectives of the study are:

- i. To develop production costs and returns for sugar beet production in Alberta.
- ii. To assist sugar beet growers with farm budgeting and planning.
- iii. To analyze economies of scale; machine use and input/output relationships for sugar beet production.
- iv. To provide each study participant with an individual farm analysis along with group averages.
- v. To provide an annual update for policy and program development and for extension personnel.

**Study Sample**

The sample for the 2010 study was originally selected from a list of producers who held sugar beet contracts. The random selection of the sample ensured a representative cross section of producers in the province. A total of 13 producers were selected to be surveyed personally to obtain detailed cost and return information. However, due to scheduling issues, only eleven (11) sugar beet producers were surveyed for the 2010 crop. These eleven (11) beet producers provided data on twenty-two (22) fields (owned and rented) as each field was recorded separately. These twenty-two (22) fields represent about six percent of the total area of sugar beets harvested in 2010.

## SECTION II

### METHOD OF ANALYSIS

The raw data obtained from the eleven (11) sugar beet producers with twenty-two (22) fields were reviewed for any information gaps before entering into the computer for analysis. In the past years, a mainframe computer program was used to analyze both the individual farm reports as well as computing group averages. For the last several crop years, Paradox 9 Program (micro computer database) has been used to analyze the data. This program allows changes and updates in many of the cost allocations.

#### **Fuel, Repairs and Machine Investment Allocations**

Farm records are usually kept on a whole farm basis. Many input costs are separable by enterprise type since crop management requires it (fertilizer and chemical use for example). Records on other important costs such as fuel and repairs are not usually kept on an enterprise level, hence, it becomes difficult sometime to come up with exact or actual numbers for such costs. Therefore, the participating producers were asked for feedback to see if cost allocations have been reasonable for their operations and most specifically the enterprise being analyzed. The cost of production studies undertaken by the Economics and Competitiveness Division have attempted to allocate costs on a crop-by-crop basis where farm records alone were insufficient or difficult to separate such costs. Sugar beet production requires intensive use of fertilizer, chemicals, fuel, labour and equipment. Proper allocation of these factors of production is important if results are to be used with confidence.

Machine investment was allocated by the study participants (beet producers) with the surveyor. Specialized sugar beet equipment was allocated 100 percent to the sugar beet enterprise. Other machinery, which was used on both conventional crops as well as sugar beet land, was allocated based on relative use. An engineering model was developed to study the time spent with various machines on a per acre basis<sup>1</sup>. These results were used to

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<sup>1</sup> Prior to 1990 repair costs to sugar beet equipment were allocated 100 percent to the sugar beet enterprise and repair costs to all other machinery were allocated based on machine investment. However for 2007, repair costs were allocated according to machine use, which was based on an engineering model.

allocate machine investment between various enterprises on the farm (i.e., grain vs. sugar beet production).

Fuel use is another factor of production, which must be allocated within the computer program since most producers do not keep separate records on a field-by-field basis. Results from the engineering model indicated that sugar beet production on average uses approximately 2.9 times the amount of fuel as compared to a conventional grain crop grown on irrigation<sup>2</sup>.

Preliminary analyses results were sent to the survey participants for their review and comments, if any. Also any numbers which appeared to be out of range were identified and producers were asked to verify those. Before developing the provincial and group averages, sugar beet producers were extensively consulted at all stages of data collection and analysis.

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<sup>2</sup> Results of the model also showed that fuel use on conventional crop production under irrigation uses 1.7 times the amount of fuel used for dryland crop production. Earlier studies allocated fuel costs based only on machine investment by enterprise.

## SECTION III

### SUGAR BEET PRODUCTION IN ALBERTA, 1980-2011

Table 1 presents a historical account of sugar beet production in Alberta from 1980 to 2011. As a result of contractual difficulties there were no sugar beets grown in 1985.

During the last thirty-one (31) years, contracted area under sugar beets in Alberta has fluctuated considerably, ranging from a low of about 18,400 acres in 2008 to almost 46,000 acres in 1999. In 1997, area contracted for sugar beets was 33,467 acres, about 1.7 percent lower than in 1996. However, in 1998 contracted area for sugar beet production increased by almost 25 percent over in 1997 to 41,742 acres due to the expansion of the sugar factory. In 1999, area contracted for sugar beet production increased by about eight (8) percent to 45,965 acres over in 1998. In 2000, contracted area for sugar beets decreased by about five (5) percent as several growers took leave from producing beets. Again in 2001, contracted area for sugar beets decreased drastically by 29 percent to 30,501 acres from 42,864 acres in 2000. A large number of beet producers again took leave from producing beets in 2001 due to anticipated water shortage and price concerns. Beet acreage contracted in 2002 further decreased marginally as some beet producers opted to grow other crops. In 2003, the area contracted for beet production was at the lowest level decreasing to 28,800 acres since 1980. However, sugar beet area contracted for the 2004 sugar beet crop increased by almost 23 percent over the previous year. For the 2005 beet crop, area contracted for beet production decreased by three percent over the previous year to 34,302 acres. In 2006, area contracted for beets increased by about eight (8) percent to 37,204 acres over 2005 area. But area planted only increased by 1.5 percent (528 acres) and area harvested by only 98 acres. Area contracted for beet production in 2007 decreased back to the level of 2005 due to record tonnage production in 2006. Sugar beet crop in 2007 recorded the second highest yield and overall tonnage as well. Because of the higher tonnage production over two years in a row, the sugar factory negotiated to decrease area contracted by over 46 percent to 18,400 acres in 2008. In 2009, area contracted for sugar beet production increased to 29,650 acres, an increase of over 61 percent from 2008. In 2010 contracted area further increased to 30,379 acres (an increase of 2.4 percent compared to 2009). In 2011 acres contracted was 33,598

acres (an increase of about 11 percent compared to 2010). As illustrated by Figure 1, there is an overall trend toward higher contracted area.

Sugar beet tonnage harvested during the last 31 years, i.e., from 1980 to 2011, ranged from a low of 385,219 tonnes in 2008 to 963,165 tonnes in 2006. Fluctuation in sugar beet tonnage has been the direct results of acres harvested and yield per acre. The sudden increase in sugar beet tonnage in 2006 was the result of record yield of just over 26 tonnes, almost five to six tonnes per acre more beets compared to previous years. The 2008 beet production was the smallest crop ever due to lower area contracted and harvested, and lower yield compared to two previous years. Area under beets in 2008 was almost half of area used for producing beets in an average year. As illustrated by Figure 4, there is an overall trend toward higher sugar beet tonnage harvested.

Yield per acre has also shown considerable variation over the period 1980 to 2011, ranging from 15.22 tonnes per acre in 2002 to over 28 tonnes per acre in 2011. The low yield per acre in 2002 could be attributed to weather resulting in overall poor production conditions both during growing and harvest seasons. Average yield per acre for the 2003 beet crop increased by almost 51 percent to 22.93 tonnes over the yield in 2002. Increase in yield was primarily due to favourable weather conditions and availability of water. Average yield per acre for the 2004 beet crop decreased by about eight percent to 21.19 tonnes over in 2003. In 2005, average beet yield decreased by six percent to 19.85 tonnes per acre. However, it set a new record of 26.04 tonnes per acre for the 2006 beets crop. In 2008, average yield per acre decreased by almost 16 percent (i.e. four tonnes per acre) to 21.15 tonnes from 25.06 tonnes in 2007. For the 2009 sugar beet crop, average yield per acre increased by almost eight percent to 22.77 tonnes over in 2008. In 2009, average yield per acre increased by almost eight percent to 22.77 tonnes relative to 2008. In 2010, average yield per acre decreased by 17 percent to 18.9 tonnes. For the 2011 sugar beet crop, average yield per acre increased by almost 51 percent to 28.45 tonnes. As illustrated by Figure 5, yield per acre is showing a positive trend.

Beet prices have also fluctuated quite dramatically during the last 30 years, i.e., from 1980 to 2010. Prices have ranged from about \$31 per tonne in 1986 to \$67 per tonne in 1980, a 116 percent difference<sup>3</sup>. For the 1999 crop, price per tonne of sugar beets increased by four percent to \$35.30 from \$33.82 per tonne in 1998. The 1998 sugar beets price was the third lowest (\$33.82 per tonne) after the 1984 price of \$31.49 per tonne and \$32.25 per tonne in 2000. Beet price received by Alberta producers for the 2001 crop was \$46.21 per tonne, about 43 percent above the price in 2000. However, beet price received for the 2002 crop decreased by about 20 percent from the previous year to \$36.74 per tonne. Beet prices for the 2003 crop increased by 16 percent to \$42.62 per tonne over the price in 2002. The final price for the 2004 beet crop increased by about 6 percent to \$45.02. It remained the same at \$45.02 per tonne for the 2005 beet crop. Beet price for the 2006 crop was \$40.58 per tonne. For the 2007 beets crop, final price was \$43.24 per tonne, an increase of 7 percent over in 2006. In 2008, beet price per tonne increased by \$2.49 per tonne to \$45.73 per tonne, an increase of almost 6 percent. In 2009, beet price per tonne decreased by about 4 percent from 2008 to \$44.05 per tonne. The final price for the 2010 sugar beet crop increased by about 9 percent from the price in 2009 to \$47.9 per tonne.

Details of sugar beet production in Alberta, contracted, planted and harvested acres, yield per acre and dollars per tonne received by beet producers from 1980 to 2011, are presented in Table 1 on the next page. Figures 1 to 6 present trends for beet production from 1980 to 2011 on acres contracted, acres planted, acres harvested, tonnage harvested, yield per acre (tonnes), and dollars per tonne (price). Final price for the 2011 sugar beet crop will be available sometime in October/November 2012.

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<sup>3</sup> All prices reported are in nominal dollars. In other words, these were the actual prices received by the producers.

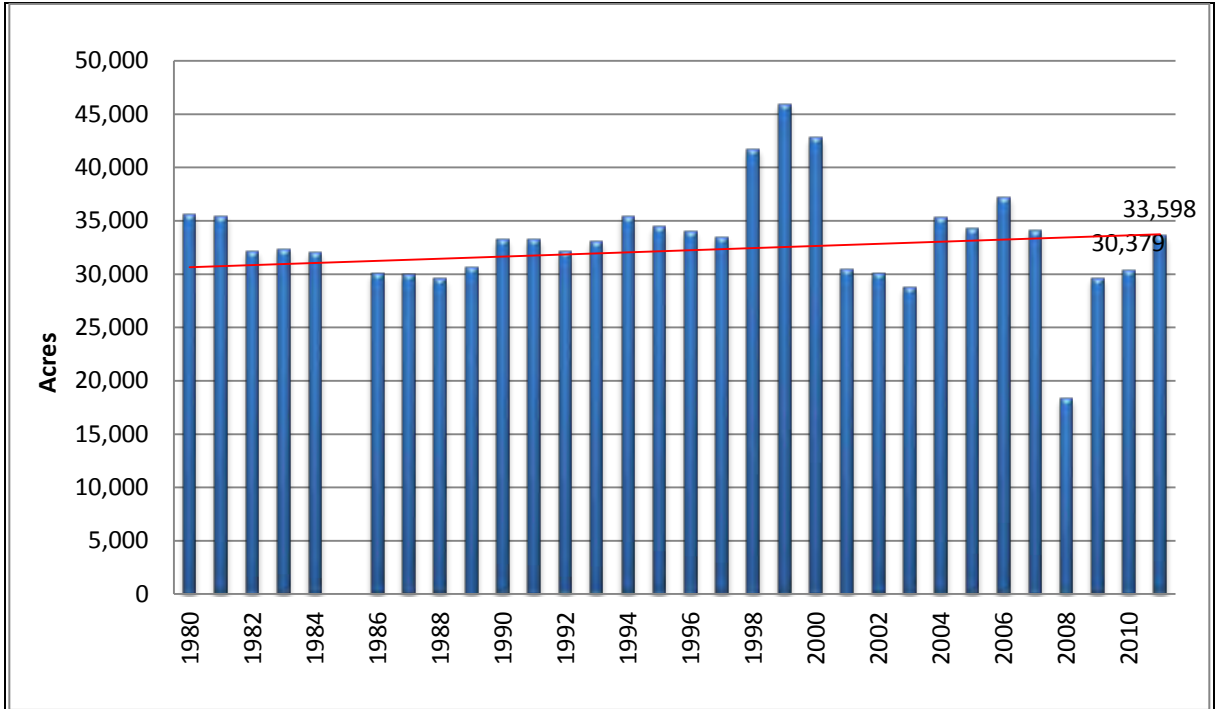
**Table 1: Historical Data on Sugar Beet Production in Alberta, 1980-2011**

Year	Acres Contracted	Acres Planted	Acres Harvested	Tonnage Harvested	Yield per Acre (Tonnes)	Price per Tonne (\$)
1980	35,609	34,850	33,771	524,251	15.52	66.99
1981	35,405	35,139	35,071	715,082	20.39	47.87*
1982	32,161	31,833	30,502	474,866	15.57	55.59*
1983	32,354	31,883	31,563	569,846	18.05	38.76
1984	32,075	31,559	28,830	513,180	17.80	31.49
1985	--- no sugar beet production ---					
1986	30,054	29,711	28,493	596,122	22.92	39.25*
1987	29,983	29,438	29,169	564,814	19.36	45.26*
1988	29,575	28,945	28,109	540,405	19.22	41.16*
1989	30,619	29,632	29,483	499,061	16.93	45.19
1990	33,299	32,875	32,664	590,303	18.07	42.28*
1991	33,260	33,013	32,779	634,949	19.37	34.38*
1992	32,148	31,351	31,127	475,823	15.29	38.19
1993	33,088	32,504	32,432	542,253	16.72	41.99*
1994	35,399	34,944	34,836	737,774	21.25	43.16*
1995	34,506	33,913	33,656	688,498	20.46	43.70
1996	34,043	33,784	33,463	676,611	20.22	42.13
1997	33,467	33,326	33,124	650,423	19.64	48.30
1998	41,742	41,250	41,132	959,310	23.32	33.82
1999	45,965	44,731	44,522	839,773	18.86	35.30
2000	42,864	42,422	42,017	920,252	21.90	32.30
2001	30,501	30,236	28,457	523,110	18.38	46.20
2002	30,089	29,670	27,754	422,389	15.22	36.74
2003	28,807	27,831	27,389	628,081	22.93	42.62
2004	35,384	35,113	34,954	740,508	21.19	45.02
2005	34,302	34,595	33,667	668,141	19.85	45.02
2006	37,204	37,537	36,992	963,165	26.04	40.58
2007	34,138	34,302	34,067	853,669	25.06	43.24
2008	18,397	18,270	18,211	385,219	21.15	45.73
2009	29,653	29,995	23,128	526,686	22.77	44.05
2010	30,379	31,109	30,360	573,640	18.90	47.90
2011	33,598	33,672	33,307	784,500	28.45	N/A

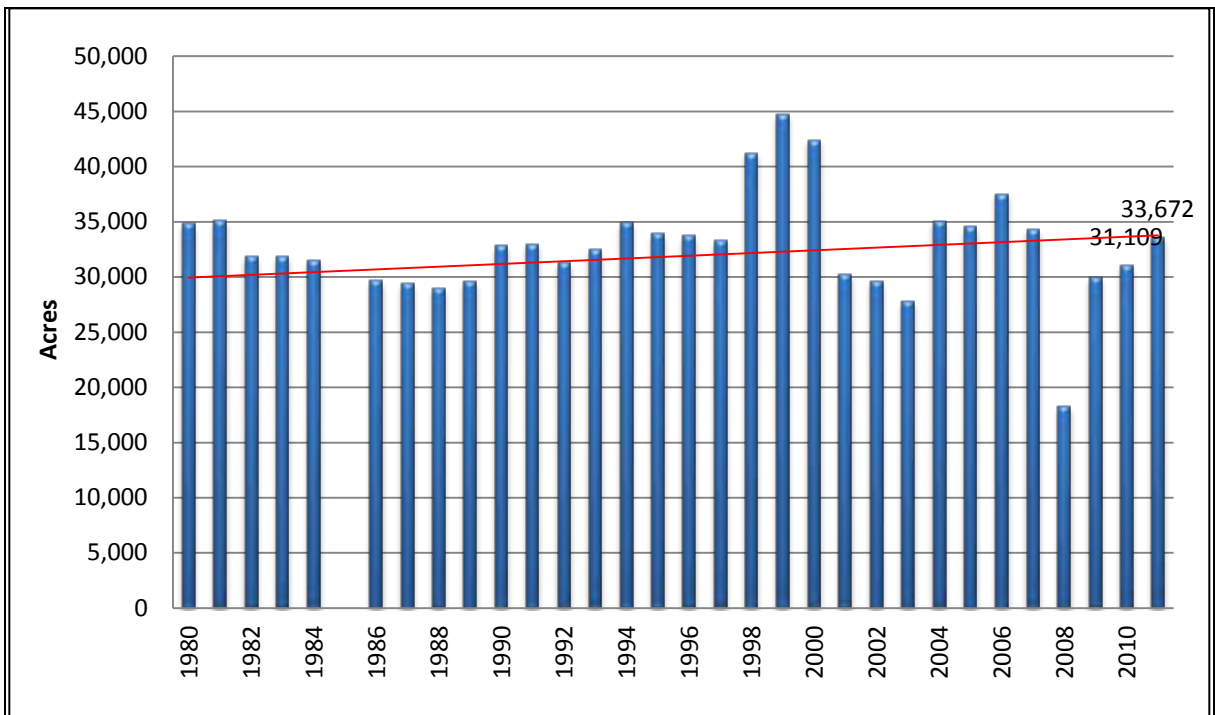
**Source:** Alberta Sugar Beet Growers, 86th Annual Report, Taber, Alberta.

(\*) Price includes payments under the Stabilization and Tripartite Programs. N/A=Not available.

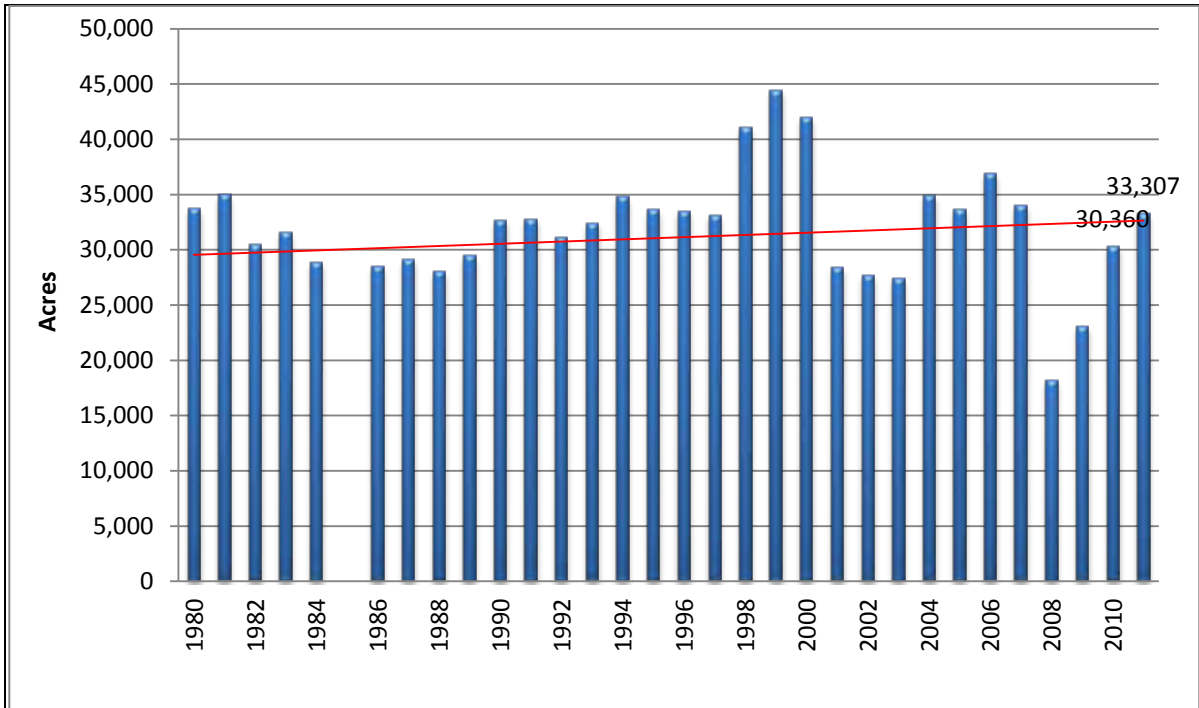
**Figure 1: Sugar Beet Acres Contracted in Alberta, 1980-2011**



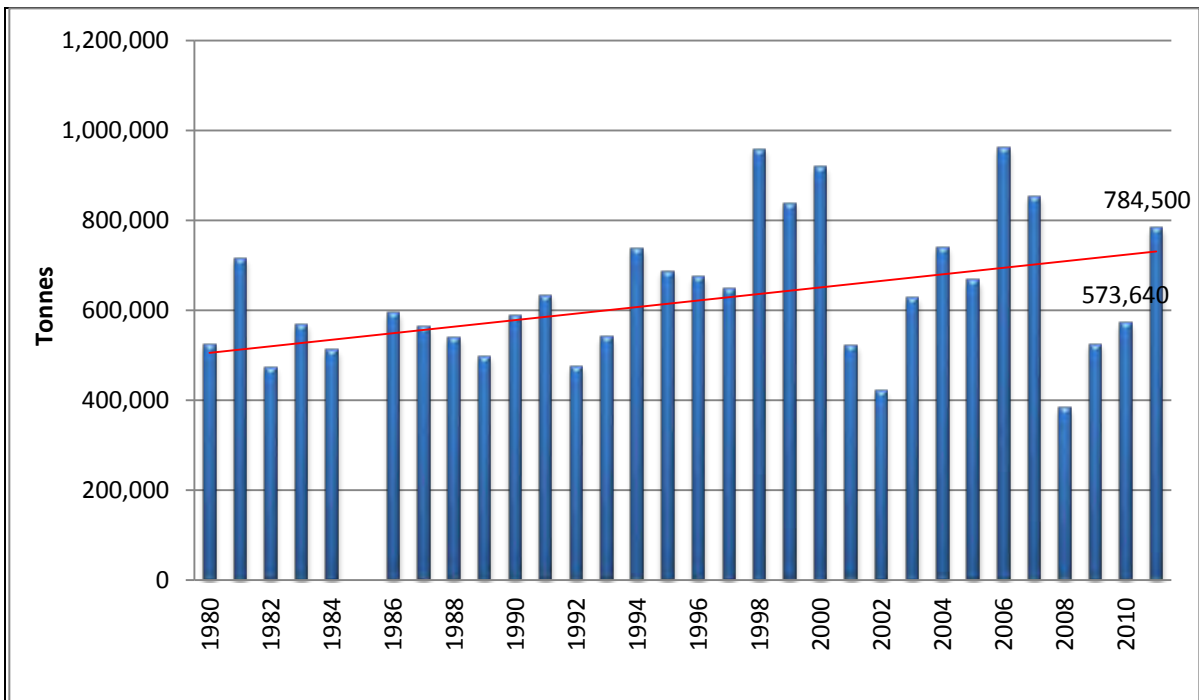
**Figure 2: Sugar Beet Acres Planted in Alberta, 1980-2011**



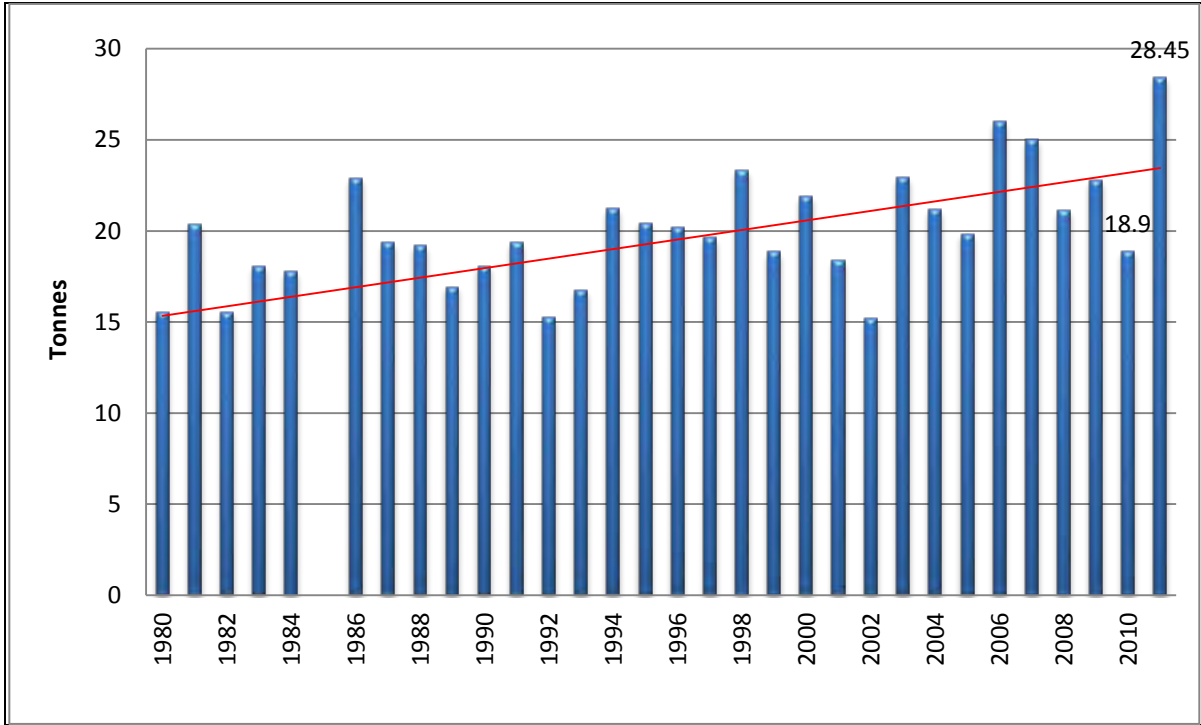
**Figure 3: Sugar Beet Acres Harvested in Alberta, 1980-2011**



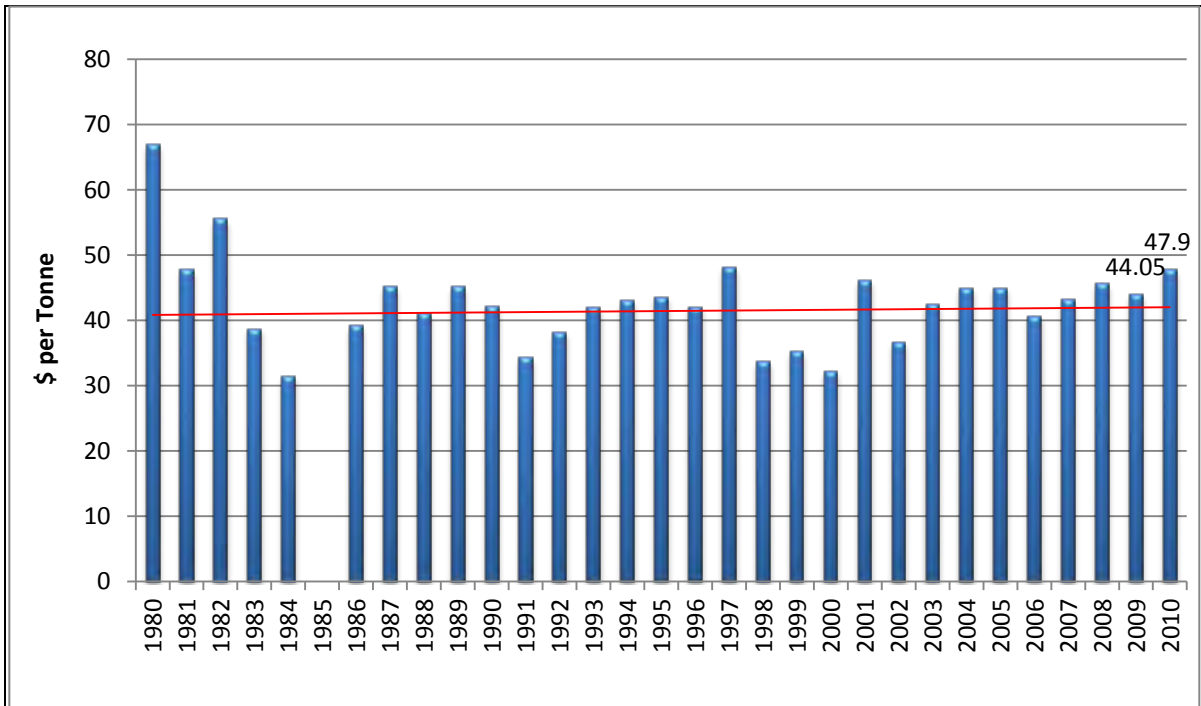
**Figure 4: Sugar Beet Tonnage Harvested in Alberta, 1980-2011**



**Figure 5: Sugar Beet Yield per Acre (Tonnes) in Alberta, 1980-2011**



**Figure 6: Sugar Beet Price per Tonne in Alberta, 1980-2010**



## SECTION IV

### **SUGAR BEET PRODUCTION COSTS AND RETURNS, 2010**

The 2010 sugar beet study sample comprised of eleven (11) sugar beet producers (22 fields) who provided detailed information on their operations. The study sample of eleven (11) beet producers was considered adequate to develop costs and returns data for the 2010 beet crop. It was divided into two groups to develop production costs and returns for beets grown on owned (16 fields) and rented (6 fields) land.

#### **Gross Returns**

Table 2 presents production costs and returns for the entire study sample of 11 sugar beet producers (22 fields). Average yield reported by the study participants in 2010 was 19.24 tonnes per acre with an average area of about 83 acres of beets per farm. Average yield for the study sample was higher by 0.34 tonnes compared to the provincial average of 18.9 tonnes. With an estimated price of \$53.12 per tonne, average value of production was \$1,022 per acre. When miscellaneous receipts (crop insurance, rebates, patronage, custom work and other government program payments) were included, average gross revenue per acre increased to \$1,172 per acre or \$60.94 per tonne. Final price for the 2010 beet crop was announced in September 2011. A detailed breakdown of gross returns for the 2010 beet crop is presented in Section A of Table 2.

#### **Variable Costs**

Detailed breakdown of various input costs is presented in Table 2. All of the costs are weighted averages and expressed on per acre and per tonne basis. Input costs (seed, fertilizer and chemicals) amounted to \$212 per acre or \$11.03 per tonne. In 2010, seed costs for beet production increased by 12% compared to 2009. This reflects an increased use of round-up ready (GMO) seed. Use of this seed led to reduced chemical costs by about 41 percent. Average trucking/marketing costs, fuel, repair costs (machinery and buildings) and utilities were \$2,261 per acre (\$13.55 per tonne) for the 2010 sugar beets crop.

Other most significant cost items for the 2010 sugar beet crop were paid and unpaid labour, custom work and specialized labour, and hail/crop insurance, which accounted for \$123 per acre (\$6.37 per tonne) or 22 percent of total variable costs. Unpaid family and operator

labour amounted to \$29 per acre (\$1.50 per tonne). Figure 7 shows a graphical presentation of variable costs for the study sample (11 sugar beet producers), beets grown on owned and rented land on a per acre basis for the 2010 sugar beet crop.

### **Total Cash Costs**

Total cash costs refers to the sum of total variable and total capital costs less expenses associated with unpaid family and management labour and equipment and building depreciation. Total cash costs for the study sample of 11 beet producers for the 2010 crop amounted to \$715 per acre or \$37 per tonne (Table 2). However, total variable costs including unpaid family and operator labour were \$617 per acre (\$32 per tonne).

Total cash costs for sugar beets grown on owned and rented land (Tables 3 & 4) were \$698 (\$38 per tonne) and \$754 (\$36 per tonne), respectively. Total variable costs for beets produced on owned land were \$626 per acre (\$34 per tonne) compared with \$595 per acre (\$29 per acre) for beets produced on rented land.

### **Capital Costs**

Capital costs are "fixed" overhead costs, which are incurred regardless of the size of enterprise or the output on a per acre basis of the enterprise. These are cash (cash rent, crop share, taxes, water rates, insurance, paid capital interest) and non-cash capital costs (depreciation and lease payments).

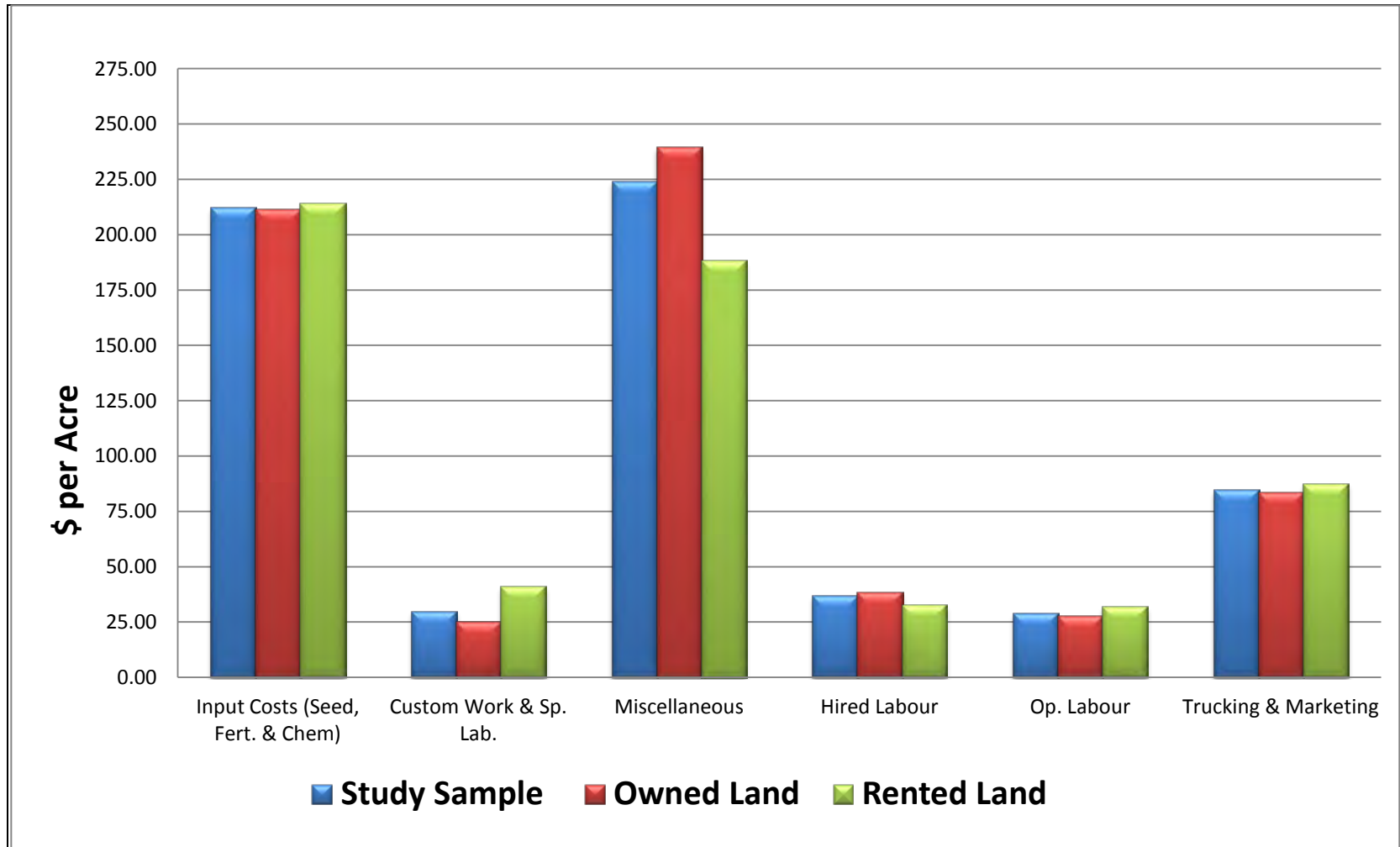
Capital costs for the study sample amounted to \$244 per acre (\$12.67 per tonne) for the 2010 beet crop. This constitutes about 28 percent of total costs of sugar beet production in 2010. Capital costs were \$230 per acre and about 27 percent (Table 3) of total costs for sugar beets produced on owned land compared to \$276 or 32 percent (Table 4) for beets produced on rented land.

**Table 2: Sugar Beet Production Costs and Returns, 2010 (22 Enterprises)**

Acres Cropped (acres)	82.59	
Yield Per Acre (tonne)	19.24	
	<b>\$ per acre</b>	<b>\$ per tonne</b>
<b>GROSS RETURNS</b>		
Crop Sales	1,022.01	53.12
Crop Insurance Receipts	150.31	
Miscellaneous Receipts	0.13	
<b>A. TOTAL GROSS RETURN</b>	<b>1,172.45</b>	<b>60.94</b>
<b>VARIABLE COSTS</b>		
Seed	128.11	
Fertilizer	66.54	
Chemicals	17.55	
Hail / Crop Insurance	27.08	
Association Fees & Research Levies	13.68	
Trucking & Marketing	84.70	
Machine Fuel (Net of Rebate)	60.15	
Irrigation Fuel	27.14	
Repairs - Machinery	59.38	
Repairs - Buildings	2.47	
Utilities, Insurance & Overhead	26.80	
Custom Work & Specialized Labour	29.89	
Operating Interest Paid	7.61	
Paid Labour & Benefits	36.77	
Unpaid Family and Operator Labour	28.87	
<b>B. TOTAL VARIABLE COSTS</b>	<b>616.74</b>	<b>32.06</b>
<b>CAPITAL COSTS</b>		
Cash Rent /Crop Share	54.66	
Taxes, Water Rates, Insurance	27.73	
Equipment/Building Depreciation	117.13	
Lease Payments	0.00	
Paid Capital Interest	44.27	
<b>C. TOTAL CAPITAL COSTS</b>	<b>243.79</b>	<b>12.67</b>
<b>D. TOTAL CASH COSTS (B+C - Unpaid Labour - Depreciation)</b>	<b>714.53</b>	<b>37.14</b>
<b>E. TOTAL PRODUCTION COSTS (B+C)</b>	<b>860.53</b>	<b>44.73</b>
<b>F. NET RETURNS</b>		
Gross Margin (A-D)	<b>457.92</b>	<b>23.80</b>
Return to Unpaid Labour (A-E + Unpaid Operator Labour)	<b>340.79</b>	<b>17.71</b>
Return to Investment (A-E + Paid Capital Interest)	<b>356.19</b>	<b>18.51</b>
Return to Equity (A-E)	<b>311.92</b>	<b>16.21</b>
<b>INVESTMENT</b>		
Land & Buildings	2,945.11	
Machinery	1,227.79	

Source: Economics Branch, Alberta Agriculture and Rural Development, Edmonton, Alberta.

**Figure 7: Variable Costs Breakdown for Sugar Beets, 2010**



**Source:** Economics Branch, Alberta Agriculture and Rural Development, Edmonton, Alberta.

Rental agreements generally include land rental, irrigation equipment and the sugar beet contract. Some producers rent land and irrigation equipment only. Average rental rate (a combination of the rental arrangements described above) for the 2010 crop was \$185 per acre (\$8.91 per tonne) for the six (6) fields used to grow sugar beets on rented land (Table 4). Land rent represents over 21 percent of total production costs for these producers.

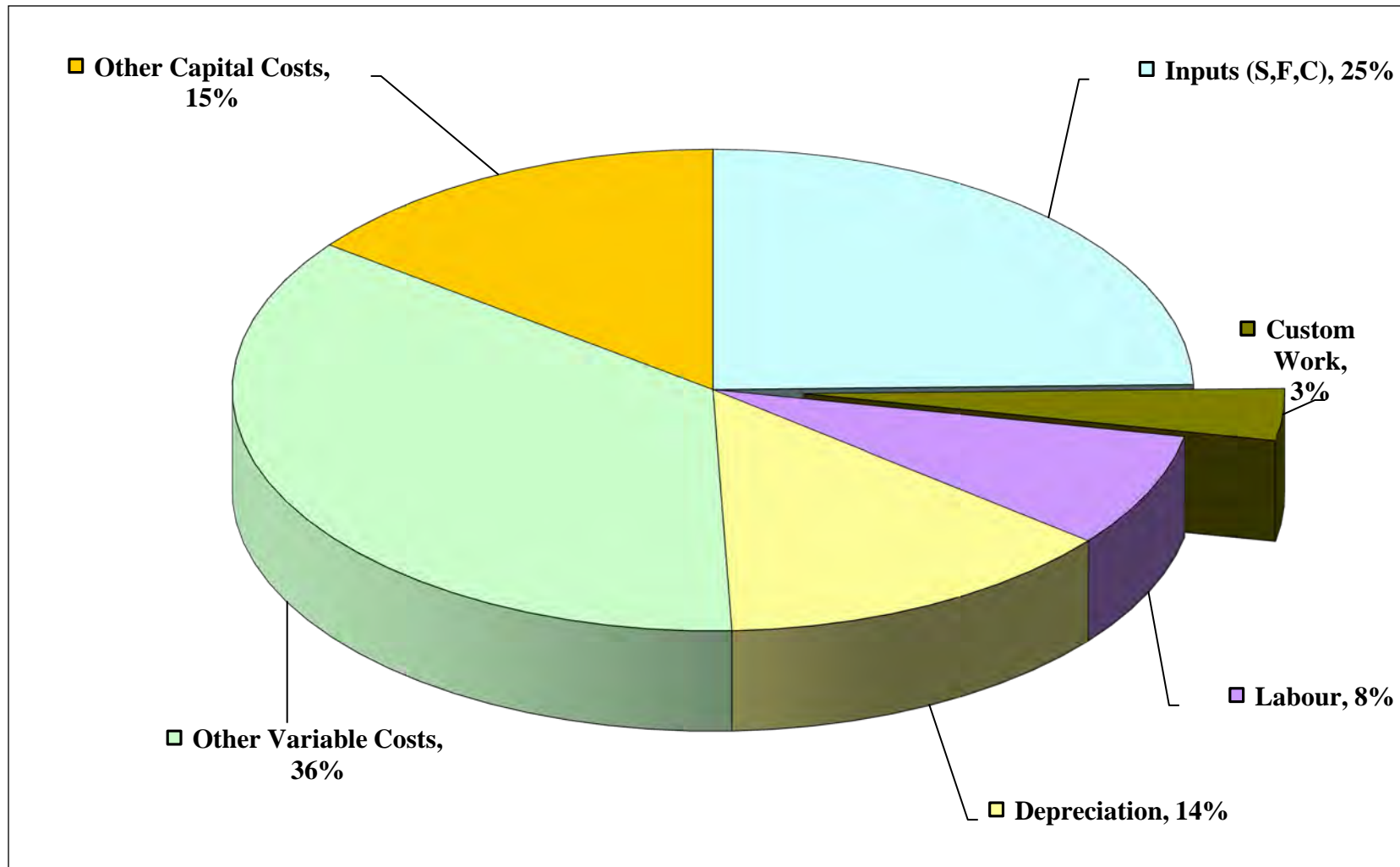
Taxes, water rates and insurance for the study participants for the 2010 beet crop were estimated at about \$28 per acre or about \$1.44 per tonne. These were about \$38 per acre (\$2.02 per tonne) for beets grown on owned land versus \$4 per acre (\$0.21 per tonne) for beets grown on rented land.

Equipment and building depreciation was calculated for specialized sugar beet equipment while other equipment was allocated and pro-rated based on use between sugar beets and the remaining farm enterprises. Equipment depreciation was calculated based on the current value of machinery. These costs (equipment and building depreciation) were significant for a sugar beet enterprise, amounting to about \$117 per acre (\$6.09 per tonne) for the study sample. For beets produced on owned land, depreciation costs were \$131 per acre (\$7.02 per tonne) (Table 3) compared to about \$85 per acre (\$4.11 per tonne) for beets produced on rented land (Table 4). Figure 8 shows the relative proportions of all costs for sugar beet production in 2010 for the eleven (11) sugar beet producers with 22 fields.

### **Total Production Costs**

Total production costs for sugar beet production for the study sample of 11 beet producers (average of all 22 fields) were estimated at \$861 per acre (\$45 per tonne) in 2010. Of this, 83 percent were direct cash costs, almost 14 percent depreciation costs and the remaining three (3) percent for unpaid operator labour (Table 2). Tables 3 and 4 present total production costs for beets produced on owned and rented land, respectively. Figure 8 shows a graphical presentation of total production costs for the 2010 sugar beet study sample (11 sugar beet producers) on a per acre basis.

**Figure 8: Breakdown of Total Production Costs for Sugar Beet Production, 2010**



**Source:** Economics Branch, Alberta Agriculture and Rural Development, Edmonton, Alberta.

### **Net Returns**

Section (F) of Tables 2, 3 and 4 presents gross margin; returns to unpaid labour; investment; and equity for the study sample, beets grown on owned and rented land, respectively. The following procedures were used to calculate net returns:

### **Gross Margin**

Gross Margin is the difference between gross returns less total cash costs. Average gross margin was \$458 per acre (\$23.80 per tonne) for the entire study sample of 11 beet producers. It was \$455 per acre (\$24.45 per tonne) for beet produced on owned land and \$465 per acre (\$22.43 per tonne) on rented land.

### **Return to Unpaid Labour**

Return to unpaid labour is gross returns less total production costs other than costs imputed for unpaid family and operator labour. Return to unpaid labour for the study sample of 11 beet producers was positive at \$341 per acre or \$17.71 per tonne. Return to unpaid labour for beets grown on owned land was positive at \$324 per acre (\$17.43 per tonne). Return to unpaid labour for beets grown on rented was also positive at \$380 per acre (\$18.32 per tonne). Details on return to unpaid labour for the study sample, beets grown on owned and rented land are presented in Tables 2, 3 and 4 under Net Returns (F).

### **Return to Investment**

Return to investment reflects the dollar or percent return to the total value of assets. This represents gross return less total production costs with the exception of interest payments on capital spending. Return to investment for sugar beet production for the study sample was positive at \$356 per acre or \$18.51 per tonne in 2010 (Table 2). It was positive at \$359 per acre (\$19.28 per tonne) for beets produced on owned land (Table 3). Return to investment was also positive at \$350 per acre (\$16.87 per tonne) for beets produced on rented land (Table 4).

### **Return to Equity**

Return to equity is gross returns less total production costs (including all capital costs). The amount of money left to pay for unpaid family labour and management was positive at \$312 per acre or \$16.21 per tonne for the study sample of 11 beet producers with 22 fields (Table 2). It was positive at \$297 per acre (\$15.95 per tonne) for beets produced on owned land (16

fields, Table 3). Return to equity was also positive at \$348 per acre or \$16.78 per tonne for beets produced on rented land (6 fields, Table 4).

**Table 3: Sugar Beet Production Costs and Returns, Owned Land, 2010 (16 Enterprises)**

Acres Cropped (acres)	79.97	
Yield Per Acre (tonne)	18.61	
	<b>\$/Acre</b>	<b>\$/Tonne</b>
<b>GROSS RETURNS</b>		
Crop Sales	988.37	53.12
Crop Insurance Receipts	164.17	
Miscellaneous Receipts	0.04	
<b>A. TOTAL GROSS RETURN</b>	<b>1,152.58</b>	<b>61.95</b>
<b>VARIABLE COSTS</b>		
Seed	128.11	
Fertilizer	64.86	
Chemicals	18.52	
Hail / Crop Insurance	24.59	
Association Fees & Research Levies	13.56	
Trucking & Marketing	83.51	
Machine Fuel (Net of Rebate)	64.35	
Irrigation Fuel	31.75	
Repairs - Machinery	69.06	
Repairs - Buildings	3.00	
Utilities, Insurance & Overhead	25.03	
Custom Work & Specialized Labour	25.20	
Operating Interest Paid	8.13	
Paid Labour & Benefits	38.47	
Unpaid Family and Operator Labour	27.55	
<b>B. TOTAL VARIABLE COSTS</b>	<b>625.69</b>	<b>33.63</b>
<b>CAPITAL COSTS</b>		
Cash Rent /Crop Share	0.00	
Taxes, Water Rates, Insurance	37.56	
Equipment/Building Depreciation	130.54	
Lease Payments	0.00	
Paid Capital Interest	62.08	
<b>C. TOTAL CAPITAL COSTS</b>	<b>230.18</b>	<b>12.37</b>
<b>D. TOTAL CASH COSTS (B+C - Unpaid Labour - Depreciation)</b>	<b>697.78</b>	<b>37.50</b>
<b>E. TOTAL PRODUCTION COSTS (B+C)</b>	<b>855.87</b>	<b>46.00</b>
<b>F. NET RETURNS</b>		
Gross Margin (A-D)	<b>454.80</b>	<b>24.45</b>
Return to Unpaid Labour (A-E + Unpaid Operator Labour)	<b>324.26</b>	<b>17.43</b>
Return to Investment (A-E + Paid Capital Interest)	<b>358.79</b>	<b>19.28</b>
Return to Equity (A-E)	<b>296.71</b>	<b>15.95</b>
<b>INVESTMENT</b>		
Land & Buildings	4,090.90	
Machinery	1,393.48	

Source: Economics Branch, Alberta Agriculture and Rural Development, Edmonton, Alberta.

**Table 4: Sugar Beet Production Costs and Returns, Rented Land, 2010 (6 Enterprises)**

Acres Cropped (acres)	89.57	
Yield Per Acre (tonne)	20.75	
	<b>\$/Acre</b>	<b>\$/Tonne</b>
<b>GROSS RETURNS</b>		
Crop Sales	1,102.09	53.12
Crop Insurance Receipts	117.31	
Miscellaneous Receipts	0.34	
<b>A. TOTAL GROSS RETURN</b>	<b>1,219.74</b>	<b>58.79</b>
<b>VARIABLE COSTS</b>		
Seed	128.11	
Fertilizer	70.54	
Chemicals	15.24	
Hail / Crop Insurance	33.02	
Association Fees & Research Levies	13.97	
Trucking & Marketing	87.51	
Machine Fuel (Net of Rebate)	50.13	
Irrigation Fuel	16.18	
Repairs - Machinery	36.33	
Repairs - Buildings	1.21	
Utilities, Insurance & Overhead	31.03	
Custom Work & Specialized Labour	41.05	
Operating Interest Paid	6.38	
Paid Labour & Benefits	32.72	
Unpaid Family and Operator Labour	32.01	
<b>B. TOTAL VARIABLE COSTS</b>	<b>595.43</b>	<b>28.70</b>
<b>CAPITAL COSTS</b>		
Cash Rent /Crop Share	184.80	
Taxes, Water Rates, Insurance	4.35	
Equipment/Building Depreciation	85.21	
Lease Payments	0.00	
Paid Capital Interest	1.87	
<b>C. TOTAL CAPITAL COSTS</b>	<b>276.23</b>	<b>13.31</b>
<b>D. TOTAL CASH COSTS (B+C - Unpaid Labour - Depreciation)</b>	<b>754.44</b>	<b>36.36</b>
<b>E. TOTAL PRODUCTION COSTS (B+C)</b>	<b>871.66</b>	<b>42.01</b>
<b>F. NET RETURNS</b>		
Gross Margin (A-D)	<b>465.30</b>	<b>22.43</b>
Return to Unpaid Labour (A-E + Unpaid Operator Labour)	<b>380.09</b>	<b>18.32</b>
Return to Investment (A-E + Paid Capital Interest)	<b>349.95</b>	<b>16.87</b>
Return to Equity (A-E)	<b>348.08</b>	<b>16.78</b>
<b>INVESTMENT</b>		
Land & Buildings	217.08	
Machinery	833.31	

Source: Economics Branch, Alberta Agriculture and Rural Development, Edmonton, Alberta.

## SECTION V

### **SUGAR BEET PRODUCTION COSTS AND RETURNS BY SIZE OF OPERATION, 2010**

The study sample of eleven (11) beet producers (22 fields) was divided into three groups by size of field. Main objective of analyzing the data by size of field was to study the economies of scale, i.e., whether the size of field had any effect on net returns and overall sugar beet production costs. Following are the three groups by size of fields: Group I (Up to 50 Acres), Group II (51 to 100 Acres), Group III (Over 100 Acres).

#### **Group I (Up to 50 Acres)**

Table 5 presents production costs and returns for sugar beet producers in Group I. Number of sugar beet fields in Group I was three (3) with an average size of 29.33 acres or about five (5) percent of the area surveyed for the 2010 study. Average yield for this group of beet producers was 19.98 tonnes per acre, somewhat closer to Group III (20.25) and higher by about two (2) tonnes per acre than Group II.

Revenue from crop sales for Group I participants was \$1,061 per acre. When crop insurance and miscellaneous receipts were added to crop sales, gross return per acre increased to \$1,091 (\$54.61 per tonne). Average variable costs for this group of beet study participants was estimated at \$585 per acre (\$29.28 per tonne). Total cash costs for Group I participants was \$600 per acre or \$30.01 per tonne. Average capital costs for this group of beet producers, i.e. up to 50 acres was estimated at \$295 per acre (\$14.78 per tonne). Total production costs for study participants in Group I amounted to \$880 per acre or \$44.06 per tonne, somewhat lower than Group II but higher than Group III.

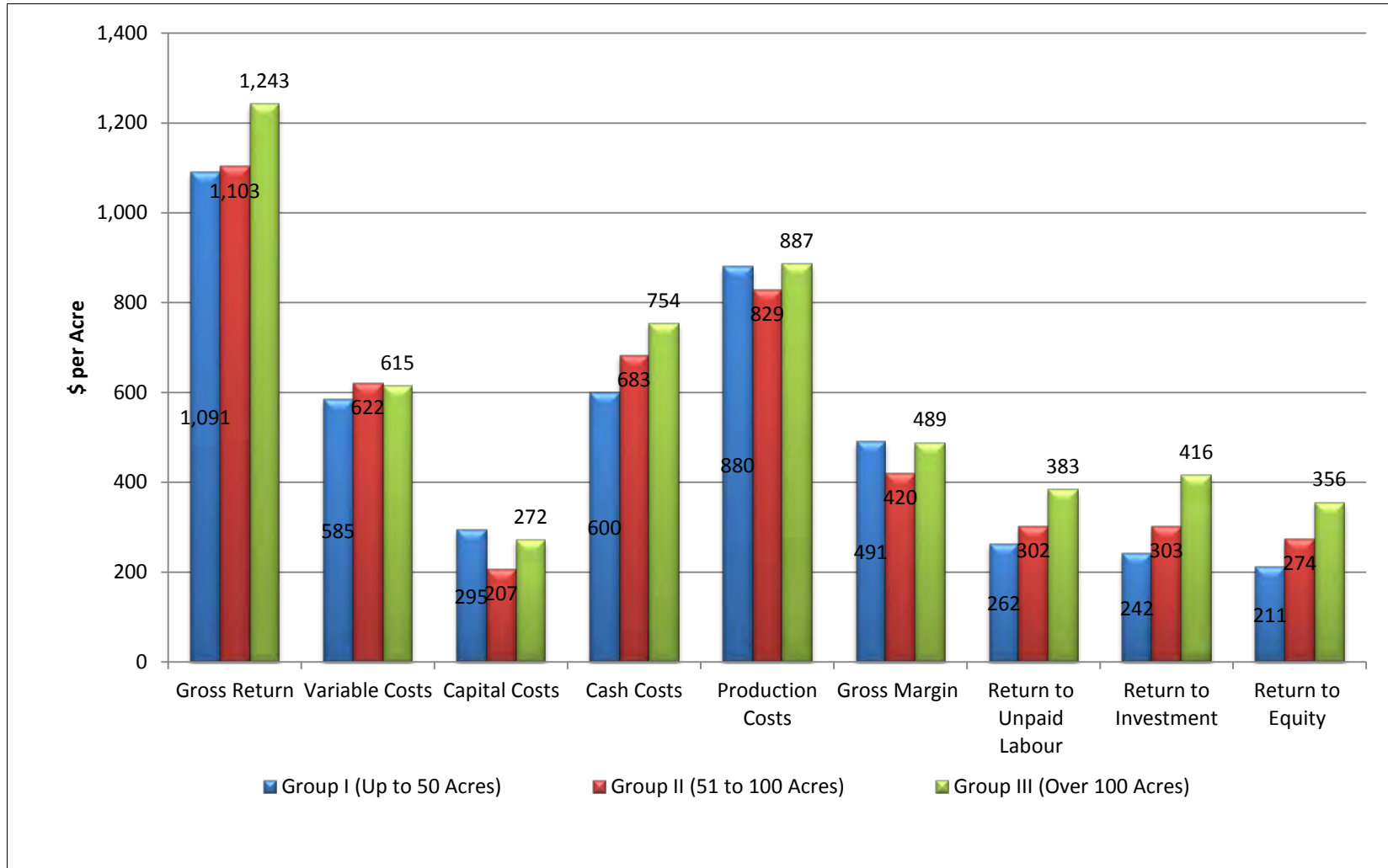
The net returns for this Group were all positive for the 2010 beet crop. The gross margin was \$491 per acre (\$24.60 per tonne). Return to unpaid labour was \$262 per acre (\$13.14 per tonne). The return to investment was at \$242 per acre (\$12.10 per tonne) and return to equity was at \$211 per acre (\$10.55 per tonne). Detailed breakdown of gross returns, variable costs, capital costs, total production costs and net returns for Group I (up to 50 acres) participants are presented in Table 5. Comparison of the costs and returns by size of operation on a per acre and per tonne basis expressed are presented in Figures 9 and 10 respectively.

**Table 5: Sugar Beet Production Costs and Returns (Up to 50 Acres), 2010 (3 Enterprises)**

Acres Cropped (acres)	29.33	
Yield Per Acre (tonne)	19.98	
	<b>\$ per acre</b>	<b>\$ per tonne</b>
<b>GROSS RETURNS</b>		
Crop Sales	1,061.21	53.12
Crop Insurance Receipts	29.70	
Miscellaneous Receipts	0.00	
<b>A. TOTAL GROSS RETURN</b>	<b>1,090.91</b>	<b>54.61</b>
<b>VARIABLE COSTS</b>		
Seed	128.11	
Fertilizer	49.59	
Chemicals	23.68	
Hail / Crop Insurance	27.73	
Association Fees & Research Levies	13.82	
Trucking & Marketing	56.07	
Machine Fuel (Net of Rebate)	53.70	
Irrigation Fuel	6.52	
Repairs - Machinery	39.99	
Repairs - Buildings	1.21	
Utilities, Insurance & Overhead	59.04	
Custom Work & Specialized Labour	14.94	
Operating Interest Paid	24.78	
Paid Labour & Benefits	34.09	
Unpaid Family and Operator Labour	51.65	
<b>B. TOTAL VARIABLE COSTS</b>	<b>584.92</b>	<b>29.28</b>
<b>CAPITAL COSTS</b>		
Cash Rent /Crop Share	13.99	
Taxes, Water Rates, Insurance	21.30	
Equipment/Building Depreciation	228.92	
Lease Payments	0.00	
Paid Capital Interest	31.01	
<b>C. TOTAL CAPITAL COSTS</b>	<b>295.22</b>	<b>14.78</b>
<b>D. CASH COSTS (B+C - Unpaid Labour - Depreciation)</b>	<b>599.57</b>	<b>30.01</b>
<b>E. TOTAL PRODUCTION COSTS (B+C)</b>	<b>880.14</b>	<b>44.06</b>
<b>F. NET RETURNS</b>		
Gross Margin (A-D)	<b>491.34</b>	<b>24.60</b>
Return to Unpaid Labour (A-E + Unpaid Operator Labour)	<b>262.42</b>	<b>13.14</b>
Return to Investment (A-E + Paid Capital Interest)	<b>241.78</b>	<b>12.10</b>
Return to Equity (A-E)	<b>210.77</b>	<b>10.55</b>
<b>INVESTMENT</b>		
Land & Buildings	1,178.72	
Machinery	2,300.40	

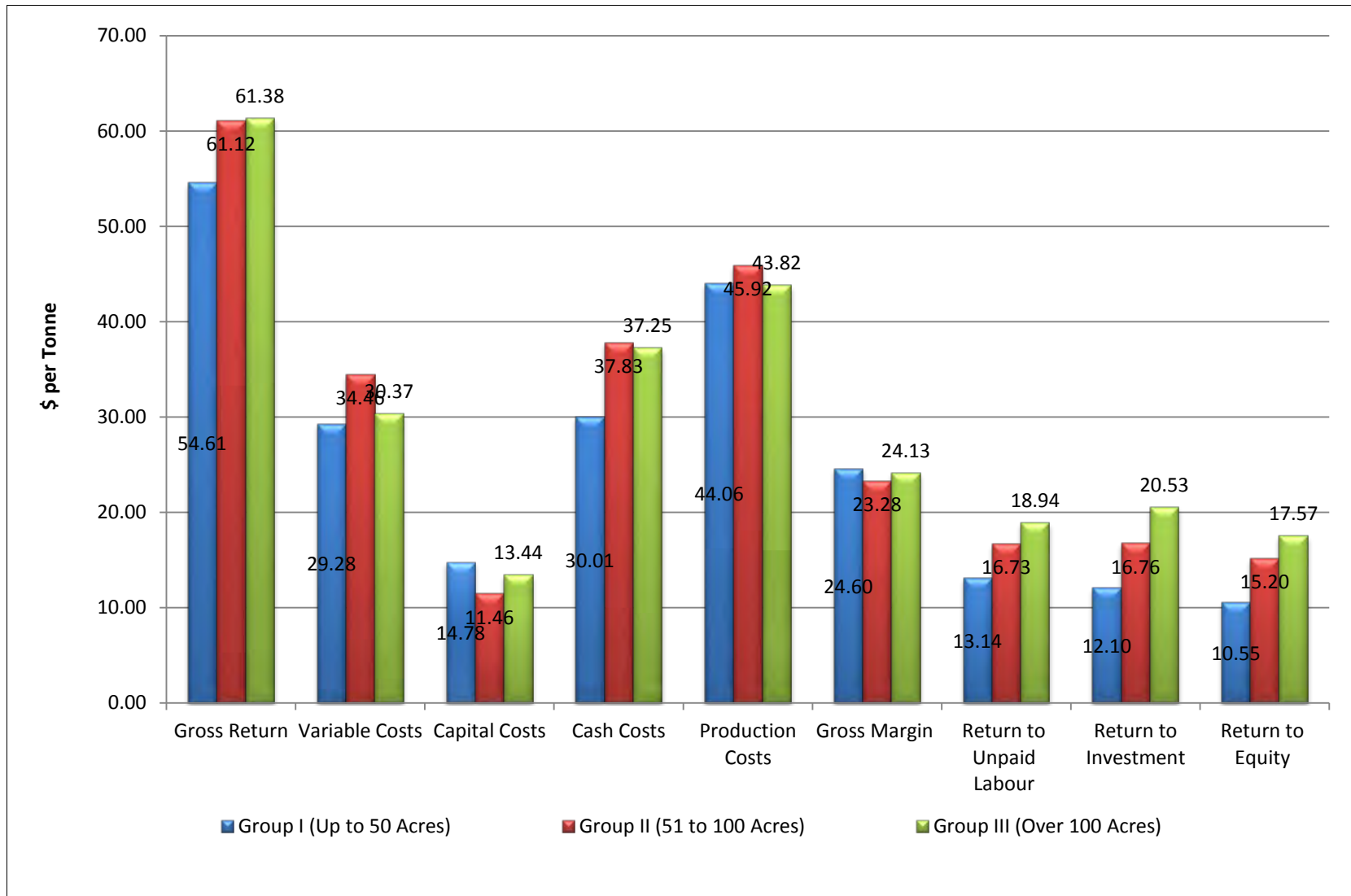
Source: Economics Branch, Alberta Agriculture and Rural Development, Edmonton, Alberta.

**Figure 9: Sugar Beet Costs and Returns by Size of Operation, 2010 (\$ per Acre)**



Source: Economics Branch, Alberta Agriculture and Rural Development, Edmonton, Alberta.

**Figure 10: Sugar Beet Costs and Returns by Size of Operation, 2010 (\$ per Tonne)**



Source: Economics Branch, Alberta Agriculture and Rural Development, Edmonton, Alberta.

### **Group II (51 to 100 Acres)**

Results for Group II beet participants are presented in Table 6. There were twelve (12) beet fields in the range of 50 to 100 acres with an average field size of 68.44 acres. This Group represented about forty-five (45) percent of the sugar beet area surveyed for the 2010 crop. Average yield per acre for this group was at 18.05 tonnes, lower by about two (2) tonnes per acre when compared with the other two groups (Group I and III). Average gross revenue for participants in Group II amounted to \$1,103 per acre or \$61.12 per tonne. Variable costs were estimated at \$622 per acre (\$34.46 per tonne). Capital costs for this group were estimated at \$207 per acre (\$11.46 per tonne). Average total production costs for these twelve (12) sugar beet fields were \$829 per acre or \$45.92 per tonne. Gross margin was positive at \$420 per acre (\$23.28 per tonne). Average net returns to unpaid labour and investment were positive at \$302 per acre (\$16.73 per tonne) and \$303 per acre (\$13.76 per tonne), respectively. Net returns to equity were also positive at \$274 per acre (\$15.20 per tonne). Detailed breakdown of costs and returns is presented in (Table 6). This group of beet producers (Group II) had somewhat higher net returns when compared with Group I (up to 50 acres) but lower than Group III (over 100 acres) study participants.

### **Group III (Over 100 Acres)**

Average area per farm for Group III study participants (over 100 acres) was 130 acres or 50 percent of the beet area surveyed for the 2010 crop. This group of beet producers had seven (7) beet fields in 2010. Average beet yield per acre for this group was 20.25 tonnes per acre. Gross revenue for Group III beet producers was \$1,243 per acre (\$61.38 per tonne). Variable costs were calculated at \$615 per acre or \$30.37 per tonne. Capital costs for this group were \$272 per acre (\$13.44 per tonne). Total production costs for these participants were \$887 per acre (\$43.82 per tonne). Gross margins were positive for this Group of participants at \$489 per acre (\$24.13 per tonne). Net returns to unpaid labour, investment and equity were all positive and significantly higher for this Group of study participants. Detailed breakdown on gross revenue, variable and capital costs and net returns are given in Table 7.

**Table 6: Sugar Beet Production Costs and Returns (51 to 100 Acres), 2010 (12 Enterprises)**

Acres Cropped (acres)	68.44	
Yield Per Acre (tonne)	18.05	
	<b>\$ per acre</b>	<b>\$ per tonne</b>
<b>GROSS RETURNS</b>		
Crop Sales	958.63	53.12
Crop Insurance Receipts	144.39	
Miscellaneous Receipts	0.18	
<b>A. TOTAL GROSS RETURN</b>	<b>1,103.20</b>	<b>61.12</b>
<b>VARIABLE COSTS</b>		
Seed	128.11	
Fertilizer	61.77	
Chemicals	16.16	
Hail / Crop Insurance	23.83	
Association Fees & Research Levies	13.45	
Trucking & Marketing	79.13	
Machine Fuel (Net of Rebate)	70.43	
Irrigation Fuel	31.24	
Repairs - Machinery	69.99	
Repairs - Buildings	2.95	
Utilities, Insurance & Overhead	30.00	
Custom Work & Specialized Labour	27.48	
Operating Interest Paid	7.92	
Paid Labour & Benefits	31.85	
Unpaid Family and Operator Labour	27.69	
<b>B. TOTAL VARIABLE COSTS</b>	<b>622.00</b>	<b>34.46</b>
<b>CAPITAL COSTS</b>		
Cash Rent /Crop Share	24.18	
Taxes, Water Rates, Insurance	36.15	
Equipment/Building Depreciation	118.29	
Lease Payments	0.00	
Paid Capital Interest	28.27	
<b>C. TOTAL CAPITAL COSTS</b>	<b>206.89</b>	<b>11.46</b>
<b>D. CASH COSTS (B+C - Unpaid Labour - Depreciation)</b>	<b>682.91</b>	<b>37.83</b>
<b>E. TOTAL PRODUCTION COSTS (B+C)</b>	<b>828.89</b>	<b>45.92</b>
<b>F. NET RETURNS</b>		
Gross Margin (A-D)	<b>420.29</b>	<b>23.28</b>
Return to Unpaid Labour (A-E + Unpaid Operator Labour)	<b>302.00</b>	<b>16.73</b>
Return to Investment (A-E + Paid Capital Interest)	<b>302.58</b>	<b>16.76</b>
Return to Equity (A-E)	<b>274.31</b>	<b>15.20</b>
<b>INVESTMENT</b>		
Land & Buildings	3,641.54	
Machinery	1,251.14	

Source: Economics Branch, Alberta Agriculture and Rural Development, Edmonton, Alberta.

**Table 7: Sugar Beet Production Costs and Returns (Over 100 Acres), 2010 (7 Enterprises)**

Acres Cropped (acres)	129.66	
Yield Per Acre (tonne)	20.25	
	<b>\$ per acre</b>	<b>\$ per tonne</b>
<b>GROSS RETURNS</b>		
Crop Sales	1,075.56	53.12
Crop Insurance Receipts	167.37	
Miscellaneous Receipts	0.10	
<b>A. TOTAL GROSS RETURN</b>	<b>1,243.03</b>	<b>61.38</b>
<b>VARIABLE COSTS</b>		
Seed	128.11	
Fertilizer	72.49	
Chemicals	18.21	
Hail / Crop Insurance	29.96	
Association Fees & Research Levies	13.87	
Trucking & Marketing	92.51	
Machine Fuel (Net of Rebate)	51.46	
Irrigation Fuel	25.44	
Repairs - Machinery	51.66	
Repairs - Buildings	2.16	
Utilities, Insurance & Overhead	20.79	
Custom Work & Specialized Labour	33.51	
Operating Interest Paid	5.67	
Paid Labour & Benefits	41.48	
Unpaid Family and Operator Labour	27.72	
<b>B. TOTAL VARIABLE COSTS</b>	<b>615.04</b>	<b>30.37</b>
<b>CAPITAL COSTS</b>		
Cash Rent /Crop Share	86.19	
Taxes, Water Rates, Insurance	20.75	
Equipment/Building Depreciation	105.25	
Lease Payments	0.00	
Paid Capital Interest	60.04	
<b>C. TOTAL CAPITAL COSTS</b>	<b>272.23</b>	<b>13.44</b>
<b>D. CASH COSTS (B+C - Unpaid Labour - Depreciation)</b>	<b>754.30</b>	<b>37.25</b>
<b>E. TOTAL PRODUCTION COSTS (B+C)</b>	<b>887.27</b>	<b>43.82</b>
<b>F. NET RETURNS</b>		
Gross Margin (A-D)	<b>488.73</b>	<b>24.13</b>
Return to Unpaid Labour (A-E + Unpaid Operator Labour)	<b>383.48</b>	<b>18.94</b>
Return to Investment (A-E + Paid Capital Interest)	<b>415.80</b>	<b>20.53</b>
Return to Equity (A-E)	<b>355.76</b>	<b>17.57</b>
<b>INVESTMENT</b>		
Land & Buildings	2,486.16	
Machinery	1,102.66	

Source: Economics Branch, Alberta Agriculture and Rural Development, Edmonton, Alberta.

## MANAGEMENT PROFILE

Sugar beet production is an intensive farming operation and requires a higher degree of management skills. The 2010 study sample of 11 beet growers (22 fields) was divided into two groups (small 1/3 and large 1/3) to examine management factors.

Overall level of management was determined by the following four factors:

1. Yield
2. Variable Costs
3. Gross Margin
4. Return to Equity

Table 8 provides a cross-section of these management factors. Each of these factors was rated 1 to 3 for the small, middle and large 1/3 producers, respectively. However, information presented in Table 8 is only for the small 1/3 and the large 1/3 sugar beet producers. Each producer was given an average rating for the above four factors. From these averages, the large 1/3 producer in all four factors were rated 3 and the small 1/3 were rated 1. The last column in Table 8 shows a blend of 1 to 3 for each factor, depending on whether that group had more top managers (closer to 3) or not.

For each factor, estimates for the large 1/3 group are presented in the first line and estimates for the small 1/3 group in the second line. As shown in Table 8, sugar beet yield per acre in 2010, was higher for the large 1/3 group (21.45 tonnes) compared with the small 1/3 group (16.53 tonnes). Total costs for the large 1/3 group of producers was \$989 per acre compared with \$722 for the small 1/3 group. Gross margin for the large 1/3 group was \$570 per acre compared with \$279 per acre for the small 1/3 group. Return to equity for the large 1/3 group was \$457 per acre compared to \$112 per acre for the bottom 1/3 (small) group.

Higher management rating is associated with the high gross margin and return to equity for the large 1/3 group relative to the small 1/3. Overall management rating between the two groups was significantly apart, i.e. 3 versus 1 (large versus small). The overall management factor includes yield, variable costs, gross margin and return to equity.

**Table 8: Profile of Management Factors for Sugar Beet Production, 2010**

TABLE 8: PROFILE OF MANAGEMENT FACTORS FOR SUGAR BEET PRODUCTION, 2010													
PROFILE OF MANAGEMENT FACTORS FOR SMALL 1/3 AND LARGE 1/3 GROUPS OF SUGAR BEET PRODUCERS													
	Acres	Yield	Special Custom	Unpaid Labour	Cash Costs	Total Costs	Gross Margin	Return to Equity	Investment				Overall Managt.
									Land	Buildings	Machine	Irrigation	
Acres	<b>129.66</b> <b>48.19</b>	20.33 19.01	32.91 36.62	28.14 38.89	758.60 658.73	893.51 881.24	487.43 468.98	352.52 246.46	2,251.71 2,714.29	170.95 143.93	929.32 1,189.35	191.13 711.87	2.11 2.07
Yield (Tonne/Acre)	83.57 85.19	<b>21.45</b> <b>16.53</b>	33.19 18.72	37.71 21.21	723.61 688.54	912.38 796.87	493.18 367.40	304.42 259.07	1,794.57 3,378.43	187.54 115.71	1,173.81 798.39	350.17 95.07	2.32 1.71
Special Custom (\$/Acre)	77.14 77.86	19.65 19.74	<b>67.18</b> <b>0.00</b>	26.74 37.29	706.30 715.56	844.46 903.95	470.55 401.30	332.39 212.91	3,973.00 1,785.71	188.55 118.77	695.32 1,338.24	397.33 225.16	2.11 1.96
Unpaid Labour (\$/Acre)	75.27 94.57	19.30 18.05	11.39 22.67	<b>41.40</b> <b>19.29</b>	700.96 722.19	896.09 834.26	406.06 446.85	210.93 334.78	1,392.86 3,601.57	203.00 97.69	1,279.71 826.51	330.54 119.64	1.82 2.07
Cash costs (\$/Acre)	102.16 73.93	19.91 18.32	33.03 8.13	27.93 32.91	<b>820.30</b> <b>605.81</b>	961.44 761.52	346.10 483.55	204.97 327.84	2,633.86 1,914.29	220.94 103.78	973.42 1,049.32	180.28 221.48	1.61 2.32
Total Costs (\$/Acre)	87.23 91.36	19.39 18.08	16.04 17.93	31.67 24.47	796.98 620.35	<b>989.20</b> <b>722.19</b>	353.15 516.75	160.94 414.91	2,312.43 3,074.86	169.59 81.69	1,216.75 754.49	448.47 66.16	1.68 2.36
Gross Margin (\$/Acre)	102.43 82.77	18.95 17.96	23.15 16.13	23.66 29.56	681.26 771.98	821.63 916.58	<b>570.19</b> <b>278.98</b>	429.82 134.39	3,503.43 2,991.00	71.04 190.83	864.15 1,029.92	416.83 180.28	2.43 1.29
Return to Equity (\$/Acre)	105.64 77.84	19.55 18.08	35.79 12.65	23.39 32.83	678.15 754.75	779.40 924.67	558.44 282.24	<b>457.19</b> <b>112.31</b>	2,360.57 2,098.14	131.79 185.97	717.26 1,137.65	66.16 257.20	2.50 1.39
Land Investment (\$/Acre)	71.79 82.49	18.23 20.02	47.66 25.77	22.51 38.63	701.24 697.84	853.26 864.14	441.78 458.98	289.75 292.68	<b>4,905.29</b> <b>0.00</b>	144.76 197.27	837.48 1,073.63	493.47 203.73	1.96 2.11
Buildings Investment (\$/Acre)	93.84 89.29	19.35 18.25	37.46 9.55	30.95 22.40	764.77 683.52	896.66 797.18	355.08 463.77	223.18 350.11	2,062.43 3,066.00	<b>265.16</b> <b>53.37</b>	876.35 891.25	158.86 63.75	1.64 2.18
Machine Investment (\$/Acre)	82.86 96.00	19.83 18.52	8.70 40.52	37.99 21.11	735.18 674.37	958.72 764.61	445.65 465.34	222.12 375.09	2,214.29 3,387.29	130.23 154.13	<b>1,399.37</b> <b>585.86</b>	575.82 98.21	2.04 2.14
Irrigation Investment (\$/Acre)	64.64 88.91	19.35 19.82	43.49 7.91	35.43 36.07	677.02 732.72	909.97 882.54	503.52 420.91	270.56 271.09	4,178.57 857.14	134.52 165.75	1,092.92 1,201.25	<b>998.07</b> <b>0.00</b>	2.07 2.00
Overall Management* (\$/Acre)	91.79 82.77	19.81 17.96	30.89 16.13	27.61 29.56	670.02 771.98	787.04 916.58	543.92 278.98	426.90 134.39	1,780.29 2,991.00	142.84 190.83	864.68 1,029.92	42.32 180.28	<b>3.00</b> <b>1.00</b>
Weighted Average(\$/Ac.)	82.59	19.24	29.89	28.87	714.53	860.53	457.92	311.92	2,793.60	151.51	930.57	297.22	2.00

\* Overall Management Factor includes Variable Costs, Return to Equity, Yield and Gross Margin

## **SECTION VI**

### **COMPARISON OF COSTS AND RETURNS, 2001-2010**

Table 9 presents a ten year (2001 to 2010) comparison of costs and returns for sugar beet production in Alberta. A graph of the gross return, total production costs, return to investment and return to equity are presented on Figure 11.

As shown on Table 9 or Figure 11, gross returns over the period ranged from \$636 per acre in 2002 to \$1,172 per acre in 2010. Average gross revenue for the 2010 beet study participants was estimated at \$1,172 per acre compared to \$979 per acre for the 2009 beet crop. This increase in returns of about 20 percent is primarily due to an increase in both yield and price received for the beet crop (i.e. 7 percent and 21 percent respectively). The average yield reported by the study participants in 2010 was 19.24 tonnes per acre compared to 17.19 tonnes per acre for the 2009 beet crop. Similarly the average price reported by the study participants in 2010 was \$53.12 per tonnes compared to \$44.05 per tone for the 2009 beet crop.

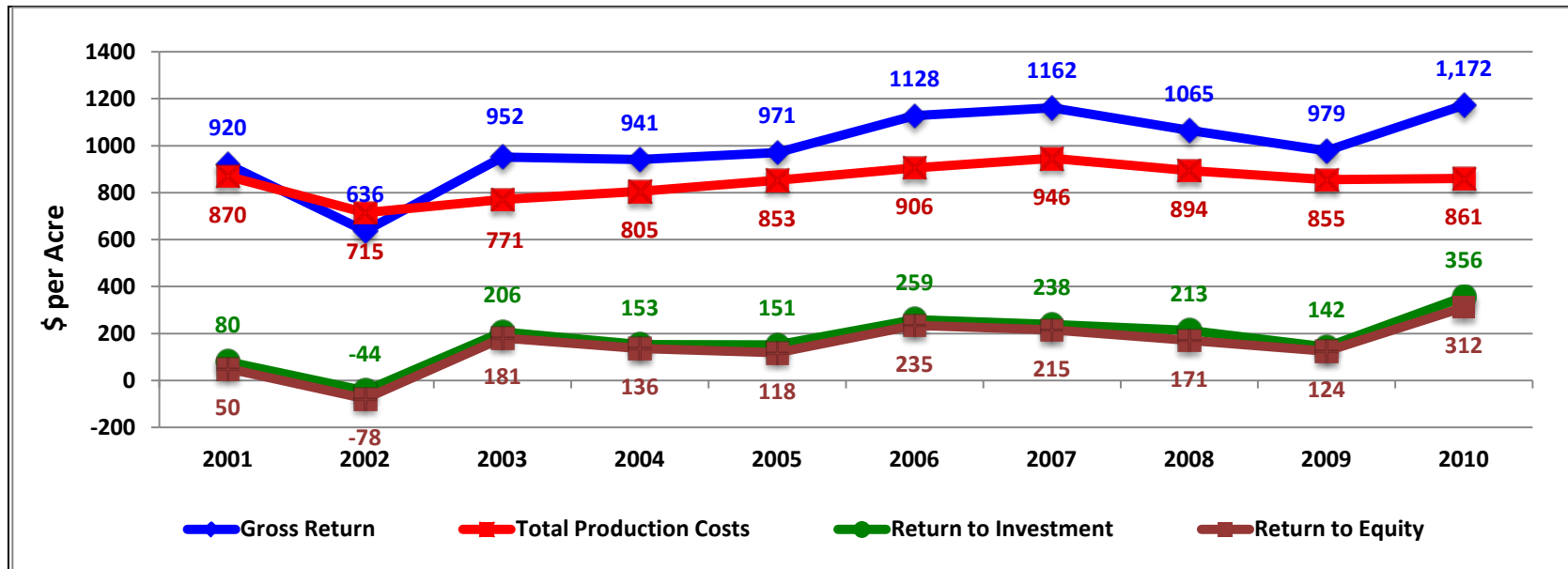
Total production costs over the period (2001 to 2010) ranged from \$715 in 2002 to \$946 per acre in 2007. The average total production costs for 2010 beet study participants increased marginally by about one (1) percent compared to 2009. Even though total variable costs per acre for the study participants in 2010 decrease by five (5) percent compared to 2009, this is offset by the high increase in total capital costs per acre of about 20 percent (i.e. from \$204 per acre in 2009 to \$244 per acre in 2010).

As shown on Table 9 or Figure 11, net returns per acre (i.e. returns to unpaid labour, investment and equity) have varied considerably during the last ten years (i.e. from 2001 to 2010). Average returns to unpaid labour ranged from a negative \$18 per acre in 2002 to \$341 per acre in 2010. Average return to investment per acre ranged from a negative \$44 per acre in 2002 to \$356 per acre in 2010. Return to equity ranged from a negative \$78 per acre in 2002 to \$312 per acre in 2010. In comparison to 2009, the net return per acre realized by the 2010 beet study participants is due to the high increase in gross return.

**Table 9: Comparison of Costs and Returns 2001 - 2010 (\$ per acre)**

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
<b>Gross Return</b>	920	636	952	941	971	1,128	1,162	1,065	979	1,172
<b>Total Variable Costs</b>	599	503	526	576	607	642	678	658	651	617
<b>Total Capital Costs</b>	271	212	245	224	246	251	269	236	204	244
<b>Total Production Costs</b>	870	715	771	805	853	906	946	894	855	861
<b>Return to Unpaid Labour</b>	113	-18	225	177	161	287	267	203	150	341
<b>Return to Investment</b>	80	-44	206	153	151	259	238	213	142	356
<b>Return to Equity</b>	50	-78	181	136	118	235	215	171	124	312

**Figure 11: Comparison of Costs and Returns for Sugar Beet Production, 2001-2010**



## SECTION VII

### SUMMARY

A summary of the 2010 sugar beets production costs and returns is presented in Table 10. As mentioned earlier, the sample size of eleven (11) sugar beet producers (22 fields) for the 2010 beets crop was divided into two groups, i.e., beets produced on owned (16 fields) and rented land (6 fields). This was the smallest sample size of beet producers participating in the cost of production study since its inception in the early sixties.

As shown on Table 10, average gross returns based on crop sales, miscellaneous receipts and government program payment amounted to \$1,172 per acre (\$60.94 per tonne) for the 2010 sugar beet crop. For beets produced on owned and rented land, gross returns were \$1,153 per acre (\$61.95 per tonne) and \$1,220 per acre (\$58.79 per tonne), respectively.

Average seed, fertilizer and chemical costs for sugar beet production in 2010 were estimated at \$212 per acre (\$11.03 per tonne) for the study sample. These costs were \$211 per acre (\$11.37 per tonne) for beets grown on owned land compared to \$214 per acre (\$10.31 per tonne) for rented land.

Miscellaneous costs (hail/crop insurance, utilities, other insurance, association fees and research levies) amounted to \$68 per acre (\$3.51 per tonne) for the study sample; \$63 per acre (\$3.40 per tonne) for beets produced on owned land and \$78 per acre (\$3.76 per tonne) on rented land.

Fuel and repairs (machinery and building) amounted to \$149 per acre (\$7.75 per tonne) for the study sample in 2010. For beets grown on owned land fuel and repairs were estimated at \$168 per acre (\$9.04 per tonne) compared to \$104 per acre (\$5.01 per tonne) for beets produced on rented land.

Trucking and marketing costs were calculated at \$85 per acre (\$4.40 per tonne) for the study sample, \$84 per acre (\$4.49 per tonne) for beets grown on owned land and \$88 per acre (\$4.22 per tonne) for beets grown on rented land.

Average cost for custom work and specialized labour amounted to \$30 per acre (\$1.55 per tonne) for the study sample, and also \$25 per acre (\$1.35 per tonne) for the owned land and \$41 per acre (\$1.98 per tonne) for the rented land group.

Average operating interest paid per acre was \$7.61 per acre (\$0.40 per tonne), \$8.13 per acre (\$0.44 per tonne), and \$6.38 per acre (\$0.31 per tonne) for the study sample, owned land and rented land groups, respectively.

Average labour cost (paid and unpaid) was \$66 per acre (\$3.41 per tonne) for the study sample. It was \$66 per acre (\$3.55 per tonne) for beets grown on owned land and \$65 per acre (\$3.12 per tonne) for rented land.

Average total variable cost for the 2010 sugar beet crop was estimated at \$617 per acre (\$32.06 per tonne) for the study sample; \$626 per acre (\$33.63 per tonne) for the owned land group and \$595 per acre (\$28.70 per tonne) for beets produced on rented land.

Details on gross returns and various costs for the three groups, i.e. study sample, beets produced on owned and rented land are presented in Table 10.

Average capital costs were estimated at \$244 per acre (\$12.67 per tonne) for all of the study participants. These were \$230 per acre (\$12.37 per tonne) for the group who produced beets on owned land and \$276 per acre (\$113.31 per tonne) for beets grown on rented land.

Average total production costs for the 2010 sugar beet crop (variable costs + capital costs) amounted to \$861 per acre (\$44.73 per tonne) for the study sample. For beets grown on owned and rented land, average production costs per acre were at \$856 per acre (\$46 per tonne) and \$872 per acre (\$42.01 per tonne).

Average gross margin for the study sample for the 2010 sugar beet crop was positive at \$458 per acre (\$23.80 per tonne). Similarly, average return to unpaid labour for the study sample was positive at \$341 per acre (\$17.71 per tonne). Returns to investment and equity for the

study sample were also positive at \$356 per acre (\$18.51 per tonne) and \$312 per acre (\$16.21 per tonne), respectively.

Average gross margin for beets grown on owned land was \$455 per acre (\$24.45 per tonne). Return to unpaid labour for beets produced on owned land was positive at \$324 per acre (\$17.43 per tonne). Return to investment for beets grown on owned land was also positive at \$359 per acre (\$19.28 per tonne). Return to equity was positive as well for beets grown on owned land at \$297 per acre (\$15.95 per tonne).

Average gross margin for beets grown on rented land was \$465 per acre (\$22.43 per tonne) for beets grown on rented land. Return to unpaid labour for beets produced on rented land was \$380 per acre (\$18.32 per tonne). The average return to investment for beets grown on rented land was \$350 per acre (\$16.87 per tonne). Similarly return to equity for this group of beet producers was \$348 per acre (\$16.78 per tonne).

**Table 10: Summary of Sugar Beet Production Costs and Returns, 2010**

	Study Sample		Owned Land		Rented Land	
Enterprises	22		16		6	
Acreage Cropped (acres)	82.59		79.97		89.57	
Yield Per Acre (tonnes)	19.24		18.61		20.75	
	\$/Acre	\$/Tonne	\$/Acre	\$/Tonne	\$/Acre	\$/Tonne
<b>GROSS RETURNS</b>	1,172.45	60.94	1,152.58	61.95	1,219.74	58.79
<b>VARIABLE COSTS</b>						
Input Costs (Seed, Fert. & Chem)	212.20	11.03	211.49	11.37	213.89	10.31
Miscellaneous	67.56	3.51	63.18	3.40	78.02	3.76
Fuel and Repairs (Mach. & Bldg.)	149.14	7.75	168.16	9.04	103.85	5.01
Custom Work & Specialized Labour	29.89	1.55	25.20	1.35	41.05	1.98
Labour (Paid & Unpaid)	65.64	3.41	66.02	3.55	64.73	3.12
Operating Interest	7.61	0.40	8.13	0.44	6.38	0.31
Trucking & Marketing	84.70	4.40	83.51	4.49	87.51	4.22
<b>B. TOTAL VARIABLE COSTS</b>	<b>616.74</b>	<b>32.06</b>	<b>625.69</b>	<b>33.63</b>	<b>595.43</b>	<b>28.70</b>
<b>C. TOTAL CAPITAL COSTS</b>	<b>243.79</b>	<b>12.67</b>	<b>230.18</b>	<b>12.37</b>	<b>276.23</b>	<b>13.31</b>
<b>D. TOTAL CASH COSTS (B+C - Unpaid Labour – Dep.)</b>	<b>714.53</b>	<b>37.14</b>	<b>697.78</b>	<b>37.50</b>	<b>754.44</b>	<b>36.36</b>
<b>E. TOTAL PRODUCTION COSTS (B+C)</b>	<b>860.53</b>	<b>44.73</b>	<b>855.87</b>	<b>46.00</b>	<b>871.66</b>	<b>42.01</b>
<b>F. NET RETURNS</b>						
Gross Margin (A-D)	457.92	23.80	454.80	24.45	465.30	22.43
Return to Unpaid Labour (A-E + Unpaid Operator Labour)	340.79	17.71	324.26	17.43	380.09	18.32
Return to Investment (A-E + Paid Capital Interest)	356.19	18.51	358.79	19.28	349.95	16.87
Return to Equity (A-E)	311.92	16.21	296.71	15.95	348.08	16.78

\* Miscellaneous costs include; hail/crop insurance, utilities, other insurance, board fees and research levies.

## **APPENDIX**

### **SUGAR BEET PRODUCTION COSTS AND RETURNS USING PROVINCIAL YIELD, 2010**

Sugar beet production costs and returns data presented in Table 11 are based on a provincial average yield of 18.9 tonnes in 2010. As mentioned at the beginning of the report, average yield for the study sample of eleven (11) beet producers was estimated at 19.24 tonnes per acre.

Assuming other receipts (crop insurance and miscellaneous) were the same for sugar beet growers for the 2010 beet crop, total gross revenue was calculated to be \$1,154 per acre or (\$61.08 per tonne). Variable and capital costs presented in Table 11 were also assumed to be the same as for the study sample. The purpose of including this data (Table 11) in the report was to observe how net returns could be impacted if industry average yield was used to arrive at sugar beet production costs and returns.

Average gross margin was positive at \$440 per acre (\$23.28 per tonne) with the provincial yield compared with \$458 per acre (\$23.80 per tonne) for the study sample yield. Return to unpaid labour was positive with the provincial yield at \$323 per acre or (\$17.08) per tonne whereas for the study sample it was \$341 per acre (\$17.71 per tonne). Returns to investment and equity were also positive with the provincial yield at \$338 per acre (\$17.89 per tonne) and \$294 per acre (\$15.55 per tonne), respectively. Similarly, returns to investment and equity for the study sample of 11 beet producers were also positive at \$356 per acre (\$18.51 per tonne) and \$312 per acre (\$16.21 per tonne), respectively. Details on gross revenue, costs and returns with the provincial average yield of 18.9 tonnes per acre for the 2010 beet crop are presented in Table 11.

**Table 11: Sugar Beet Production Costs and Returns Based on Provincial Yield, 2010**

Acres Cropped (acres)	82.59	
Yield Per Acre (tonne)	18.90	
	<b>\$ per acre</b>	<b>\$ per tonne</b>
<b>GROSS RETURNS</b>		
Crop Sales	1,003.97	53.12
Crop Insurance Receipts	150.31	
Miscellaneous Receipts	0.13	
<b>A. TOTAL GROSS RETURN</b>	<b>1,154.41</b>	<b>61.08</b>
<b>VARIABLE COSTS</b>		
Seed	128.11	
Fertilizer	66.54	
Chemicals	17.55	
Hail / Crop Insurance	27.08	
Association Fees & Research Levies	13.61	
Trucking & Marketing	84.70	
Machine Fuel (Net of Rebate)	60.15	
Irrigation Fuel	27.14	
Repairs - Machinery	59.38	
Repairs - Buildings	2.47	
Utilities, Insurance & Overhead	26.80	
Custom Work & Specialized Labour	29.89	
Operating Interest Paid	7.61	
Paid Labour & Benefits	36.77	
Unpaid Family and Operator Labour	28.87	
<b>B. TOTAL VARIABLE COSTS</b>	<b>616.67</b>	<b>32.63</b>
<b>CAPITAL COSTS</b>		
Cash Rent /Crop Share	54.66	
Taxes, Water Rates, Insurance	27.73	
Equipment/Building Depreciation	117.13	
Lease Payments	0.00	
Paid Capital Interest	44.27	
<b>C. TOTAL CAPITAL COSTS</b>	<b>243.79</b>	<b>12.90</b>
<b>D. TOTAL CASH COSTS (B+C - Unpaid Labour - Depreciation)</b>	<b>714.46</b>	<b>37.80</b>
<b>E. TOTAL PRODUCTION COSTS (B+C)</b>	<b>860.46</b>	<b>45.53</b>
<b>F. NET RETURNS</b>		
Gross Margin (A-D)	<b>439.94</b>	<b>23.28</b>
Return to Unpaid Labour (A-E + Unpaid Operator Labour)	<b>322.81</b>	<b>17.08</b>
Return to Investment (A-E + Paid Capital Interest)	<b>338.21</b>	<b>17.89</b>
Return to Equity (A-E)	<b>293.94</b>	<b>15.55</b>
<b>INVESTMENT</b>		
Land & Buildings	2,945.11	
Machinery	1,227.79	

Source: Economics Branch, Alberta Agriculture and Rural Development, Edmonton, Alberta.