

Economics of Production and Marketing
Greenhouse Crops
in Alberta



A 2017 report on the costs and returns of greenhouse crop production in Alberta

OCTOBER 2018

Alberta 

Alberta Agriculture and Forestry, Government of Alberta
October 2018
Economics of Production and Marketing Greenhouse Crops in Alberta
AGDEX 821-59
ISSN 1927-5714 (Online), ISSN 1186-155X (Print)

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Acknowledgements

We acknowledge and appreciate the participation of all the greenhouse operators in Alberta who willingly provided detailed information and the contribution and support of the Alberta Greenhouse Growers association for this study. Without the participation and support of greenhouse growers and the association, the publication of this report would not have been possible.

Growing Forward 2, a federal-provincial-territorial initiative, sponsored the data collection.

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EXECUTIVE SUMMARY

Alberta's greenhouse crops industry ranks fourth in the country after Ontario, British Columbia and Quebec. In 2017, the size of Alberta's industry under both glass and plastic was approximately 1.53 million square metres (153 hectares or 378 acres). Vegetables accounted for about 47 per cent of the greenhouse area (176.6 acres) followed by bedding plants, potted flowers and ornamentals at 40 per cent (152.9 acres) and the remaining 13 per cent or 48.5 acres constituted tree seedlings. Of the 176.6 acres for vegetables, 90 acres were cucumbers, 52.6 were tomatoes, 27 were peppers, five acres lettuce and the remaining two acres were eggplant and other crops.

There are about 230 greenhouse operations in Alberta. The industry supports over 2,000 full-time and over 2,500 part-time jobs. Approximately 99 per cent of the greenhouse area in Alberta is under commercial production, with the balance confined to institutions such as universities, research stations and colleges. Most of Alberta's greenhouse operations are highly diversified and are equipped with the most modern equipment to achieve production efficiencies.

Greenhouse operators across the province were interviewed to obtain 2017 production costs and returns information on cucumbers, tomatoes, peppers, bedding plants/ornamentals and tree seedlings. In total, forty-seven (47) completed questionnaires covering a total production area of approximately 4,278,624 square feet or 98 acres was surveyed. The information collected was analyzed and individual reports were mailed to study participants for their review and feedback before finalizing the group averages contained in this report. To preserve confidentiality, group averages were only developed for greenhouse crops with three or more participants. This report details the blended or weighted average data from growers who provided their information.

The results show that average investment cost per square metre ranged from \$112.75 for cucumber to \$321.01 for bedding plants/ornamentals producing greenhouses in Alberta. The total production costs ranged from a low of \$71.55 per square metre for tree seedlings to \$139.15 per square metre for bedding plants/ornamentals. The most significant cost items for the 2017 crop were labour (hired and operator), material inputs (growing media, seed/cuttings, fertilizer and chemicals, trays, boxes and other packaging materials), marketing and natural gas.

Estimated gross margins were positive for all crops except peppers, which had a negative margin of -\$5.03 per square metre. Greenhouses producing bedding plants/ornamentals showed the highest gross margin per square metre at \$35.28 followed by tree seedlings at \$23.84. Average returns to unpaid labour, investment and equity were positive for all crops except peppers. The results show that margins have become slim for the majority of producers when compared with previous studies.

Based on the results of the 2017 study, the gross revenue generated by the provincial greenhouse industry in 2017 was estimated at approximately \$179.9 million with an investment or total asset value of about \$328.5 million. The report can assist growers in making profitable management decisions. In addition, the information in the report will serve as a guide to government when developing and evaluating programs and policies for industry. New producers can also use this information to increase their understanding of greenhouse production costs and returns.

SECTION I

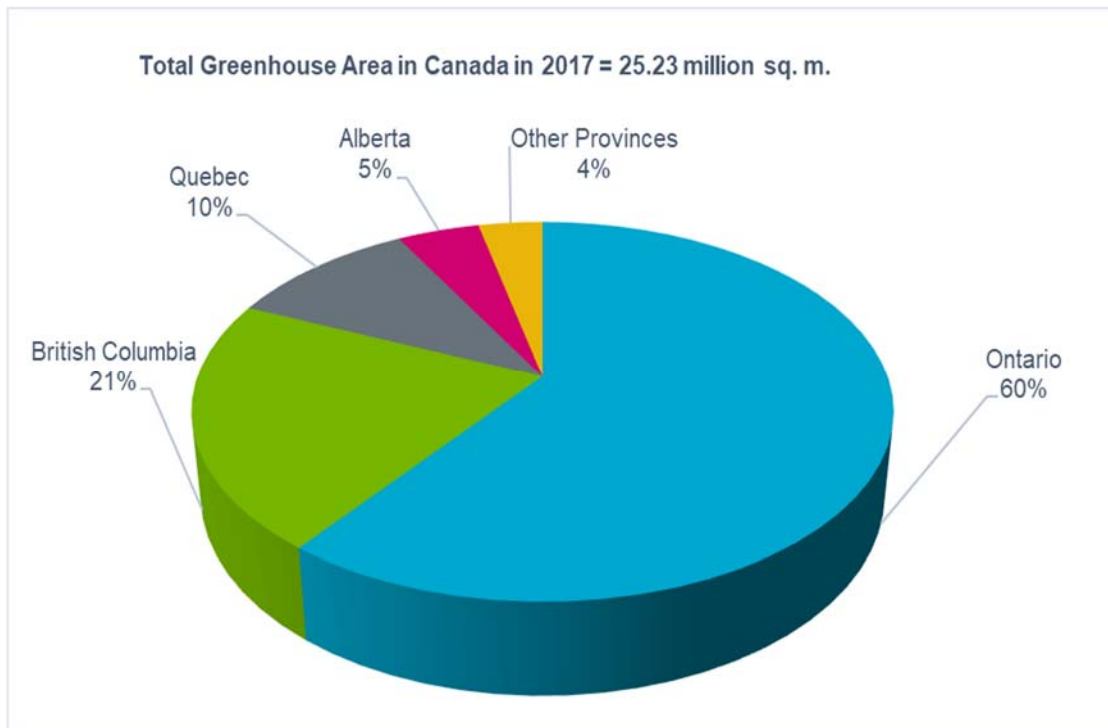
INTRODUCTION

The origin of the Alberta Greenhouse Crops Industry goes back over a hundred years. It was in 1905 when Dutch and German settlers began plant production under protection cultivation. Since 1970, Alberta Agriculture and Forestry (AF) has committed material resources to the development and growth of this industry in Alberta.

Alberta's greenhouse industry ranks fourth in the country. Estimates of total greenhouse area by Statistics Canada in 2017 shows that Ontario continues to lead the greenhouse industry with 15.2 million square metres (1,521 hectares), followed by British Columbia at 5.4 million square metres (538 hectares) and Quebec at 2.6 million square metres (261 hectares). Operations that exclusively produce tree seedlings for reforestation are not included in these estimates. They were included in prior surveys before 2016.

In percentage terms, Ontario accounts for 60 per cent of all the greenhouse area in Canada, with British Columbia at 21 per cent and Quebec at 10 per cent. Alberta accounts for about five (5) per cent of the greenhouse area in Canada and the other provinces combined accounted for the remaining four (4) per cent. Figure 1 shows estimates of total greenhouse area in Canada in 2017.

Figure 1: Total Greenhouse Area in Canada, 2017



Source: Statistics Canada

Most of Alberta's greenhouse operations are highly diversified and are equipped with the most modern equipment to achieve production efficiencies. The greenhouse industry supports rural maintenance trades, trucking, packaging, plastic and recycling industries in addition to providing fresh produce to Albertans year round.

Alberta's greenhouse industry has steadily expanded since 1980. This expansion was prompted by consumer demand for fresh and quality produce. Lower taxes and input costs as well as the integration of research, extension and technology transfer contributed to this growth. Despite this growth, industry has faced a number of threats related to energy costs, markets/prices, labour shortages, import competition, regulation and fierce competition from large retailers. Several adjustments have been made by industry and government to address the issues that would have hindered the industry from growing and remaining competitive.

Due to the several adjustments, the greenhouse industry in Alberta has gone through, the need to estimate costs and returns data based on current conditions is important to contribute to informed decision making. This report, which details the current production costs and returns for major greenhouse crops, is a continuing effort to monitor the costs and returns of greenhouse crop production in Alberta.

Objectives of the Study

The major objectives of the study were:

- to describe the structure of the greenhouse industry in Alberta
- to report estimated greenhouse production costs and returns by major crops
- to identify the main factors influencing production and marketing of greenhouse crops in Alberta, and
- to identify major problems experienced by greenhouse producers in Alberta

The Study Sample

A questionnaire specifically designed for greenhouse operations was used to obtain the production costs and returns information on cucumbers, peppers, tomatoes, ornamentals (bedding plants and flowers) and tree seedlings, for the 2017 crop. The sample for the study was randomly selected from a list of greenhouse operators in Alberta.

Following selection, copies of the questionnaire together with recruitment letters were mailed to all the selected growers after which individual phone calls were made to confirm their willingness to participate in the study. In total, forty-seven (47) completed questionnaires were analyzed.

The total production area surveyed was approximately 4,278,624 square feet or 397,498 square metres or 98.2 acres. This translates to about 26 per cent of the total greenhouse area of 378 acres in Alberta.

Table 1 shows the breakdown of the greenhouse cost of production questionnaires analyzed by crop.

Table 1: Breakdown of Questionnaires Analyzed by Greenhouse Crop

Greenhouse Crop	Number of Questionnaires Analyzed	Production Area (sq. ft.)	Production Area (sq. m.)
Cucumber	9	1,058,223	98,312
Tomato	7	514,548	47,803
Pepper	6	308,805	28,689
Lettuce	2	23,355	2,170
Eggplant	2	38,779	3,603
Bedding Plant / Ornamental	17	1,552,863	144,266
Tree Seedling	4	782,051	72,655
Total	47	4,278,624	397,498

Method of Analysis

The raw data obtained was reviewed for information gaps before entering into the computer for analysis. Individual analyses and group averages were developed using the Paradox program. Individual analyses were mailed to study participants for their review and feedback before finalizing the group averages for this report. To preserve confidentiality, group averages were only developed for greenhouse crops with three or more participants.

It is important to note that virus and diseases can affect the production figures and therefore the cost and returns of individual growers in any given year. This report details the average data from growers who provided their information.

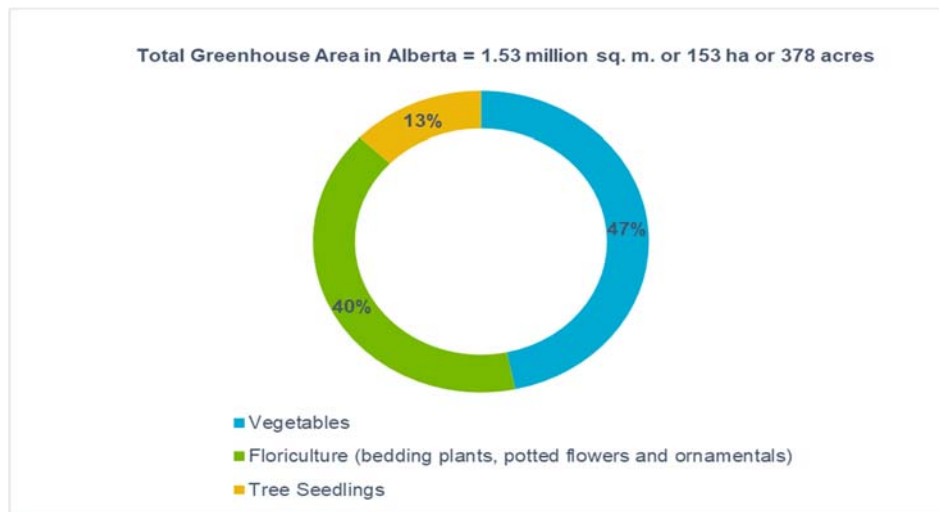
Readers are advised to note that due to the small sample size, only aggregate production costs and returns information for the whole province has been presented in this report.

SECTION II

ALBERTA GREENHOUSE INDUSTRY OVERVIEW

In 2016, a major expansion of vegetables took place in Southern Alberta and this increased area under vegetables by a total of 35 acres. In 2017, the size of Alberta's industry under both glass and plastic was estimated at approximately 1.53 million square metres (153 hectares or 378 acres). Figure 2 shows the percentage of Alberta's total greenhouse area by crop in 2017.

Figure 2: Total Greenhouse Area by Crop in Alberta, 2017



Source: Alberta Greenhouse Growers Association

As presented in Figure 2, vegetables account for about 47 per cent of the greenhouse area (176.6 acres) followed by bedding plants, potted flowers and ornamentals at 40 per cent (152.9 acres) and the remaining 13 per cent or 48.5 acres constitute tree seedlings. Out of the 176.6 acres for vegetables, 90 acres are under cucumbers, 52.6 acres under tomatoes, 27 acres under peppers, five acres under lettuce and the remaining two acres are under eggplant and other crops. It is worth noting that this total greenhouse area in use excludes any new acreage that is going to be cultivated to *Cannabis sativa* or marijuana.

Almost two-thirds of greenhouses in Alberta are located in the south and south-central regions. The area around Medicine Hat/Redcliff is known as the “greenhouse capital of the Prairies”. This area is well known for the Red Hat Co-op (a producer organization responsible for marketing of greenhouse vegetables).

Most greenhouse operations are located in cities and towns because of easy access to labour, marketing facilities, utilities and the services necessary for a greenhouse operation. Due to very high land prices and taxes, during the last several years few new greenhouses have been built at a distance from major population centers.

Based on the “*Profile of the Greenhouse Industry in Alberta 2014*” report, the Medicine Hat region that includes Redcliff has the highest total greenhouse area (45 per cent) followed by Red Deer at 16 per cent, Edmonton at nine per cent and Calgary at seven per cent. Approximately 36 per cent of greenhouses are year-round and 64 per cent are seasonal in nature. Approximately 99 per cent of the greenhouse area in Alberta is under commercial production, with the balance confined to institutions such as universities, research stations and colleges.

During the past decade, there has been a steady increase in greenhouse vegetable acreage compared to bedding plants and ornamentals. This trend is reflected by growth in farm cash receipts due to the consumer demand for fresh and quality produce for the sector. Based on the 2014 profile report, 27 per cent of greenhouse operations have annual gross sales of less than \$100,000. About 39 per cent reported sales of \$100,001 to \$500,000, 21 per cent reported 500,001 to \$2 million, eight per cent reported \$2 million to \$4 million and remaining five per cent reported sales of over \$4 million. The greenhouse industry also supports rural maintenance trades, trucking, packaging, plastic and recycling industries.

Number and Size of Greenhouse Operations in Alberta

According to the comprehensive profile survey of the provincial greenhouse industry published in 2015, Alberta has approximately 230 commercial greenhouse operations. Approximately 19 per cent or 44 of these greenhouses are located in regional centers while the remaining 186 greenhouses or 81 per cent are located outside of regional centers. Table 2 shows the grouping of the various sizes of greenhouse operations in Alberta.

Table 2: Size of Greenhouse Operations in Alberta

Greenhouse Area (sq. ft.)	Number of Greenhouses	Per cent of Greenhouses
Under 10,000	70	30%
10,000 to 19,999	48	21%
20,000 to 40,000	38	17%
Greater than 40,000	74	32%
Total	230	100%

Source: Profile of the Greenhouse Industry in Alberta 2014

There has been a major shift in the average size of Alberta greenhouses when you compare the 2014 profile report with previous studies. Area under 10,000 ft² dropped from 42 per cent in 2000 to 30 per cent in 2014, while area over 40,000 ft² increased to 32 per cent from 18 per cent in 2000. It is believed that the vegetable greenhouses have likely influenced this trend.

Presently, the economic unit in terms of size of an average greenhouse is about two acres. This is especially true for the commercial and wholesale markets. For direct marketing to smaller retailers

in rural areas and farmer's markets, the size could be far less than two acres. Many growers have done it successfully with about 6,000 to 10,000 ft². Approximately 36 per cent of greenhouses are year-round and 64 per cent are seasonal in nature. This is changing with new acreage being year round.

Crops Grown in Alberta Greenhouses

Over the past three decades, the industry has diversified substantially in terms of types of crops. Currently, the major greenhouse crops grown include vegetables, bedding plants, potted flowers and ornamentals, cut flowers, herbs, perennials and tree seedlings. The most commonly grown greenhouse vegetables are:

- Long English and mini cucumbers of different types.
- Beefsteak tomatoes, tomatoes on the vine (TOV), cherry tomatoes, cocktail tomatoes of different colours.
- Peppers of different colours, green, red, orange, yellow and other colours.
- Lettuce (butter head, romaine and different types of coloured lettuce).
- Other crops such as eggplant, Swiss chard, kale, beans, mantra beans, snap peas, sprouts, basil, strawberries, micro greens, etc.
- Bedding plants, potted flowers and ornamentals.
- Cut flowers, herbs, perennials.
- Tree seedlings, primarily white and Colorado spruce and pine for reforestation

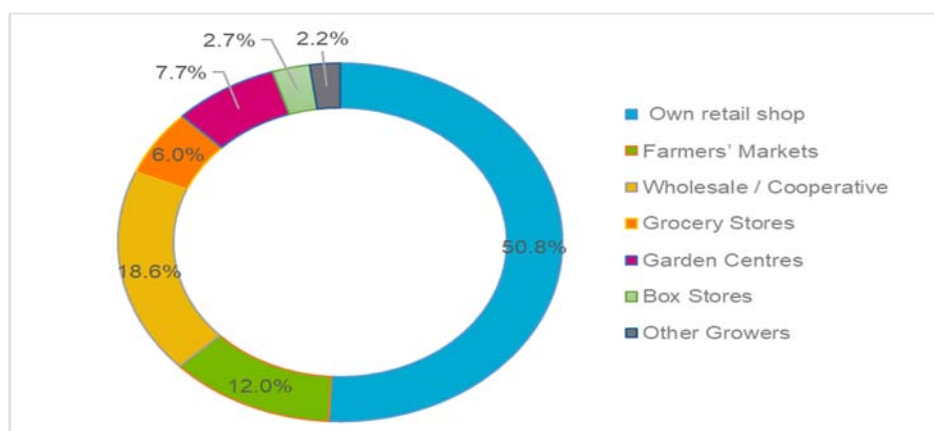
Based on the 2014 profile report, the top ten bedding plants grown by region in Alberta include petunia, geranium, pansy, marigold, begonia, lobelia, bacopa, calibrachoa, snapdragon, tomatoes and peppers in containers. It must be noted that these growers produced multiple crops, with an average of ten crops per operation. Greenhouses in Alberta produce many kinds of flowers; chrysanthemums, roses and geraniums being the most common potted plants. Outdoor flowers such as petunias and marigolds are also produced in these greenhouses. Some greenhouse operations concentrate on importing tropical plants, which are acclimatized to Alberta conditions before resale.

A considerable number of greenhouses produce more than one crop. The only greenhouses growing a single crop are those producing vegetables and a few also grow bedding plants. Greenhouses producing a variety of crops are in operation year round. Majority of the vegetable greenhouses are in operation for about ten months, February through November. Those producing bedding plants are in operation for about five months, February to June.

Marketing of Greenhouse Crops

Greenhouse operators in Alberta use several channels to market their produce. Figure 3 shows the majority of sales by market channels.

Figure 3: Majority of Sales by Market Channels



Source: Profile of the Greenhouse Industry in Alberta 2014

The leading responses included “own retail shop” at approximately 51 per cent, “wholesale / cooperative” at 19 per cent, and “farmers market” at 12 per cent. The retail facilities owned by greenhouse operators are either attached to the greenhouses or located in an urban area. The Red Hat Co-op at Redcliff serves as the focal point for the marketing of long English cucumbers, tomatoes and peppers grown in and around Medicine Hat/Redcliff. Vegetable producers in north-central Alberta market their produce through Pick-N-Pack (a cooperative of growers in Lacombe). Greenhouse operators pay a commission or fee set by the Board of Directors of the Co-ops to cover grading, packaging, storage, marketing and administration costs.

In north-central Alberta, greenhouses producing vegetables and bedding plants sell a large percentage of their produce at the gate and through rented stalls/booths in shopping centers and farmers’ markets. Farmers’ markets have become popular marketing outlets, especially during the bedding plant season. The Red Hat Co-op at Redcliff serves as the focal point for the marketing of long English cucumbers, tomatoes and peppers grown in and around Medicine Hat/Redcliff. Vegetable producers in north-central Alberta market their produce through Pick-N-Pack (a cooperative of growers in Lacombe). Greenhouse operators pay a commission or fee set by the Board of Directors of the Co-ops to cover grading, packaging, storage, marketing and administration costs.

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Physical Characteristics of Greenhouses

Greenhouses in Alberta range from small sash roof “lean-to” houses constructed of a wood-frame sash, to large modern steel frame houses with truss supported roofs. Most new greenhouses are made of steel, wood or masonry covered with either glass, fiberglass, double plastic or a single layer of plastic. Based on the 2014 profile report, double poly greenhouses account for about

85 per cent of total area followed by glass at 13 per cent. New greenhouse operations are equipped with the most modern and efficient crop production tools. The major internal features of greenhouse systems in Alberta are as follows:

a. Heating and Environmental Control Systems:

A year round greenhouse operation is heated, using natural gas, steam, propane, etc. to maintain optimum temperatures for crops grown during the winter months. Some growers use more than one heating system in their greenhouses. Based on the 2014 profile, the majority of growers (52 per cent or 125 growers) use forced air furnaces, 30 per cent hot water and steam boilers and the remaining use in floor heating, pipes under the growing media, soil heating and combine heat and power. Of the 52 per cent who use forced air furnaces, approximately 112 or 47 per cent were natural gas furnaces, 12 or five per cent were propane and only one grower used coal.

Some vegetable producing greenhouses operate 10 months of the year and close down during December and January. Greenhouses producing cut flowers operate year around and thus have high heating requirements. Natural gas burners heat almost all of the greenhouses in southern Alberta and when combined with stovepipes these burners provide sufficient heating through natural air movement. Greenhouses in northern Alberta are equipped with natural gas boilers and hot water pipes for heating. All boiler-heating systems have automatic temperature control devices. In addition to heating systems, most greenhouses in Alberta are equipped with a pad and fan cooling system. The cooling system is essential if temperatures are to be lowered during the hot summer months. Table 3 presents the various types of heating systems used in greenhouse operations in the province.

Table 3: Type of Heating Systems Used in Greenhouses

Heating System		Responses	Per cent of Responses
Boiler	Hot Water	63	26.6%
	Steam	7	3.0%
Forced Air Furnace	Natural Gas	112	47.3%
	Propane	12	5.1%
	Coal	1	0.4%
Other Heating	In-floor Heating	21	8.9%
	Pipe under growing media	12	5.1%
	Soil Heating	4	1.7%
	Combine Heat and Power	5	2.1%

Source: Profile of the Greenhouse Industry in Alberta 2014

N = 230

b. *Watering Systems:*

The watering of ground beds is usually done by the use of soaker hoses, which run parallel to each side of the bed. Bench beds and potted plants are usually watered with the use of chapin tubes. Other operations may use water supply pipes along with garden hoses. In 2014-2015, 29 per cent of respondents indicated that their water is sourced from dugouts, 25 per cent from wells, 41 per cent from city water and the remaining five per cent from irrigation canals and rivers.

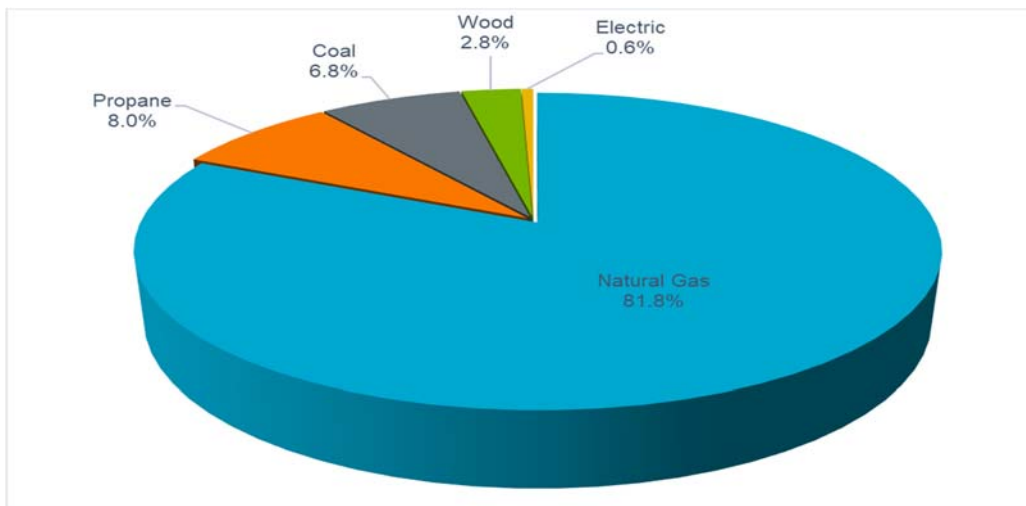
c. *Supplementary Lighting:*

Very few greenhouses have supplementary lighting. Those that do, make use of ordinary lamps, or High Pressure Sodium (HPS) lights in winter to increase flower production and thus adjust the supply and demand balance usually five to six feet apart. Supplementary lighting is mostly used for producing chrysanthemums and roses.

Type of Fuel Used in Greenhouse Operations

As illustrated in Figure 4, natural gas continues to be the fuel of choice for heating greenhouses in Alberta. In 2014-2015, about 82 per cent of growers in Alberta used natural gas, eight per cent propane, seven per cent coal, three per cent wood and one per cent electricity. None of the respondents had an oil heating system.

Figure 4: Type of Fuel used in Alberta Greenhouses

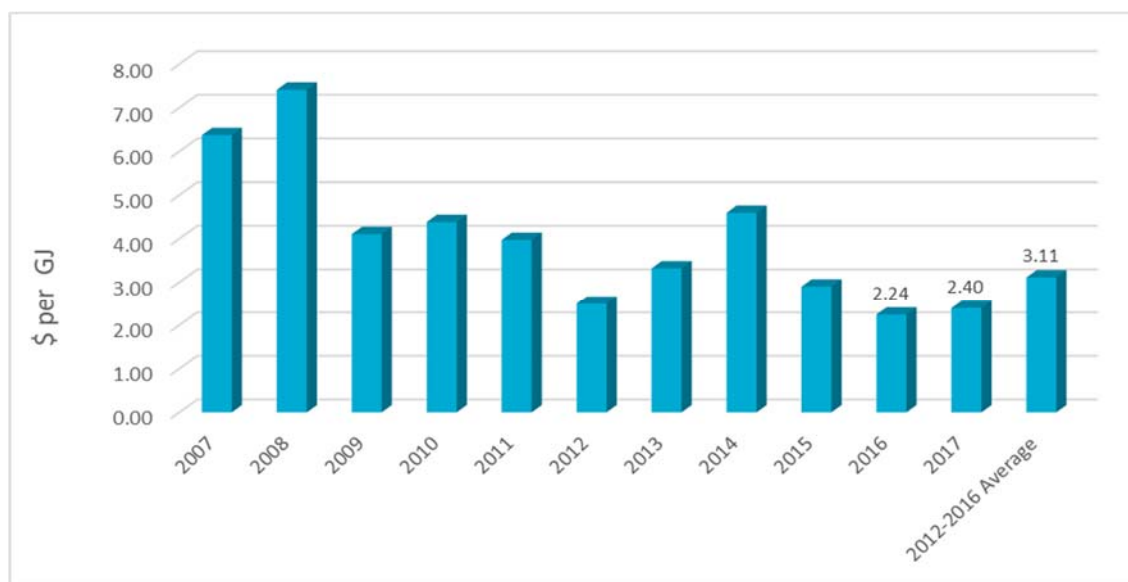


Source: Profile of the Greenhouse Industry in Alberta 2014

Figure 5 shows historical natural gas prices in Alberta (net farm, excluding service or delivery charge) from 2007 to 2017 obtained under the Alberta Input Monitoring Systems (AIMS). The price of natural gas in Alberta averaged \$2.40 per gigajoules (GJ) in 2017, an increase of 6.8 per cent compared to 2016 but a decrease of 23 per cent compared to the 2012-2016 average. Historical price fluctuations over the past five years show that natural gas prices in Alberta (net farm,

excluding service or delivery charge) were on average 11 per cent higher in winter months than summer months.

Figure 5: Alberta Natural Gas Prices, 2007-2017



Source: Alberta Farm Input Prices, Statistics and Data Development Section, AF

Trade

Alberta is a net importer of greenhouse produce, with the bulk of imports occurring during the winter months. Trade data from Statistics Canada shows that in 2017, Alberta held approximately 5.2 per cent of the Canadian import share of food crops grown under cover, importing \$22.6 million of the nation's total of approximately \$433.6 million. By definition, under cover includes crops grown in greenhouses, cold frames, cloth houses, and lath houses. The crops grown are removed at various stages of maturity. Table 4 presents Alberta's trade balances for food crops grown under cover.

Table 4: Alberta's Trade Balance for Food Crops Grown under Cover

	2013	2014	2015	2016	2017
Total Exports	790,042	333,149	415,945	701,322	4,736,000
Total Imports	14,340,944	18,054,533	20,654,942	25,332,438	22,552,872
Trade Balance	(13,550,902)	(17,721,384)	(20,238,997)	(24,631,116)	(17,816,872)

Source: Trade Data Online (accessed: September 28, 2018)

Table 5 presents Alberta's trade balances for nursery and floriculture products. The imports of \$15.3 million in 2017 and represents approximately 3.0 per cent of the nation's total of

\$516.6 million. Products imported include cut flowers and buds, live plants, cuttings and slips, bulbs, tubers, corms, crowns and rhizomes, roses, etc.

Table 5: Alberta's Trade Balance for Nursery and Floriculture Products

	2013	2014	2015	2016	2017
Total Exports	97,991	83,618	84,171	64,630	43,516
Total Imports	6,768,387	7,149,017	7,081,684	7,368,696	15,261,075
Trade Balance	(6,670,396)	(7,065,399)	(6,997,513)	(7,304,066)	(15,217,559)

Source: Trade Data Online (accessed: September 28, 2018)

SECTION III

KEY COSTS AND RETURNS TERMINOLOGIES

The terminologies used in this report are defined as follows:

Gross Return

This refers to the value of what was produced by the greenhouse enterprise over the course of the production year.

Variable Costs

Variable costs are those costs that rise and fall with production volume. It includes costs associated with production materials and supplies, utilities, labour (paid and unpaid), transportation, repair and maintenance (machinery and buildings), marketing, fuel, etc. provided by the study participants.

- **Production Materials and Supplies** - include costs associated with the purchase of seeds, plants, cuttings, growing media (soils, vermiculite, perlite, peat moss, straw, and peat), pots, trays, boxes, containers, fertilizers and chemicals.
- **Utility Costs** - include natural gas, electricity, telephone and water. Where the utility bill was combined with the greenhouse operator's residence, the operator was asked to apportion the bill to arrive at total utility costs for the greenhouse operation.
- **Labour Costs** - include the amount of wages and any benefits received by the hired workers, such as contributions to Workers' Compensation, Canada Pension Plan, and Unemployment Insurance. The hours spent in greenhouse production by the operator and family labour under 16 years (unpaid labour) were valued at \$21 and \$15 per hour, respectively.
- **Transportation or Trucking Costs** - includes expenses for trucks or other vehicles owned by greenhouse operators that were used for production. It excludes the proportion used by the greenhouse operator for personal and leisure driving. Freight charges paid to commercial or private carriers for hauling greenhouse produce or supplies were included in the transportation expenses.
- **Repairs and Maintenance Costs** - include repairs to greenhouse structures, boilers, heating equipment, tractors and all other machinery and equipment associated with the greenhouse operation.
- **Marketing Charges** - include the actual amount paid by each greenhouse operator for having produce marketed through the Co-ops. These charges covered grading,

packaging, marketing and administrative fees. The charges paid by each grower were included as a cost item in the study.

- **Miscellaneous Costs** - include legal and accounting fees, office supplies, membership fees, insurance costs and other costs incurred in a greenhouse operation, but not reported under any other heading.

Capital Costs

This refers to fixed overhead costs that are incurred regardless of the size of enterprise. This comprise of cash capital costs (property/business taxes and paid capital interest) and non-cash capital costs (depreciation and lease payments).

- **Property and business taxes** - This refers to taxes on real estate. This include payments made on the assessed value of the greenhouse operation less any assessment for the greenhouse operator's residence or operations other than the greenhouse. There is a business tax on greenhouses located in urban municipalities. Exact amounts of property and business taxes were included in the costs.
- **Depreciation** - This refers to the loss in value of an asset over time, mainly because of obsolescence. For buildings and equipment, it is that portion of the decrease in value resulting from usage and the passage of time. The entire depreciation is considered a fixed cost.

Each operator was asked to value the greenhouse structure based on the current market costs of replacement. To calculate depreciation on buildings, machinery and equipment, participants were asked to provide an estimate on life of the structure and equipment. In computing depreciation, a 10 per cent allowance or salvage value is taken from the purchase price of the buildings and equipment. The following formula was used in arriving at depreciation for buildings and equipment.

$$\text{Depreciation} = \frac{\text{Purchase Price} - \text{Salvage Value}}{\text{Number of Years of Life}}$$

- **Capital interest** - was the actual amount paid by the study participants for the use of investment capital. Had the capital not been invested to buy a specific asset, it could have been used elsewhere, either within or outside the firm and would have brought some additional return to the firm. However, for the purposes of this study, actual paid capital interest was used to arrive at capital costs.

Cash Costs

Cash costs represent all out-of-pocket costs incurred during the production period and marketing of honey. It does not include costs associated with operators and family labour and depreciation for buildings and equipment.

Total Production Costs

Total production costs comprise of variable costs and capital costs.

Management Indicators:

Management indicators presented at the bottom of various tables show gross margin, return to unpaid labour, investment and equity. These indicators provide profit margins and economic viability of the various enterprises.

- **Gross margin** - gross revenue less cash costs. A positive gross margin shows that enterprise is economically feasible.
- **Return to unpaid labour** - gross revenue less total production costs plus unpaid labour.
- **Return to investment** - gross revenue less total production costs plus capital interest.
- **Return to equity** - gross revenue less total production costs

SECTION IV

GREENHOUSE PRODUCTION COSTS AND RETURNS FOR CUCUMBERS

In 2017, cucumber production represented about 24 per cent of the greenhouse area in Alberta (90 acres). Long English cucumbers are the second largest crop produced in a controlled environment closely followed by bedding plants. Almost 80 per cent of greenhouse cucumber production is in the “Greenhouse Capital of the Prairies” - the Medicine Hat/Redcliff area.

Production costs and returns as well as investment data presented in this section (Section IV) are based on data obtained from nine (9) greenhouse cucumber producers surveyed across the province. Production costs include operating costs, investment costs, depreciation (buildings, equipment and automotive) and operator’s labour. For any enterprise or operation to be economically viable, it must recover operating costs.

Gross Return:

Gross return (A) represents sales of cucumbers through the co-ops and other market outlets. Cucumber sales for an average greenhouse with production area of 10,928 square metres (117,628 square feet) were estimated at \$1,066,469 or \$97.59 per square metre (Table 6). When crop insurance and other miscellaneous receipts were included to value of cucumber sales, total gross revenue increased to \$1,073,865 or \$98.27 per square metre.

Variable Costs:

Variable costs (B) include all out-of-pocket costs and unpaid labour, which amounted to \$962,082 per greenhouse with average production area of 10,928 square metres. In terms of variable costs per square metre, this was estimated at \$88.04. Due to the producers’ interest in knowing their variable costs for each basic unit of production, these costs were broken into as much detail as possible. The most significant cost items were labour followed by growing media/seed, marketing costs, natural gas, electricity, fertilizer and chemical costs.

Capital Costs:

Capital costs (C) were comprised of property/business taxes, equipment and building depreciation, lease payments and actual capital interest paid. On average, the total capital cost per greenhouse amounted to \$90,109 or \$8.25 per square metre in 2017.

Cash Costs:

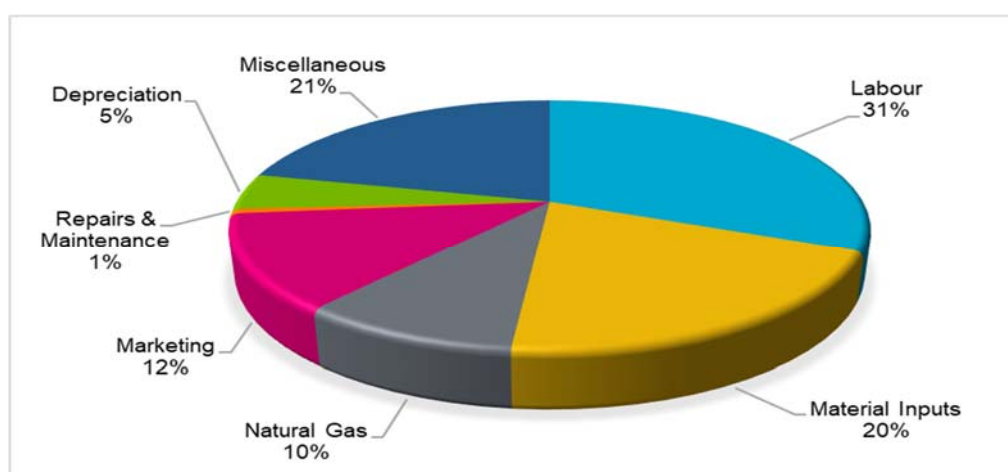
Cash costs (D) include all out-of-pocket costs except unpaid labour and equipment and building depreciation. These costs amounted to \$973,713 per average greenhouse (10,928 square metres) or \$89.10 per square metre.

Total Production Costs:

Average total production costs for cucumber producing greenhouses were estimated at \$1,052,191 or \$96.29 per square metre. Details on the total production costs for greenhouse cucumber production are presented in Table 6.

Figure 6 shows the relative proportion of all costs for greenhouse cucumber production for the 2017 crop year. Labour accounted for about 31 per cent of total production costs followed by material input costs at 20 per cent, marketing at 12 per cent and natural gas at 10 per cent. Expenses associated with material inputs include growing media, seed/cuttings, fertilizer and chemicals, trays, boxes and other packaging materials. The miscellaneous category includes all the other remaining variable and capital costs.

Figure 6: Breakdown of Cucumber Production Costs in Alberta, 2017



Management Indicators:

Average gross margin (A-D) was positive at \$100,152 or \$9.17 per square metre. A positive gross margin indicates that the enterprise is economically feasible. Average return to unpaid labour amounted to \$51,459 or \$4.71 per square metre. Average return to investment was positive at \$56,824 or \$5.20 per square metre. Average return to equity was also positive at \$21,674 per greenhouse or \$1.98 per square metre.

Investment Costs:

The average greenhouse area for the nine (9) cucumber producing greenhouses was estimated at 11,301 square metres (121,643 square feet). On average, land associated with these greenhouses was valued at \$125,698 or \$11.12 per square metre of greenhouse area. Average investment in greenhouse buildings amounted to \$866,694 or \$76.69 per square metre. Average investment in machinery and equipment amounted to \$281,759 or \$24.93 per square metre. When land, buildings, machinery and equipment investments were combined, total investment was estimated at \$1,274,151 per greenhouse. In terms of dollars per square metre it was \$112.75. Details on land, building, machinery and equipment investment and depreciation are given in Table 7.

Table 6: Costs and Returns for Cucumber Producing Greenhouses in Alberta, 2017

Production Area:		10,928.00 sq. m.		
Number of Producers:		9		
			Total \$	\$/sq. m.
(A)	1. Crop Sales - Imputed Value of Production		1,066,468.50	97.59
	2. Crop Insurance Receipts		0.00	-
	3. Miscellaneous Receipts		7,396.22	0.68
GROSS RETURN			1,073,864.72	98.27
(B)	1. Growing Media, Seed/Cuttings		134,205.76	12.28
	2. Fertilizer & Chemicals		66,084.68	6.05
	3. Greenhouse Insurance		24,575.29	2.25
	4. Trays, Boxes & Other Packaging		13,660.81	1.25
	5. Freight and /or Trucking Costs		11,319.01	1.04
	6. Auto Fuel, Repairs, Licenses & Auto Ins.		14,856.99	1.36
	7. Repairs - Buildings and Equipments		6,212.77	0.57
	8. Utilities: Natural Gas	6,779.11 GJ	99,729.22	9.13
	9. Electricity	0.00 KWh	94,466.71	8.64
	10. Water	0.00 M3	10,224.57	0.94
	11. Phone		1,499.62	0.14
	12. Custom Work & Specialized Labour		4,277.38	0.39
	13. Marketing Costs		130,601.11	11.94
	14. Assoc. Dues, Profl Fees & Promotion		10,197.67	0.93
	15. Small Tools, Supplies & Misc. Expenses		9,406.79	0.86
	16. Operating Interest Paid		1,474.22	0.13
	17. Labour Insurance / Benefits		359.67	0.03
	18. Hired Labour	21,307.67 hours	299,144.34	27.38
	19. Unpaid Labour	1,418.33 hours	29,784.95	2.73
VARIABLE COSTS			962,081.56	88.04
(C)	1. Property / Business taxes		6,265.56	0.57
	2. Equipment & Building	a) Depreciation	48,693.25	4.46
		b) Lease Payments	0.00	0.00
	3. Paid Capital Interest		35,150.62	3.22
TOTAL CAPITAL COSTS			90,109.43	8.25
(D)	CASH COSTS	(B+C-B19-C2a)	973,712.79	89.10
(E)	TOTAL PRODUCTION COSTS	(B+C)	1,052,190.99	96.29
(F)	GROSS MARGIN	(A-D)	100,151.93	9.17
	RETURN TO UNPAID LABOUR	(A-E+B19)	51,458.68	4.71
	RETURN TO INVESTMENT	(A-E+C3)	56,824.35	5.20
	RETURN TO EQUITY	(A-E)	21,673.73	1.98

Table 7: Average Investment for Cucumber Producing Greenhouses in Alberta, 2017

Greenhouse Area: 11,301 sq. m.			
INVESTMENT SUMMARY:	Total \$	\$/sq. m.	
Land	125,697.78	11.12	
Buildings	866,693.53	76.69	
Machinery & Equipment	281,759.44	24.93	
TOTAL INVESTMENT	1,274,150.75	112.75	
<hr/>			
INVESTMENT DETAIL:	Enterprise Value (\$)	Age (Years)	Depreciation (\$)
Land - Building Site:	125,697.78		
Greenhouse Buildings:	866,693.53	14.1	30,334.27
Equipment:			
Refrigeration / Freezer Storage	891.67	3.2	44.58
Warehouses / Storage Sheds	14,953.33	7.8	747.67
Fuel Tanks	427.78	3.0	21.39
Houses (25%)	43,583.33	16.3	2,179.17
Other Buildings	440.00	1.7	22.00
Lighting	2,320.00	2.4	116.00
Heating System	96,383.33	3.0	4,819.17
Ventilation System	22,388.89	2.2	1,119.44
Humidity Control	14,511.11	2.6	725.56
Benches	440.00	0.5	22.00
Irrigation System	11,164.56	7.3	1,116.46
Water Pumps / Sand Filters	2,587.00	5.3	258.70
Soil Mixers / Flat Fillers /Seedling Lines	41.67	2.8	4.17
Generators	9,653.33	14.6	965.33
Roto-Tillers	0.00	0.0	0.00
Storage / Mixing Tanks	1,989.56	8.2	198.96
Sterilizers	0.00	0.0	0.00
Sprayers	2,261.00	5.1	226.10
Carts / Dollies	8,341.00	10.5	834.10
Fertilizer Injectors	5,460.22	6.8	546.02
Small Tools / Hardware	9,041.67	11.1	904.17
Sub-Total	246,879.44		14,870.97
Machinery & Vehicles			
Bobcats / Forklifts	6,672.22	13.8	667.22
Trucks	26,874.44	16.6	2,687.44
Other Machinery	1,333.33	0.6	133.33
Sub-Total	34,880.00		3,488.00

SECTION V

GREENHOUSE PRODUCTION COSTS AND RETURNS FOR TOMATOES

In 2017, tomato production accounted for about 14 per cent of the greenhouse area in Alberta (52.6 acres). Data on the greenhouse production costs and returns for tomatoes was obtained from seven (7) greenhouse operations across the province. Table 8 shows the production costs and returns for an average tomato-producing greenhouse in Alberta in 2017.

Gross Return:

Gross return (A) represents tomato sales and some miscellaneous receipts (wage subsidy, dividend, etc.) during the 2017 crop year. It amounted to \$643,253 per average tomato greenhouse with 6,831 square metre production area or \$94.16 per square metre.

Variable Costs:

Variable costs (B) including unpaid labour amounted to \$594,884 per greenhouse or \$87.08 per square metre. The most significant cost items for greenhouse tomato production were; hired labour costs at \$25.17 per square metre, marketing costs at \$19.30, and natural gas costs at \$10.82 per square metre. A detailed breakdown of all variable costs are shown in Table 8.

Capital Costs:

Capital costs (C) comprise of property/business taxes, equipment and building depreciation, lease payments and actual capital interest paid. The average total capital costs for a tomato-producing greenhouse was \$42,699.04 or \$6.25 per square metre. Equipment and building depreciation accounted for about 83 per cent of total capital cost.

Cash Costs:

Cash Costs (D) comprise of out-of-pocket costs incurred during the tomato production period. These costs were estimated at \$566,575 per average tomato producing greenhouse with a production area of 6,831 square metres. In terms of per square metre, these costs were \$82.94.

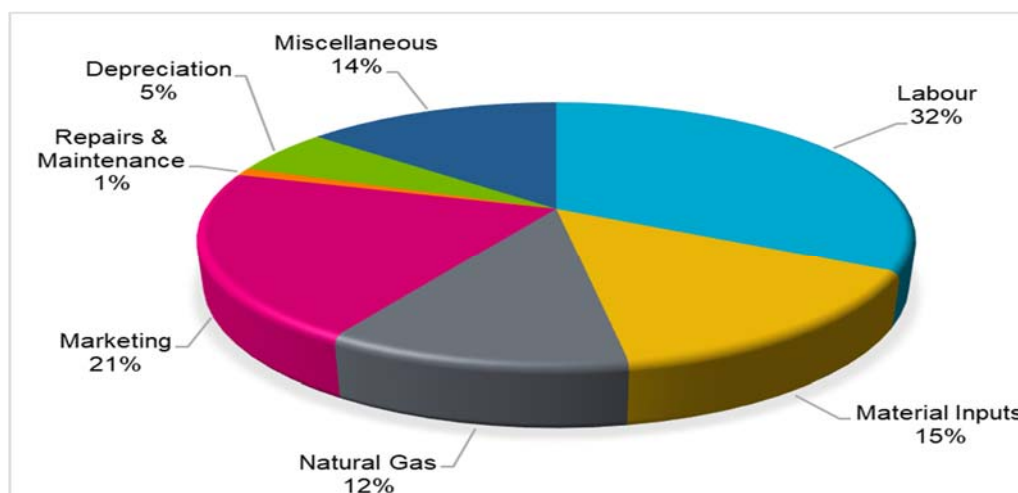
Total Production Costs:

Average total production costs for tomato producing greenhouses in Alberta was estimated at \$637,583 or \$93.33 per square metre for the 2017 crop year. Details on various costs are presented in Table 8.

Figure 7 presents the breakdown of major production costs. Labour accounted for about 32 per cent of total production costs. This was followed by marketing costs at 21 per cent and

natural gas at 12 per cent. Expenses associated with material inputs include growing media, seed/cuttings, fertilizer and chemicals, trays, boxes and other packaging materials. The miscellaneous category includes all the other remaining variable and capital costs.

Figure 7: Breakdown of Greenhouse Tomato Production Costs in Alberta, 2017



Management Indicators:

For an average tomato-producing greenhouse in Alberta, gross margin was positive at \$76,678 per greenhouse or \$11.22 per square metre. Average return to unpaid labour was positive at \$41,268 per greenhouse or \$6.04 per square metre. Average return to investment was estimated at 1.2 per cent. In terms of dollars per greenhouse, it was \$11,105 or \$1.63 per square metre. Average return to equity was positive at \$5,670 per tomato-producing greenhouse or \$0.83 per square metre. Details on management indicators are presented in Table 8.

Investment Costs:

The investment data was obtained from seven tomato producing greenhouse operations across the province. The average greenhouse area for these operations was 7,186 square metres. Average land area associated with these greenhouses was valued at \$78,557 or \$10.93 per square metre.

Buildings investment for tomato producing greenhouses amounted to \$704,971 or \$98.11 per square metre. Machinery and equipment investment for these greenhouses amounted to \$150,551.71 per greenhouse or \$20.95 per square metre. A detailed breakdown of land, buildings, machinery and equipment investment are presented in Table 9. Total investment for tomato producing greenhouses was estimated at \$934,080 or \$129.99 per square metre.

Table 8: Costs and Returns for Tomato Producing Greenhouses in Alberta, 2017

Production Area:		6,831.00 sq. m.		
Number of Producers:		7		
			Total \$	\$/sq. m.
(A)	1. Crop Sales - Imputed Value of Production		641,600.29	93.92
	2. Crop Insurance Receipts		0.00	-
	3. Miscellaneous Receipts		1,652.43	0.24
GROSS RETURN			643,252.72	94.16
(B)	1. Growing Media, Seed/Cuttings		50,660.24	7.42
	2. Fertilizer & Chemicals		33,229.81	4.86
	3. Greenhouse Insurance		14,033.81	2.05
	4. Trays, Boxes & Other Packaging		10,118.34	1.48
	5. Freight and /or Trucking Costs		4,825.13	0.71
	6. Auto Fuel, Repairs, Licenses & Auto Ins.		14,720.46	2.15
	7. Repairs - Buildings and Equipments		5,948.04	0.87
	8. Utilities: Natural Gas	2,857.14 GJ	73,928.71	10.82
	9. Electricity	0.00 KWh	24,816.33	3.65
	10. Water	0.00 M3	8,266.43	1.21
	11. Phone		1,438.56	0.21
	12. Custom Work & Specialized Labour		2,342.60	0.34
	13. Marketing Costs		131,846.29	19.30
	14. Assoc. Dues, Prof'l Fees & Promotion		6,456.56	0.95
	15. Small Tools, Supplies & Misc. Expenses		3,153.10	0.46
	16. Operating Interest Paid		484.00	0.07
	17. Labour Insurance / Benefits		1040.43	0.15
	18. Hired Labour	11,616.45 hours	171,977.34	25.17
	19. Unpaid Labour	1,695.13 hours	35,597.64	5.21
VARIABLE COSTS			594,883.82	87.08
(C)	1. Property / Business taxes		1,853.27	0.27
	2. Equipment & Building	a) Depreciation	35,410.64	5.18
		b) Lease Payments	0.00	0.00
	3. Paid Capital Interest		5,435.13	0.80
TOTAL CAPITAL COSTS			42,699.04	6.25
(D)	CASH COSTS	(B+C-B19-C2a)	566,574.58	82.94
(E)	TOTAL PRODUCTION COSTS	(B+C)	637,582.86	93.33
(F)	GROSS MARGIN	(A-D)	76,678.14	11.22
	RETURN TO UNPAID LABOUR	(A-E+B19)	41,267.50	6.04
	RETURN TO INVESTMENT	(A-E+C3) 1.2%	11,104.99	1.63
	RETURN TO EQUITY	(A-E)	5,669.86	0.83

Table 9: Average Investment for Tomato Producing Greenhouses in Alberta, 2017

Greenhouse Area: 7,186 sq.m.			
INVESTMENT SUMMARY:	Total \$		\$/sq. m.
Land	78,557.14		10.93
Buildings	704,971.43		98.11
Machinery & Equipment	150,551.71		20.95
TOTAL INVESTMENT	934,080.29		129.99
INVESTMENT DETAIL:	Enterprise Value (\$)	Age (Years)	Depreciation (\$)
Land - Building Site:	78,557.14		
Greenhouse Buildings:	704,971.43	17.3	24,674.00
Equipment:			
Refrigeration / Freezer Storage	535.71	4.3	26.79
Warehouses / Storage Sheds	24,592.86	13.7	1,229.64
Fuel Tanks	278.57	5.0	13.93
Houses (25%)	6,482.14	16.9	324.11
Other Buildings	565.71	2.1	28.29
Lighting	8,700.00	4.4	435.00
Heating System	38,564.29	5.1	1,928.21
Ventilation System	5,571.43	7.0	278.57
Humidity Control	514.29	2.0	25.71
Benches	565.71	0.6	28.29
Irrigation System	3,641.86	8.9	364.19
Water Pumps / Sand Filters	1,848.57	11.1	184.86
Soil Mixers / Flat Fillers /Seedling Lines	53.57	3.6	5.36
Generators	5,769.29	12.0	576.93
Roto-Tillers	0.00	0.0	0.00
Storage / Mixing Tanks	886.86	14.1	88.69
Sterilizers	0.00	0.0	0.00
Sprayers	689.14	7.0	68.91
Carts / Dollies	12,953.86	11.9	1,295.39
Fertilizer Injectors	901.43	6.1	90.14
Small Tools / Hardware	2,685.71	11.9	268.57
Sub-Total	115,801.00		7,261.56
Machinery & Vehicles			
Bobcats / Forklifts	9,214.29	9.4	921.43
Trucks	25,536.43	10.1	2,553.64
Other Machinery	0.00	0.0	0.00
Sub-Total	34,750.71		3,475.07

SECTION VI

GREENHOUSE PRODUCTION COSTS AND RETURNS FOR PEPPER

In 2017, pepper production accounted for about seven (7) per cent of the greenhouse area in Alberta (27 acres). Data on the greenhouse production costs and returns for peppers was obtained from six (6) greenhouse operations across the province. Table 10 shows the production costs and returns for an average pepper-producing greenhouse in Alberta in 2017.

Gross Return:

Gross return (A) represents the total value of pepper sales during the crop year. Gross return from an average greenhouse producing peppers including miscellaneous receipts was \$391,665 or \$81.88 per square metre (Table 10). The average size of the greenhouse was 4,783 per square metre. Among the three major greenhouse vegetables (cucumbers, tomatoes and peppers), peppers showed the lowest return per square metre.

Variable Costs:

Variable costs (B) for greenhouses producing peppers amounted to \$422,654 or \$88.36 per square metre. Among these costs, hired labour was the highest at \$27.70, followed by natural gas at \$12.81, growing media, seed and cuttings at \$10.46, marketing costs at \$8.25 and electricity at \$7.91 per square metre. A detailed breakdown of these costs is presented in Table 10.

Capital Costs:

Average total capital cost (C) per greenhouse producing peppers amounted to \$38,280 or \$8.01 per square metre. Equipment and building depreciation accounted for about 67 per cent of total capital cost.

Cash Costs:

Cash costs (D) represent all costs incurred during the crop production period less unpaid labour, equipment and building depreciation. These costs were estimated at \$415,705 per average greenhouse or \$86.91 per square metre for pepper production.

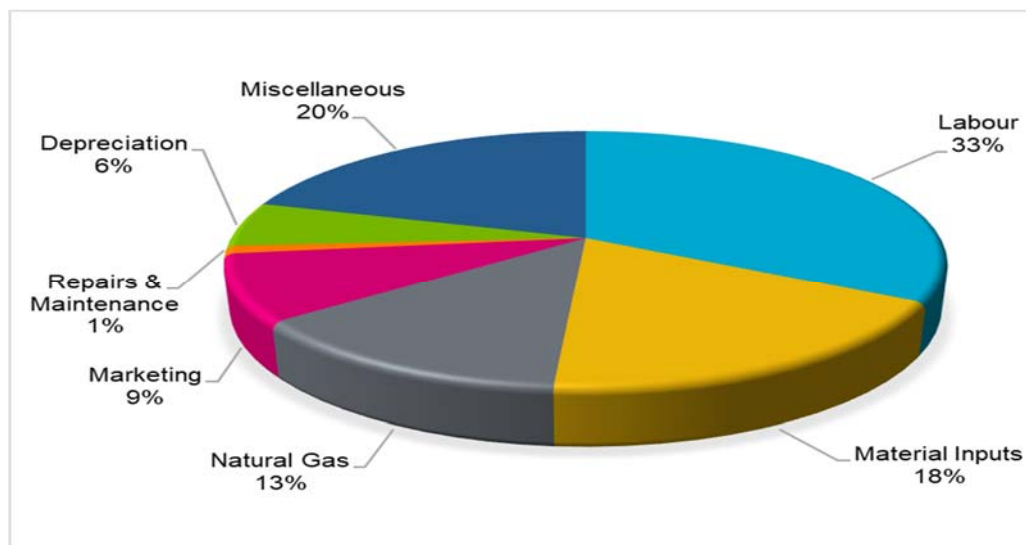
Total Production Costs:

Average total production costs for pepper producing greenhouses amounted to \$460,933 or \$96.37 per square metre. Details on total production costs are presented in Table 10.

Figure 8 presents a breakdown of major production costs for greenhouse pepper production. The most significant cost items were labour at 33 per cent, followed by material input costs and natural

gas costs. Expenses associated with material inputs include growing media, seed/cuttings, fertilizer and chemicals, trays, boxes and other packaging materials. The miscellaneous category includes all the other remaining variable and capital costs.

Figure 8: Breakdown of Greenhouse Pepper Production Costs in Alberta, 2017



Management Indicators:

When cash costs (D) were deducted from gross return (A), average greenhouse producing peppers showed a negative gross margin of \$24,040 or \$5.03 per square metre. Average returns to unpaid labour, investment and equity were all negative. Details on management indicators are presented in Table 10.

Investment Costs:

Greenhouse investment data was obtained from six (6) pepper producing greenhouse operations in Alberta. Details on land, buildings, and machinery and equipment investments are provided in Table 11.

Average land area associated with greenhouses producing peppers valued at \$125,617 or \$24.91 per square metre. The average greenhouse area for pepper production was reported at 5,044 square metres for the 2017 crop year. Buildings investment for pepper producing greenhouses was reported at \$398,833 per greenhouse or \$79.08 per square metre. Machinery and equipment investment for each pepper greenhouse was estimated at \$176,527 or \$35.0 per square metre.

When land, buildings, machinery and equipment investments were combined, total investment for pepper producing greenhouses amounted to \$700,977 or \$138.99 per square metre of greenhouse area.

Table 10: Costs and Returns for Pepper Producing Greenhouses in Alberta, 2017

		Production Area:	4,783.00 sq. m.		
		Number of Producers:	6		
				Total \$	\$/sq. m.
(A)	1. Crop Sales - Imputed Value of Production			389,635.17	81.46
	2. Crop Insurance Receipts			0.00	-
	3. Miscellaneous Receipts			2,029.83	0.42
GROSS RETURN				391,665.00	81.88
(B)	1. Growing Media, Seed/Cuttings			50,029.53	10.46
	2. Fertilizer & Chemicals			21,215.36	4.44
	3. Greenhouse Insurance			10,618.78	2.22
	4. Trays, Boxes & Other Packaging			12,779.72	2.67
	5. Freight and /or Trucking Costs			3,189.34	0.67
	6. Auto Fuel, Repairs, Licenses & Auto Ins.			10,689.23	2.23
	7. Repairs - Buildings and Equipments			4,445.47	0.93
	8. Utilities: Natural Gas	5,000.00 GJ		61,258.47	12.81
	9. Electricity	0.00 KWh		37,835.22	7.91
	10. Water	0.00 M3		7,285.00	1.52
	11. Phone			311.09	0.07
	12. Custom Work & Specialized Labour			2,757.23	0.58
	13. Marketing Costs			39,483.83	8.25
	14. Assoc. Dues, Profl Fees & Promotion			3,833.84	0.80
	15. Small Tools, Supplies & Misc. Expenses			2,115.69	0.44
	16. Operating Interest Paid			974.00	0.20
	17. Labour Insurance / Benefits			1816.83	0.38
	18. Hired Labour	9,465.05 hours		132,514.55	27.70
	19. Unpaid Labour	943.25 hours		19,500.32	4.08
VARIABLE COSTS				422,653.50	88.36
(C)	1. Property / Business taxes			3,948.17	0.83
	2. Equipment & Building	a) Depreciation		25,727.37	5.38
		b) Lease Payments		0.00	0.00
3. Paid Capital Interest			8,604.09	1.80	
TOTAL CAPITAL COSTS				38,279.63	8.01
(D)	CASH COSTS	(B+C-B19-C2a)		415,705.44	86.91
(E)	TOTAL PRODUCTION COSTS	(B+C)		460,933.13	96.37
(F)	GROSS MARGIN	(A-D)		-24,040.44	-5.03
	RETURN TO UNPAID LABOUR	(A-E+B19)		-49,767.81	-10.41
	RETURN TO INVESTMENT	(A-E+C3)	-8.7%	-60,664.04	-12.69
	RETURN TO EQUITY	(A-E)		-69,268.13	-14.49

Table 11: Average Investment for Pepper Producing Greenhouses in Alberta, 2017

Greenhouse Area: 5,044 sq.m.			
INVESTMENT SUMMARY:	Total \$		\$/sq. m.
Land	125,616.67		24.91
Buildings	398,833.33		79.08
Machinery & Equipment	176,527.00		35.00
TOTAL INVESTMENT	700,977.00		138.99
<hr/>			
INVESTMENT DETAIL:	Enterprise Value (\$)	Age (Years)	Depreciation (\$)
Land - Building Site:	125,616.67		
Greenhouse Buildings:	398,833.33	16.3	13,959.17
Equipment:			
Refrigeration / Freezer Storage	470.83	5.0	23.54
Warehouses / Storage Sheds	16,686.67	10.8	834.33
Fuel Tanks	450.00	6.2	22.50
Houses (25%)	15,729.17	29.7	786.46
Other Buildings	0.00	0.0	0.00
Lighting	720.00	5.8	36.00
Heating System	70,083.33	7.7	3,504.17
Ventilation System	12,416.67	7.8	620.83
Humidity Control	1,133.33	2.3	56.67
Benches	0.00	0.0	0.00
Irrigation System	2,553.67	10.3	255.37
Water Pumps / Sand Filters	1,717.83	13.8	171.78
Soil Mixers / Flat Fillers /Seedling Lines	0.00	0.0	0.00
Generators	7,905.00	13.5	790.50
Roto-Tillers	0.00	0.0	0.00
Storage / Mixing Tanks	360.33	11.0	36.03
Sterilizers	0.00	0.0	0.00
Sprayers	845.83	5.7	84.58
Carts / Dollies	17,058.00	11.3	1,705.80
Fertilizer Injectors	1,709.67	7.7	170.97
Small Tools / Hardware	5,187.50	10.3	518.75
Sub-Total	155,027.83		9,618.28
Machinery & Vehicles			
Bobcats / Forklifts	5,625.00	13.2	562.50
Trucks	15,874.17	11.3	1,587.42
Other Machinery	0.00	0.0	0.00
Sub-Total	21,499.17		2,149.92

SECTION VII

PRODUCTION COSTS AND RETURNS FOR BEDDING PLANTS/ORNAMENTALS

Greenhouse bedding plants production in Alberta has been increasing steadily over the years. This is despite competition from cheap imports from British Columbia and south of the border. In 2017, area under floriculture that includes cut flowers, potted flowers and ornamentals, bedding and foliage plants was estimated at 618,886 square metres or 152.9 acres. This translates into about 40 per cent of the total greenhouse area in Alberta. Production costs and returns as well as investment data for 2017 presented in this section were obtained from 17 bedding plants / ornamentals producing greenhouses in Alberta.

Gross Return:

Gross return (A) represents sales of bedding plants/ornamentals during the 2017 crop production year. For a greenhouse with a production area of 8,489 square metres, gross return including miscellaneous receipts was calculated at \$1,288,816 or \$151.82 per square metre.

Variable Costs:

Total variable cost (B) representing all out-of-pocket costs including unpaid labour was estimated at \$998,361 or \$117.59 per square metre. The most significant variable cost items were hired labour at \$33.30 per square metre, followed by growing media and seed/cuttings at \$27.71 per square metre. Details on all variable cost items are presented in Table 12.

Capital Costs:

Capital costs (C) include property/business taxes, equipment and building depreciation and actual interest paid on capital. These costs amounted to \$183,057 or \$21.56 per square metre.

Cash Costs:

Cash costs (D) represent all out-of-pocket costs incurred during the 2017 production period. These amounted to \$989,468 per greenhouse with an average area of 8,489 square metres or \$116.54 per square metre.

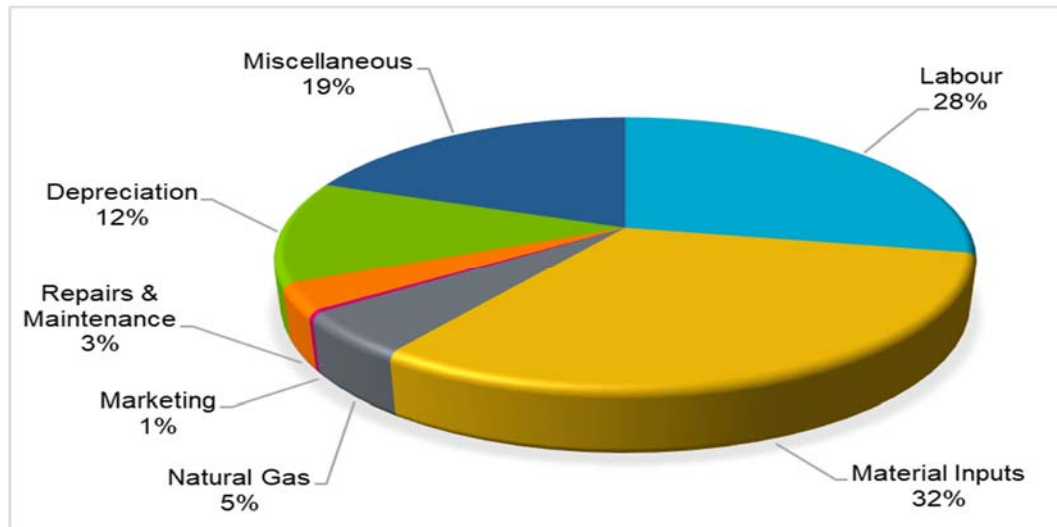
Total Production Costs:

Average total production costs (E) for bedding plants/ornamentals producing greenhouses was calculated at \$139.15 per square metre. Detailed breakdowns of various cost items are given in Table 12.

Figure 9 shows the relative proportion of all production costs for a bedding plants/ornamentals greenhouse in 2017. Material inputs costs which comprise of growing media, seed/cuttings,

fertilizer and chemicals, trays, boxes and other packaging materials was estimated at 32 per cent, labour at 28 per cent and natural gas at five per cent. The miscellaneous category includes all the other remaining variable and capital costs.

Figure 9: Breakdown of Bedding Plants/Ornamentals Production Costs in Alberta, 2017



Management Indicators:

Gross margin for an average greenhouse producing bedding plants/ornamentals was calculated at \$299,348 or \$35.28 per square metre. It was the highest gross margin recorded when compared with other greenhouse crops. Average return to unpaid labour for these greenhouses estimated at \$154,988 or \$18.28 per square metre. Average return to investment was estimated at approximately 4.3 per cent. In terms of total amount, it was \$139,910 or \$16.50 per square metre. Return to equity amounted to \$107,398 or \$12.67 per square metre. Details on gross return, production costs and management indicators are presented in Table 12.

Investment Costs:

Average land area associated with greenhouse operations producing bedding plants and ornamentals was estimated at \$57.73 per square metre. Building investment for the above sized greenhouse amounted to \$1,488,647 or \$148.23 per square metre. Machinery and equipment investment was estimated at \$1,155,455 per average greenhouse or \$115.05 per square metre.

A detailed breakdown of land, buildings, machinery and equipment investment is presented in Table 13.

Table 12: Costs and Returns for Bedding Plants/Ornamentals Greenhouses in Alberta, 2017

Production Area:		8,489 sq.m.		
Number of Producers:		17		
		Total \$	\$/sq. m.	
(A)	1. Crop Sales - Imputed Value of Production	1,265,915.10	149.12	
	2. Crop Insurance Receipts	-	-	
	3. Miscellaneous Receipts	22,900.48	2.70	
GROSS RETURN		1,288,815.58	151.82	
(B)	1. Growing Media, Seed/Cuttings	235,238.40	27.71	
	2. Fertilizer & Chemicals	14,297.26	1.68	
	3. Greenhouse Insurance	12,954.49	1.53	
	4. Trays, Boxes & Other Packaging	127,063.31	14.97	
	5. Freight and /or Trucking Costs	102,662.21	12.09	
	6. Auto Fuel, Repairs, Licenses & Auto Ins.	15,821.99	1.86	
	7. Repairs - Buildings and Equipments	38,036.89	4.48	
	8. Utilities: Natural Gas	8,005.94 GJ	60,302.21	7.10
	9. Electricity	0.00 KWh	17,086.80	2.01
	10. Water	0.00 M3	1,747.00	0.21
	11. Phone		3,068.14	0.36
	12. Custom Work & Specialized Labour		367.22	0.04
	13. Marketing Costs		3,726.29	0.44
	14. Assoc. Dues, Prof'l Fees & Promotion		18,076.89	2.13
	15. Small Tools, Supplies & Misc. Expenses		9,698.71	1.14
	16. Operating Interest Paid		4,114.71	0.48
	17. Labour Insurance / Benefits		3,821.29	0.45
	18. Hired Labour	16,781.18 hours	282,687.29	33.30
	19. Unpaid Labour	2,285.12 hours	47,590.06	5.61
VARIABLE COSTS		998,361.16	117.59	
(C)	1. Property / Business taxes	5,523.29	0.65	
	2. Equipment & Building	a) Depreciation	144,359.62	17.00
		b) Lease Payments	661.00	0.08
3. Paid Capital Interest		32,512.59	3.83	
TOTAL CAPITAL COSTS		183,056.50	21.56	
(D)	CASH COSTS (B+C-B19-C2a)	989,467.98	116.54	
(E)	TOTAL PRODUCTION COSTS (B+C)	1,181,417.66	139.15	
(F)	GROSS MARGIN (A-D)	299,347.60	35.28	
	RETURN TO UNPAID LABOUR (A-E+B19)	154,987.98	18.28	
	RETURN TO INVESTMENT (A-E+C3)	139,910.51	16.50	
	RETURN TO EQUITY (A-E)	107,397.92	12.67	

Table 13: Average Investment for Bedding Plants/Ornamentals Greenhouses in Alberta, 2017

Greenhouse Area: 10,043 sq.m.			
INVESTMENT SUMMARY:	Total \$	\$/sq. m.	
Land	579,741.18	57.73	
Buildings	1,488,647.06	148.23	
Machinery & Equipment	1,155,454.59	115.05	
TOTAL INVESTMENT	3,223,842.82	321.01	
INVESTMENT DETAIL:	Enterprise Value (\$)	Age (Years)	Depreciation (\$)
Land - Building Site:	579,741.18		
Greenhouse Buildings:	1,488,647.06	13.3	52,102.65
Equipment:			
Refrigeration / Freezer Storage	758.82	3.5	37.94
Warehouses / Storage Sheds	55,167.65	17.6	2,758.38
Fuel Tanks	8,923.53	7.5	446.18
Houses (25%)	78,125.00	26.3	3,906.25
Other Buildings	11,975.29	7.3	598.76
Lighting	21,352.94	4.1	1,067.65
Heating System	236,800.00	9.6	11,840.00
Ventilation System	2,425.88	1.4	121.29
Humidity Control	13,088.24	1.5	654.41
Benches	37,152.35	11.4	1,857.62
Irrigation System	234,663.24	9.6	23,466.32
Water Pumps / Sand Filters	43,294.12	4.5	4,329.41
Soil Mixers / Flat Fillers /Seedling Lines	51,073.53	6.9	5,107.35
Generators	9,769.41	13.5	976.94
Roto-Tillers	747.06	1.4	74.71
Storage / Mixing Tanks	37,122.29	13.5	3,712.23
Sterilizers	2.35	1.2	0.24
Sprayers	5,807.18	4.2	580.72
Carts / Dollies	241,774.53	8.9	24,177.45
Fertilizer Injectors	1,758.82	7.1	175.88
Small Tools / Hardware	17,976.47	13.6	1,797.65
Sub-Total	1,109,758.71		87,687.39
Machinery & Vehicles			
Bobcats / Forklifts	18,370.59	7.8	1,837.06
Trucks	27,325.29	11.8	2,732.53
Other Machinery	0.00	0.0	0.00
Sub-Total	45,695.88		4,569.59

SECTION VIII

GREENHOUSE PRODUCTION COSTS AND RETURNS FOR TREE SEEDLINGS

Forestry companies and the provincial government contract for greenhouse tree seedlings. Tree seedlings production received a big boost in the late eighties when a decision was made to encourage local production of seedlings. Prior to this, forestry tree seedlings were largely imported from British Columbia. As soon as the contracts to grow seedlings locally became available, several existing greenhouses switched to producing seedlings and quite a few new greenhouses were built to meet the contractual demand.

In 2017, tree seedlings constituted approximately 48.5 acres of greenhouse area in Alberta. This translates into about 13 per cent of the total greenhouse area in Alberta. Production costs, returns, and investment data for 2017 presented in this section were obtained from four (4) tree seedlings operations in Alberta. The average size of these operations was about 18,170 square metres.

Gross Return:

Gross return (A) represents sales of tree seedlings to the contractors at the agreed price and any income received under crop insurance, etc. Total gross return for the average greenhouse (18,170 square metres) producing tree seedlings was estimated at about \$1,507,510 or \$82.97 per square metre. Details on gross return from sale of tree seedlings are presented in Table 14.

Variable Costs:

Variable costs (B) amounted to \$1,101,388 per average greenhouse producing tree seedlings. In terms of dollars per square metre, these costs were estimated at \$60.61. The most significant cost item was hired labour at \$24 per square metre, about 40 per cent of all variable costs. Other significant costs were natural gas followed by trays, boxes and other packaging. A detailed breakdown of all variable costs is presented in Table 14.

Capital Costs:

Capital costs (C) were estimated at \$198,842 per average greenhouse producing tree seedlings or \$10.94 per square metre. Almost 77 per cent of the capital costs were equipment and building depreciation.

Cash Costs:

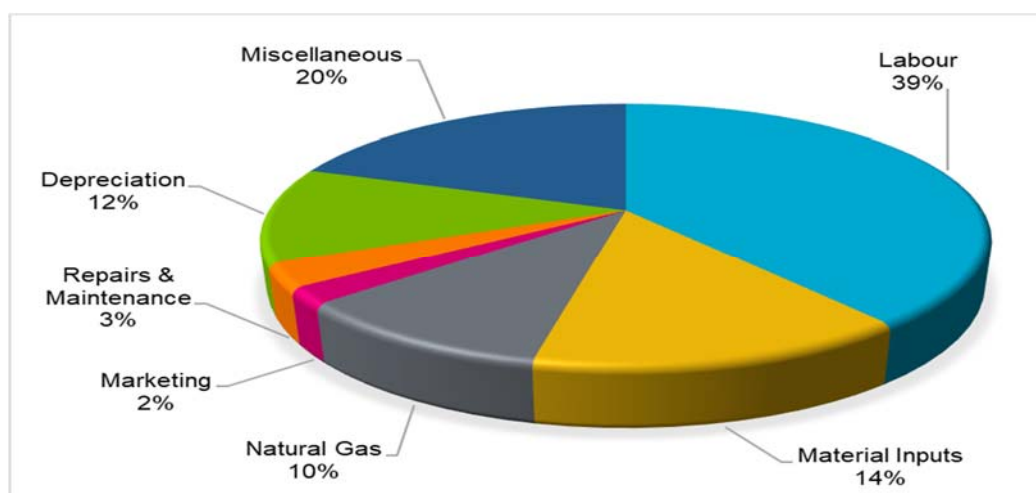
Cash costs (D) which comprise all out-of-pocket costs incurred during the tree seedlings production period in 2017 was estimated at approximately \$1,074,634 per greenhouse or \$59.13 per square metre. These costs were very close to the variable costs.

Total Production Costs:

Average total production costs for tree seedlings greenhouses in 2017 were estimated at \$1,300,230 or \$71.55 per square metre. The most significant cost items were labour, material inputs, depreciation and natural gas. Details on various costs are presented in Table 14.

Figure 10 presents the breakdown of all production costs for greenhouse tree seedlings production. Material inputs costs comprise of growing media, seed/cuttings, fertilizer and chemicals, trays, boxes and other packaging materials. The miscellaneous category includes all the other remaining variable and capital costs.

Figure 10: Breakdown of Greenhouse Tree Seedlings Production Costs in Alberta, 2017



Management Indicators:

For an average tree seedlings producing greenhouse, gross margin was calculated at \$432,877 or \$23.84 per square metre. Average return to unpaid labour was positive at \$279,730 or \$15.41 per square metre. Return to investment was calculated at \$207,697 or \$11.44 per square metre. In terms of percentage return to investment, it was calculated at 5.9 per cent. Return to equity was also positive at \$207,280 or \$11.42 per square metre. Details on management indicators are presented in Table 14.

Investment Costs:

The average greenhouse area for the four (4) tree seedlings operations was estimated at 18,233 square metres. Land area associated with these greenhouses was valued at \$465,900 per greenhouse or \$25.55 per square metre. Investment in the greenhouse buildings for tree seedlings operations was calculated at \$1,641,750 per operation or \$90.04 per square metre. Average investment in machinery and equipment including vehicles amounted to \$1,403,527 or \$76.98 per square metre. When land, buildings, machinery and equipment investments were combined, total investment was estimated at about \$3.5 million per operation or \$192.58 per square metre. Details on land, buildings, machinery and equipment investment are presented in Table 15.

Table 14: Costs and Returns for Tree Seedlings Producing Greenhouses in Alberta, 2017

Production Area:		18,170 sq.m.	
Number of Producers:		4	
		Total \$	\$/sq. m.
(A)	1. Crop Sales - Imputed Value of Production	1,495,593.75	82.31
	2. Crop Insurance Receipts	-	-
	3. Miscellaneous Receipts	11,916.50	0.66
GROSS RETURN		1,507,510.25	82.97
(B)	1. Growing Media, Seed/Cuttings	44,433.75	2.45
	2. Fertilizer & Chemicals	29,153.00	1.60
	3. Greenhouse Insurance	21,829.00	1.20
	4. Trays, Boxes & Other Packaging	112,554.25	6.19
	5. Freight and /or Trucking Costs	8,319.00	0.46
	6. Auto Fuel, Repairs, Licenses & Auto Ins.	26,655.00	1.47
	7. Repairs - Buildings and Equipments	38,824.50	2.14
	8. Utilities: Natural Gas	7,403.51 GJ	132,472.75
	9. Electricity	110,489.41 KWh	49,314.25
	10. Water	4,768.00 M3	14,007.50
	11. Phone	5,509.75	0.30
	12. Custom Work & Specialized Labour	3014.50	0.17
	13. Marketing Costs	26,597.00	1.46
	14. Assoc. Dues, Prof'l Fees & Promotion	16,159.25	0.89
	15. Small Tools, Supplies & Misc. Expenses	15,347.75	0.84
	16. Operating Interest Paid	6,582.50	0.36
	17. Labour Insurance / Benefits	42,099.50	2.32
	18. Hired Labour	24,498.75 hours	436,064.75
	19. Unpaid Labour	3,450.00 hours	72,450.00
VARIABLE COSTS		1,101,388.00	60.61
(C)	1. Property / Business taxes	37,786.75	2.08
	2. Equipment & Building	a) Depreciation	153,146.38
		b) Lease Payments	7,492.00
	3. Paid Capital Interest	417.00	0.02
TOTAL CAPITAL COSTS		198,842.13	10.94
(D)	CASH COSTS	(B+C-B19-C2a)	1,074,633.75
(E)	TOTAL PRODUCTION COSTS	(B+C)	1,300,230.13
(F)	GROSS MARGIN	(A-D)	432,876.50
	RETURN TO UNPAID LABOUR	(A-E+B19)	279,730.12
	RETURN TO INVESTMENT	(A-E+C3)	207,697.12
	RETURN TO EQUITY	(A-E)	207,280.12

Table 15: Average Investment for Tree Seedlings Producing Greenhouses in Alberta, 2017

Greenhouse Area: 18,233 sq.m.			
INVESTMENT SUMMARY:	Total \$		\$/sq. m.
Land	465,900.00		25.55
Buildings	1,641,750.00		90.04
Machinery & Equipment	1,403,527.50		76.98
TOTAL INVESTMENT	3,511,177.50		192.58
INVESTMENT DETAIL:	Enterprise Value (\$)	Age (Years)	Depreciation (\$)
Land - Building Site:	465,900.00		
Greenhouse Buildings:	1,641,750.00	18.7	57,461.25
Equipment:			
Refrigeration / Freezer Storage	90,000.00	10.8	4,500.00
Warehouses / Storage Sheds	375,250.00	13.3	18,762.50
Fuel Tanks	750.00	3.8	37.50
Houses (25%)	62,500.00	24.0	3,125.00
Other Buildings	2,500.00	4.3	125.00
Lighting	41,577.50	10.3	2,078.88
Heating System	98,775.00	15.9	4,938.75
Ventilation System	39,250.00	11.5	1,962.50
Humidity Control	50,000.00	1.3	2,500.00
Benches	132,750.00	13.8	6,637.50
Irrigation System	118,500.00	16.3	11,850.00
Water Pumps / Sand Filters	12,750.00	5.5	1,275.00
Soil Mixers / Flat Fillers /Seedling Lines	88,750.00	16.0	8,875.00
Generators	26,000.00	18.8	2,600.00
Roto-Tillers	0.00	0.0	0.00
Storage / Mixing Tanks	11,375.00	15.5	1,137.50
Sterilizers	15,000.00	3.8	1,500.00
Sprayers	375.00	3.8	37.50
Carts / Dollies	59,750.00	6.4	5,975.00
Fertilizer Injectors	16,000.00	11.0	1,600.00
Small Tools / Hardware	20,750.00	9.8	2,075.00
Sub-Total	1,262,602.50		81,592.63
Machinery & Vehicles			
Bobcats / Forklifts	45,675.00	11.2	4,567.50
Trucks	95,250.00	9.1	9,525.00
Other Machinery	0.00	0.0	0.00
Sub-Total	140,925.00		14,092.50

SECTION IX

SUMMARY OF GREENHOUSE PRODUCTION COSTS AND RETURNS

This section provides a summary of 2017 costs and returns data for the various greenhouse crops produced in Alberta. Data on the major greenhouse crops presented in Sections IV to VIII above are based on 43 out of the 47 completed cost of production questionnaires obtained from greenhouse operations across the province. The breakdown of questionnaires analyzed by crops are as follows:

Greenhouse Crop	Number of Questionnaires Analyzed	Production Area (sq. ft.)	Production Area (sq. m.)
Cucumber	9	1,058,223	98,312
Tomato	7	514,548	47,803
Pepper	6	308,805	28,689
Lettuce	2	23,355	2,170
Eggplant	2	38,779	3,603
Bedding Plant/ Ornamental	17	1,552,863	144,266
Tree Seedling	4	782,051	72,655
Total	47	4,278,624	397,498

To preserve confidentiality, the group averages for lettuce and eggplant were not included in the report since the participants were less than three.

Table 16 presents a summary of greenhouse production costs and returns by crops in Alberta for the 2017 production year. It shows the average investment costs, gross returns and production costs on a per unit basis (dollar per square metre) for the various greenhouse crops analyzed.

The investment costs were computed from the data provided by study participants. Compared to previous studies the land values used in this report were not standardized in order to present a true picture of what the real investment costs are. As shown in Table 16, the average investment cost per square metre ranged from \$112.75 for cucumber to \$321.01 for bedding plants/ornamentals producing greenhouses in Alberta.

Bedding Plants/Ornamentals production recorded the highest gross return per square metre among the various crops, followed by cucumbers, tomatoes, tree seedlings and peppers.

The production costs varied by type of crops produced in the greenhouses. Total production costs ranged from a low of \$71.55 per square metre for tree seedlings to \$139.15 per square metre for bedding plants/ornamentals. The most significant cost items for the 2017 crop were labour (hired and operator), material inputs (growing media, seed/cuttings, fertilizer and chemicals, trays, boxes and other packaging materials), marketing and natural gas.

The results show that margins have become slim for majority of producers when compared with previous studies. The gross margins estimated were positive for all crops except peppers, which had a negative margin of -\$5.03 per square metre. Greenhouses producing bedding plants/ornamentals showed the highest gross margin per square metre at \$35.28 followed by tree seedlings at \$23.84. Average returns to unpaid labour, investment and equity were positive for all crops except peppers. Details on costs and returns are presented in Table 16.

Based on the results of the 2017 study, the gross revenue generated by the provincial greenhouse industry in 2017 was estimated to be approximately \$179.9 million, with an investment or total value of assets of about \$328.5 million. The estimated gross revenue was calculated using the 2017 average revenue data (total production area, number of units sold and average selling price per unit sold) collected from the greenhouse operators across the province and acreage information for 2017. The estimated gross revenue represents sales through the co-ops where applicable and other market outlets.

Table 16: Summary of Greenhouse Production Costs and Returns by Crops in Alberta, 2017

Greenhouse Crop	Cucumbers	Tomatoes	Pepper	Bedding Plants / Ornamentals	Tree Seedlings
Number of Producers	9	7	6	17	4
Average Production Area (sq. m.)	10,928	6,831	4,783	8,489	18,170
 dollars per square metre				
Average Investment	112.75	129.99	138.99	321.01	192.58
Gross Return	98.27	94.16	81.88	151.82	82.97
Material Inputs*	19.58	13.76	17.57	44.36	10.24
Natural Gas	9.13	10.82	12.81	7.10	7.29
Marketing Costs	11.94	19.30	8.25	0.44	1.46
Hired Labour	27.38	25.17	27.70	33.30	24.00
Operator Labour	2.73	5.21	4.08	5.61	3.99
Other Variable Costs**	17.28	12.82	17.95	26.78	13.63
Capital Costs	8.25	6.25	8.01	21.56	10.94
Total Production Costs	96.29	93.33	96.37	139.15	71.55
Gross Margin	9.17	11.22	-5.03	35.28	23.84
Return to Unpaid labour	4.71	6.04	-10.41	18.28	15.41
Return to Investment	5.20	1.63	-12.69	16.50	11.44
Return to Equity	1.98	0.83	-14.49	12.67	11.42

* Material Inputs include Growing Media, Seed/Cuttings, Fertilizer and Chemicals, Trays, Boxes and Other Packaging Materials.

** Other Variable Costs include Greenhouse Insurance, Freight and/or Trucking Costs, Auto Fuel, Repairs, Licenses and Auto Ins., Repairs - Buildings and Equipment, Electricity, Water, Phone, Custom Work and Specialized Labour, Association Dues, Professional Fees and Promotion, Small Tools, Supplies and Miscellaneous Expenses and Operating Interest Paid.

APPENDICES

Appendix 1: Summary of Greenhouse Production Costs and Returns by Crops, 2011

	Cucumbers	Tomatoes	Pepper	Bedding Plants / Ornamentals	Cut Flowers	Tree Seedlings
	Alberta	Alberta	Alberta	Alberta	Alberta	Alberta
Number of Producers Surveyed	8	7	5	8	3	5
Average Production Area (sq. m.)	11,374	8,637	3,682	2,076	2,994	10,569

..... dollars per square metre

Average Investment	118.37	135.24	148	300.51	197.75	179.54
Gross Return	107.21	107.88	103.59	158.51	151.61	101.65
Material Inputs*	17.63	13.78	18.33	25.36	16.62	15
Natural Gas	10.84	12.73	10.35	6.82	11.36	11.97
Hired Labour	26.33	28.18	30.98	50.4	32.27	31.28
Marketing Costs	13.32	15.79	9.81	0.83	0.23	7.77
Other Cash Costs	24.26	14.94	27.02	23.58	38.43	16.79
Operator Labour	0.03	0.17	0.69	1.4	8.2	3.55
Capital Costs	9.03	8.95	10.16	17.44	16.18	10.06
Total Production Costs	101.44	94.54	107.34	125.83	123.29	96.41
Gross Margin	11.12	20.39	3.82	48.92	46.75	18.66
Return to Unpaid labour	5.8	13.51	-3.07	34.08	36.52	8.79
Return to Investment	8.67	14.97	-0.83	34.38	29.23	5.3
Return to Equity	5.77	13.34	-3.76	32.68	28.32	5.24

* Expenses associated with material inputs include (growing media, seed/cuttings, fertilizer and chemicals, trays, boxes and other packaging materials).

Appendix 2: Summary of Greenhouse Production Costs and Returns by Crops, 2010

	Cucumbers		Tomatoes		Peppers	Bedding Plants/ Ornamentals	Cut Flowers	Tree Seedlings
	Med. Hat/ Redcliff	North-Central	Med. Hat/ Redcliff	North-Central	Med. Hat/ Redcliff	Alberta	Alberta	Alberta
Number Survey	9	3	3	3	5	5	3	7
Average Production Area (sq. m.)	8,540	3,824	12,670	10,717	9,907	2,844	2994	10,779
-----dollars per square metre-----								
Average Investment	129.68	168.95	116.42	110.48	142.03	130.13	160.40	146.73
Gross Return	84.98	124.29	108.45	106.95	94.13	129.89	150.33	98.16
Material Inputs	10.81	12.92	9.23	10.39	10.75	21.38	32.29	12.85
Natural Gas	9.02	7.50	12.07	8.72	10.99	4.36	12.46	8.02
Hired Labour	19.88	30.91	27.92	28.86	20.94	26.92	34.72	29.94
Marketing Costs	16.90	17.37	23.85	18.29	12.85	0.35	0.49	6.57
Other Cash Costs	9.58	32.01	10.59	11.70	10.50	17.74	35.79	17.94
Operator Labour	0.00	0.76	1.18	0.00	0.00	5.95	8.74	2.19
Capital Costs	9.66	13.69	11.47	10.22	10.60	10.67	17.25	13.09
Total Production Costs	75.84	115.15	96.31	88.19	76.63	87.37	141.74	90.59
Gross Margin	15.77	19.53	21.45	26.03	26.42	55.35	28.84	20.67
Return to Investment	15.77	18.77	20.27	26.03	26.42	49.40	20.10	18.47
Return to Equity	9.14	9.14	12.14	18.76	17.50	42.52	8.59	7.57

Appendix 3: Summary of Greenhouse Production Costs and Returns by Crops, 2008

	Cucumbers		Tomatoes		Peppers	Bedding Plants/ Ornamentals	Cut Flowers	Tree Seedlings*
	Med. Hat/ Redcliff	North-Central	Med. Hat/ Redcliff	North-Central	Med. Hat/ Redcliff	Alberta	Alberta	Alberta
Number Survey	9	3	3	3	5	5	3	7
Average Production Area (sq. m.)	8,540	3,824	12,670	10,717	9,907	2,844	2994	10,779

-----dollars per square metre-----

Average Investment	140.62	189.89	130.75	125.67	127.50	139.31	172.00	195.50
Gross Return	82.24	126.79	109.06	103.96	102.62	129.89	170.37	93.49
Material Inputs	12.27	13.78	11.53	12.55	11.14	21.58	17.21	10.59
Natural Gas	15.26	7.05	20.43	14.76	18.71	7.38	12.91	9.94
Hired Labour	18.39	28.88	25.82	26.69	17.17	24.90	30.49	23.17
Marketing Costs	16.89	17.03	23.83	18.28	13.37	0.35	0.54	4.38
Other Cash Costs	10.09	32.64	11.22	12.43	9.13	18.64	58.76	19.41
Operator Labour	0.00	0.71	1.09	0.00	0.00	5.50	4.59	2.08
Capital Costs	11.20	13.43	12.90	11.40	12.13	10.68	10.62	13.09
Total Production Costs	84.11	113.52	106.81	96.11	81.65	89.03	135.12	82.66
Gross Margin	4.76	23.61	11.47	15.12	29.75	53.24	49.75	23.82
Return to Investment	4.76	22.90	10.38	15.12	29.75	47.74	45.16	21.74
Return to Equity	-1.87	13.27	2.25	7.85	20.97	40.86	35.25	10.84

*Carried forward from the 2005 survey.

Appendix 4: Summary of Greenhouse Production Costs and Returns by Crops, 2005

	Cucumbers		Tomatoes		Peppers	Bedding Plants/ Ornamentals	Cut Flowers	Tree Seedlings*
	Med. Hat/ Redcliff	North-Central	Med. Hat/ Redcliff	North-Central	Med. Hat/ Redcliff	Alberta	Alberta	Alberta
Number Survey	6	4	6	5	4	6	3	7
Average Production Area (sq. m.)	6,753	4,480	5,603	4,262	7,305	1,671	2994	10,779

-----dollars per square metre-----

Average Investment	100.42	170.74	139.80	178.94	201.07	174.57	214.40	195.50
Gross Return	88.21	90.72	90.80	97.84	94.30	135.39	143.31	93.49
Material Inputs	14.95	11.98	11.24	11.47	11.74	27.04	25.52	10.59
Natural Gas	16.07	18.31	15.89	18.71	19.57	13.94	15.44	9.94
Hired Labour	16.59	20.10	21.80	24.98	18.09	28.19	26.87	23.17
Marketing Costs	15.24	15.26	19.56	11.76	14.41	1.68	0.33	4.38
Other Cash Costs	11.98	20.04	15.57	13.49	13.48	24.31	33.20	19.41
Operator Labour	0.77	1.90	0.15	1.24	2.22	8.34	8.29	2.08
Capital Costs	10.94	13.68	10.68	17.62	16.01	13.66	17.10	13.09
Total Production Costs	86.54	101.47	94.89	99.27	95.52	117.16	126.75	82.66
Gross Margin	7.20	0.38	3.21	9.24	11.05	36.61	36.36	23.82
Return to Investment	6.43	-1.52	3.06	8.00	8.83	28.26	28.07	21.74
Return to Equity	1.67	-10.75	-4.09	-1.43	-1.23	18.23	16.56	10.84

Appendix 5: Summary of Greenhouse Production Costs and Returns by Crops, 2000

	Cucumbers	Tomatoes	Peppers	Bedding Plants/ Ornamentals	Cut Flowers	Tree Seedlings
Number Survey	10	7	5	7	6	7
Average Production Area (sq. m.)	4958	3272	3435	2443	2176	10396
-----dollars per square metre-----						
Average Investment	135.15	152.25	156.67	112.66	205.20	165.70
Gross Revenue	64.67	82.85	93.07	84.90	136.54	83.17
Material Inputs	9.15	11.84	12.48	14.96	31.63	10.33
Natural Gas	10.44	17.22	11.73	7.42	11.62	8.82
Hired Labour	8.72	14.20	9.90	13.67	26.68	33.14
Marketing Costs	10.65	11.51	11.62	2.80	2.69	4.30
Other Cash Costs	11.51	12.37	10.01	8.29	31.10	13.77
Operator Labour	4.95	3.66	6.67	16.46	5.38	1.29
Capital Costs	13.56	15.38	15.60	9.58	13.34	10.76
Total Production Costs	68.97	86.19	78.01	73.17	122.45	82.42
Gross Margin	7.32	8.07	30.56	34.65	30.99	11.51
Return to Investment	2.37	4.41	23.89	18.08	25.61	10.22
Return to Equity	-4.41	-3.34	15.16	11.62	14.20	0.75