

Business Planning and Economics of Apple Orchard Establishment and Cost of Production in Nova Scotia





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Introduction

The Annapolis Valley of Nova Scotia is the centre of apple production on Canada's Eastern Seaboard. Nova Scotia is one of the most northerly growing regions in North America, giving Nova Scotia's commercial apple producing region a relatively short and cool growing season. Within Canada, New Brunswick is the only province producing apples with a shorter and cooler season. With respect to the amount of precipitation, Nova Scotia surpasses most North American apple producing regions. The annual precipitation for Kentville Nova Scotia is 1,211 mm which means that most growers in Nova Scotia do not need to rely on irrigation to produce a crop. The short, cool and moist growing season of the Annapolis Valley can provide a competitive advantage to growers with respect to input costs and apple quality. One of the greatest climatic advantages that Nova Scotia has over other apple producing regions is the ability to produce highly coloured apples due to the cool evening temperatures in late summer and the fall combined with good light diffusion. The other advantages Nova Scotia growers have with respect to weather are, that Nova Scotia orchards are less prone to adverse weather events and frost damage. Nova Scotia apples are also less prone to calcium deficiency which is advantageous to the Nova Scotia growers and contributes to the ability to produce quality fruit.

The Nova Scotia Industry

The growing of apples in Nova Scotia can be traced back more than 400 years to the arrival of the first French settlers in the region of Annapolis Royal. Nova Scotia currently produces an annual average of approximately 2.5 million bushels of apples, which is equal to between eight and nine percent of the Canadian production or 1% of the US production. The farm gate value of Nova Scotia's annual apple crop is approximately \$13 million. Over the past century the tree fruit sector in Nova Scotia has gone through significant change with the consolidation of the industry, changes in cultivars and the development of a packing house and processing industry.

Nova Scotia is currently and is likely to remain a net exporter of apples due to the volume of apples produced relative to the available customers in the domestic market place.

Objectives

The purpose of this report is to provide individuals interested in the production of apples a guide to developing a plan and an understanding of the costs associated with the establishment and operation of an orchard. This report reflects the management practices of growers in Nova Scotia at the present time and the current economic conditions that can influence the establishment and operating costs. The costs in this document represent an average scenario and the expenses will vary depending on the grower and the site.

Methods and Procedures

The information presented in this report was gathered through economic reports from other apple growing regions in Canada, online and printed resources, and discussions with Nova Scotia growers, specialists and agribusiness operators.

Overview of Orchard Establishment

In the apple growing business, returns are a function of costs (capital + operating) and revenue which is a function of yield, quality, price and cultivar.

The cost associated with establishing and operating an orchard can vary from site to site and from operator to operator due to the significant variation in the cost of land, labour, machinery and materials. During the initial years of orchard establishment the main costs at play are the capital costs such as the land purchase, land preparation, labour, trees, support system materials, pest management materials and interest on debt. There is significant variation in the cost of land preparation depending on the need for clearing, leveling, and drainage. However it has been found that the added expenses of land improvement will result in an earlier and more consistent crop, thus bringing an earlier return on the investment. Variation in the establishment costs are affected by many cultural practices like cultivar, planting density, training systems, pest management and the location of the site. A new grower or someone considering entry into apple production must carefully consider the advantages and disadvantages of the site and cultivar selection because these decisions will have a significant impact on the profitability of the planting.

Just knowing the establishment and production costs is not enough to make an educated decision whether to undertake apple production as a business or not. The individual must give consideration to the potential for profitability which is directly related to cultivar, yield and price. Yield is a function of site, soil, cultivar and management to

mention a few, where the price is determined by the current market and quality. Therefore the price is a function of your ability to grow and market a quality product. Apple packers in Nova Scotia are interested in marketing a premium quality apple, and are very interested in securing the highest quality apples.

The establishment of an orchard is a long term investment, with orchards having a life expectancy of 20 years. It is important that the establishment of an orchard be well planned including the site planning, the planting and the tree care. The high density plantings can require a grower investing in excess of \$20,000 per acre for the establishment. The extensive planning for high density plantings will pay off in maximizing yields and returns over the productive life of the orchard. Mistakes made in the planning and planting can be very costly and are difficult to correct in later years. It is paramount that careful attention be paid to the site selection, soil preparation, tree quality, cultivar selection and early tree care.

Orchard – Site Selection

The success of an orchard is closely linked to the location; therefore, a new orchard site needs to be thoroughly investigated as to the micro-climate, soil and topography best suited to the production of apples.

Orchard sites should preferably be on gently sloping hillside with good air drainage to provide greater protection against frost and freezing injury. It is also preferred that site not be exposed to consistently strong winds. The soil should have a minimum rooting depth of 60 cm. It is important that the soil on a potential site be thoroughly investigated to determine the soil constraints of the site and to properly plan the modifications of the soil including such things as removal of excess water, deep soil manipulation and nutrient modification.



Soil

Soil analysis also needs to be conducted; the optimal level of soil pH for fruit tree growth is 6.5. This level of pH increases the availability of important nutrients including nitrogen, phosphorous, potassium, magnesium, calcium and sulfur. This level of pH will also increase micro-organism activity which will speed up the decomposition of organic materials, and aids in tree growth. Although apple trees can still grow in soil that has a pH as low as 5, acidic soils (pH of less than 5) are high in aluminum and manganese, which are soluble at this level and can directly affect tree growth. The application of lime

on acidic soils can raise the pH to a more productive level, also limiting these toxic substances.

Trees

The first step to determining the tree requirements is to measure the field and decide on the spacing that will suit the desired management techniques. You may wish to consult with a tree fruit specialist at this point in the planning. The success of the new orchard planting is highly influenced by the quality of the nursery trees that are planted. The nursery stock should be vigorous, one or two year old trees with lateral shoots and high density. Where early production is required it is advised to plant one-year old feathered trees with a minimum of eight lateral shoots. The trees should be dormant, free from freezing and other injury and should have never been subjected to drying conditions. It is important that the trees be planted as soon as possible after they are received. Spring time (April-May) is the best time for planting nursery stock, as soon as the soil is ready.

Apple Cultivars for Nova Scotia

You might think that today there are a wide range of apple cultivars, however you might be interested to know that over a century ago there was up to 1000 different cultivars available in the United States and Canada. Over many seasons growers withdrew a number of cultivars that were not favored by consumers or did not store well. Presently there are at least 30 different cultivars that are grown in Nova Scotia for sale commercially, however, the selection of locally grown cultivars on the shelves of the major retailers is significantly smaller. Consumers demand the cultivars best suited for their uses such as baking, fresh eating, freezing, or salads. The apple cultivars most in demand on the market include (Listed in order of Harvest):

- Gravensteins
- McIntosh
- Cortland
- Gala
- Honeycrisp
- Spartan
- Red Delicious
- Golden Delicious
- Idared
- Northern Spy



Commonly Grown Cultivars for Nova Scotia



Gravenstein: Medium to large, round, red blushed with yellow background. Flesh is cream, juicy and tart. Excellent for fresh eating, sauce and freezing. Good for salads and baking.



McIntosh: Medium, round, red to red blushed. Flesh is white, crisp, juicy, sub-acid and browns quickly. McIntosh apples are excellent for fresh eating and good for sauce.



Cortland: Medium to large, round to round conic striped or blushed red. Flesh is white, sub-acid and non-browning. Excellent for fresh eating, salads and sauce. Good for pies, baking and freezing.



Gala: Medium to small, conical shape, streaked with bright orange red and with golden yellow background. Mild, sweet flavor, softer for eating and favored for apple slices.



Honeycrisp: Large, bright red with yellow background. Explosively crisp, firm, sweet and juicy. Exceptional for fresh eating, salads, sauce and cooking.



Spartan: Medium, round, red blushed. Flesh is cream, crisp, and lightly aromatic and sub-acid. Spartans are considered good for fresh eating, salads and sauce.



Red Delicious: Small to large conic, striped or blushed red. Flesh is greenish cream, juicy and sweet. Red Delicious apples' sweet taste makes them excellent for fresh eating.



Golden Delicious: Yellow to yellow-green, sweet/bland flavor, juicy and crisp flesh that resists browning, all-purpose but do lose some flavor when cooked.



Idared: Medium to large, round oblong, blushed red. Flesh is cream, firm and sub-acid after storage. Excellent for pies and baking. Good for fresh eating, salads, sauce and freezing. Available November to July; primarily February to July.



Northern Spy: Large, sweet-tart apple, red skin with yellow streaking, all-purpose apple. also called *spy apple*. Premium pie apple.

Establishment and Cost of Production Assumptions

- It has been assumed that the development is a 20 acre orchard and there will be a purchase of a tractor and other related equipment such as a mower and sprayer at an investment of \$50,000 borrowed at a fixed rate 6.5% for 10 years.
- For the purpose of calculating the land tax, a rate of \$0.80/\$100 was used.
- The land preparation costs are based on land in a pasture state prior to planting.
- The cost of land has not been included in this study because of the great deal of variation in land prices and values. It is therefore important to remember that if you are using this information in the planning of your own development, you will need to allow for the land expense in the calculation of your own establishment and operating costs.
- Costs associated with general farm overhead like accounting, legal, office and general farm maintenance have not been included due to the variability that exists from situation to situation.
- The information in this document looks at the establishment of orchards unsupported at 300 trees/acre and supported at 400, 600 and 800 trees/acre.
- The establishment is based on the higher valued apple cultivars.
- For the purpose of this report year one is the pre-planting year.



Costs and Returns of Apple Production

Variable Costs

The variable costs are those costs that change directly with an increase or decrease in acreage. Trees, training materials, pesticides, fertilizers, labour and operating expenses for machinery are examples of variable costs.

Fixed Costs

Fixed cost or overhead costs do not change as a result of an increase or decrease in acreage. Some examples of fixed costs are machinery (depreciation and interest), and taxes.

Year 1: Pre-planting - Costs

In the year prior to planting the orchard, the selected location will require preparation for the planting of the trees. The site will, in most cases, require installation of tile drainage. Following the installation of the tile drain, the site will require tilling, fumigation, deep ripping and the application of lime, fertilizer and manure according to recommendations from soil testing. Once the land preparations are complete a cover crop should be planted for the winter to prevent erosion.

Table 1. Pre-Planting year 1 costs (all plantings)

Variable Costs	Cost/Acre
Tile Drainage	\$2000
Deep Ripping	\$500
Land Preparation (seed bed condition)	\$500
Fumigation	\$1200
Soil Testing and Amendments	\$126
Cover Crop	\$35
Tractor and Equipment Expenses	\$200
Labour	\$300
Total Variable Costs	\$4,861
Fixed Costs	
Interest and Depreciation Tractor and Equipment	\$560
Taxes (land)	\$28
Total Fixed Costs	\$588
Total Cost for Pre-planting Year	\$5,449

Year 2: Planting Year – Costs

It is in the year of planting that there is a requirement for a significant infusion of cash into the orchard. Labour is a very large part of the cost in the planting year, as is the cost of supplies for the support system and the trees themselves. There will be variation in the requirements for some things like pesticides, fertilizer, manure and lime.

The labour expense will vary depending on the amount of labour you need to hire, the availability of the labour, and the wage expected by the labour pool available to you at the time of planting. If you are using your own labour and family labour it is important to remember that even if you are not using cash to pay for it directly it still has a value and the value must be accounted for in all financial projections.

Table 2. Establishment Costs per acre – Year 2: Planting Year

Variable Costs	Unsupported Trees 300	Supported Trees 400	Supported Trees 600	Supported Trees 800
Soil Testing and Amendments	\$400	\$400	\$400	\$400
Tractor and Equipment Expenses	\$200	\$200	\$200	\$200
Labour	\$1,500	\$1,500	\$1,500	\$1,500
Trees (\$11/tree)	\$3,300	\$4,400	\$6,600	\$8,800
Tree Support	\$0	\$1,800	\$2,700	\$3,600
Insect, Pest and Weed control	\$100	\$100	\$100	\$100
Total Variable Expenses	\$5,500	\$8,400	\$11,500	\$14,600
Fixed Costs				
Taxes (land)	\$28	\$28	\$28	\$28
Interest and Depreciation Tractor and Equipment	\$560	\$560	\$560	\$560
Total Fixed Expenses	\$588	\$588	\$588	\$588
Total Expenses	\$6,088	\$8,988	\$12,088	\$15,188

Year 3: Growth Year

In year three, the trees are left to grow and establish themselves. There will be some input this year in the areas of labour, pesticides and fertilizer. In year three there is no expectation for revenue. In the growth year the cost will be similar in all plantings.

Table 3. Establishment Costs per acre – Year 3: Growth Year

Variable Costs	All Orchards
Soil Testing and Amendments	\$400
Tractor and Equipment Expenses	\$200
Labour	\$1,000
Insect, Pest and Weed control	\$200
Thinning (hand)	\$90
Total Variable Expenses	\$1,890
Fixed Costs	
Taxes (land)	\$28
Interest and Depreciation Tractor and Equipment	\$560
Total Fixed Expenses	\$588
Total Expenses	\$2,478

Year 4 and Beyond: Production Years

It is in the fourth year of the establishment when the higher density orchard plantings (600+ Supported Trees/acre) will begin to yield some return. As the orchard begins to produce fruit it will take a number of years to reach full production of a mature orchard. The density of the planting impacts the time it takes to reach the mature yield. The unsupported orchard planting will not reach the expected mature yield until year 14, however the supported orchard at 800 trees/acre should reach the mature yield in year 7. Once the orchard is in a mature state the expected yield is 800 bushel/acre and the variable cost of production is approximately \$4800/acre.

Treatment of Establishment Costs

The establishment of an orchard requires that a grower manage four successive years of establishment costs prior to any revenue being received. In order to evaluate the orchard enterprise it is often necessary to accumulate the establishment costs until such time as a crop is harvested and revenue is received. In order to do this, the variable establishment costs in each of the three years along with their respective interest charges are accumulated to the fourth year using an interest rate of 6.5% compounded annually. The total compounded amount represents the variable cost of establishment per acre of orchard that is to be repaid over a period of years of harvesting.

Table 4. Establishment Costs per acre

	Unsupported Trees 300	Supported Trees 400	Supported Trees 600	Supported Trees 800
Preplanting Costs (variable)	\$4,861	\$4,861	\$4,861	\$4,861
Planting Costs (variable)	\$5,500	\$8,400	\$11,500	\$14,600
Growth Year 3 Costs (variable)	\$1,890	\$1,890	\$1,890	\$1,890
Growth Year 4 Costs (variable)	\$1,890	\$1,890		
Total Variable Cost of Establishment	\$14,141	\$17,041	\$18,251	\$21,351
Compounded Interest	\$2,705	\$3,270	\$2,455	\$2,858
Total Variable Cost of Establishment + Compounded Interest	\$16,846	\$20,311	\$20,706	\$24,209
Interest Rate on Establishment cost	6.50%	6.50%	6.50%	6.50%
Term	10	10	10	10
Yearly Payment	\$2,343	\$2,825	\$2,880	\$3,368

To maintain a straightforward approach to production costs, it is necessary to assume constant costs and returns for each of the successive harvest years. It is for the same reason that the total compounded cost of establishment is amortized and the repayment of these costs is divided equally over the harvest years. By assuming that the establishment of the orchard increases the asset value of the land, the grower is able to depreciate the costs annually over a defined number of years of actual harvesting.

Table 4 above shows the amortization of the total three year establishment cost over a 10 year period at an interest rate of 6.5% for each of the planting densities.

Revenue

With the production of apples, the revenue or return on the investment does not begin until the fourth year, however, it is not until year 7 or later that a grower should expect the orchard to be mature and to produce a full yield. On average, a grower practicing best management practices in Nova Scotia should expect a mature yield to be about 800 bushel/acre.

The price that a grower receives for the apples produced is a function of cultivar and quality. It is important that potential growers understand there is a correlation between cultivar and price. The current farm gate value for high valued apples depending upon quality(or pack-out) ranges from \$110 - \$500/bin. Each bin of apples contains 17 bushels so the price per bushel ranges between \$6.47 - \$29.41/bushel.

Contribution Margin

The contribution margin is the difference between the revenue generated and the expenses used to generate the revenue. The contribution margin must provide funds to cover the other expenses such as overhead, loan payments and capital expenses. The contribution margin on a mature orchard producing 800 bushels per acre is dependant on the price received for the apples, which is a function of the cultivar and quality.

Table 5. Price and Contribution Margin

Price	Contribution Margin
\$10.00/bushel	\$2,334
\$12.50/bushel	\$4,134
\$15.00/bushel	\$5,934
\$20.00/bushel	\$9,534
\$25.00/bushel	\$13,134
\$30.00/bushel	\$16,734

Breakeven Analysis

Table 6. Breakeven Analysis per acre

Financing	Planting Density	Price/bushel \$10	Price/bushel \$12.50	Price/bushel \$15	Price/bushel \$20	Price/bushel \$30
No	300 Non-supported	25 years	17 years	14 years	11 years	9 years
	400 supported	24	16	15	11	9
	600 supported	22	14	11	9	8
	800 supported	22	13	11	9	7
Yes	300 Non-supported	30+ years	22 years	17 years	13 years	10 years
	400 supported	30+	24	18	14	11
	600 supported	30+	22	16	12	9
	800 supported	30+	23	17	12	8

It can be easily seen from table 6 that the price received for the crop and the requirement for financing the establishment both have a significant impact on the number of years it takes to break even on the orchard enterprise. In all cases the breakeven does not include principle or interest payments on land.

Land Purchase

The price of land which is suitable for the establishment of an orchard will vary considerably depending on a number of factors such as:

- Location
- Site suitability
- Demand
- Local economy

Conclusion

It is obvious from the information presented in this report that there is a significant investment of time and money required for the establishment of an orchard in Nova Scotia. The growing of apples requires growers to pay close attention to both the production and financial details in order to ensure the crop has adequate yield and quality and to provide a return on the investment. If the establishment of the orchard does not require external financing, there is significantly less pressure on the finances and the breakeven on the investment occurs much sooner as seen in table 9.

Careful planning prior to establishment and close attention to detail during production are essential for the successful production of apples in Nova Scotia.

Business Planning Resources for Establishment of an Orchard

There are a number of useful resources available to individuals wishing to establish an orchard in Nova Scotia, many of which are available by contacting one of the following:

**Nova Scotia Department of Agriculture –
Business Development and Economics Division**
<http://www.gov.ns.ca/agri/bde/>

AgraPoint
<http://www.agrapoint.ca>

Nova Scotia Fruit Growers Association
<http://www.nsapples.com>

References:

Nova Scotia Tree Fruit Industry Vitalization Program Review, submitted by AgraPoint to the Nova Scotia Fruit Growers Association. March 2009

Planting and Care of the Young Apple Orchard, Publication ACFC Agdex:211 Rev. Oct 05

What You Should Know About Fruit Production in Ontario Factsheet, Agdex 206/11, 06/04

Planning for Profit, Province of British Columbia, Agdex 211-810, Spring 1994

Nova Scotia Fruit Growers Association, <http://www.nsapples.com>

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Appendix Chart 1 - Unsupported Planting 300 trees/acre

	Pre-Plant														
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year10	Year 11	Year 12	Year 13	Year 14	
Income															
Yield bushels/acre					100	200	250	300	400	500	600	700	750	800	
Revenue \$12.50/bushel					\$1,125	\$2,250	\$2,813	\$3,375	\$4,500	\$5,625	\$6,750	\$7875	\$8,438	\$9,000	
Total Income					\$1,125	\$2,250	\$2,813	\$3,375	\$4,500	\$5,625	\$6,750	\$7875	\$8,438	\$9,000	
Variable Costs															
Tile Drainage	\$2,000														
Ripping	\$500														
Land Preparation	\$500														
Fumigation	\$1,200														
Soil Testing and Amendments	\$126	\$400	\$400	\$400	\$200	\$200	\$200	\$200	\$200	\$200	\$200	\$200	\$200	\$200	
Cover Crop	\$35														
Tractor & equipment expenses	\$200	\$200	\$200	\$200	\$200	\$200	\$200	\$200	\$200	\$200	\$200	\$200	\$200	\$200	
Labour (Not Harvesting)	\$300	\$1,500	\$1,000	\$1,000	\$1,000	\$1,300	\$1,300	\$1,500	\$1,500	\$1,500	\$1,500	\$1,500	\$1,500	\$1,500	
Trees \$11.00/tree		\$3,300													
Pest control and chemical thinning		\$100	\$200	\$400	\$400	\$600	\$600	\$600	\$600	\$600	\$600	\$600	\$600	\$600	
Thinning (Hand)			\$90	\$90	\$180	\$180	\$300	\$300	\$300	\$300	\$300	\$300	\$300	\$300	
Crop Insurance					\$56	\$56	\$56	\$56	\$56	\$56	\$56	\$56	\$56	\$56	
Pollination					\$25	\$25	\$25	\$25	\$25	\$25	\$25	\$25	\$25	\$25	
Harvesting Costs \$30/bin					\$167	\$333	\$417	\$500	\$667	\$833	\$1,000	\$1,167	\$1,250	\$1,333	
Bin Rental \$0.37/bushel					\$37	\$74	\$93	\$111	\$148	\$185	\$222	\$259	\$278	\$296	
Trucking \$8.00/bin					\$44	\$89	\$111	\$133	\$178	\$222	\$267	\$311	\$333	\$356	
Variable costs Total	\$4,861	\$5,500	\$1,890	\$1,890	\$2,309	\$3,057	\$3,301	\$3,625	\$3,873	\$4,122	\$4,370	\$4,618	\$4,742	\$4,866	
Contribution Margin	-\$4,861	-\$5,500	-\$1,890	-\$1,890	-\$1,384	-\$807	-\$489	-\$250	\$627	\$1,503	\$2,380	\$3,257	\$3,696	\$4,134	
Fixed Costs															
Taxes	\$28	\$28	\$28	\$28	\$28	\$28	\$28	\$28	\$28	\$28	\$28	\$28	\$28	\$28	
Tractor, Equipment, Interest & Depreciation	\$560	\$560	\$560	\$560	\$560	\$560	\$560	\$560	\$560	\$560	\$560	\$560	\$560	\$560	
Fixed Cost Total	\$588	\$588	\$588	\$588	\$588	\$588	\$588	\$588	\$588	\$588	\$588	\$588	\$588	\$588	

Appendix Chart 2 - Supported Planting 400 trees/acre

	Pre-Plant	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Income											
Yield bushels/acre						100	200	250	400	600	800
Revenue Fresh \$12.50/bushel						\$1,125	\$2,250	\$2,813	\$4,500	\$6,750	\$9,000
Total Income						\$1,125	\$2,250	\$2,813	\$4,500	\$6,750	\$9,000
Variable Costs											
Tile Drainage	\$2,000										
Ripping	\$500										
Land Preparation	\$500										
Fumigation	\$1,200										
Soil Testing and Amendments	\$126	\$400	\$400	\$400	\$400	\$200	\$200	\$200	\$200	\$200	\$200
Cover Crop	\$35										
Tractor & equipment expenses	\$200	\$200	\$200	\$200	\$200	\$200	\$200	\$200	\$200	\$200	\$200
Labour (Not Harvesting)	\$300	\$1,500	\$1,000	\$1,000	\$1,000	\$1,300	\$1,300	\$1,500	\$1,500	\$1,500	\$1,500
Trees \$11.00/tree		\$4,400									
Tree Support \$4.50/tree		\$1,800									
Pest control and chemical thinning		\$100	\$200	\$200	\$400	\$600	\$600	\$600	\$600	\$600	\$600
Thinning (Hand)			\$90	\$90	\$180	\$180	\$300	\$300	\$300	\$300	\$300
Crop Insurance					\$56	\$56	\$56	\$56	\$56	\$56	\$56
Pollination					\$25	\$25	\$25	\$25	\$25	\$25	\$25
Harvesting Costs \$30/bin					\$167	\$333	\$417	\$667	\$1,000	\$1,333	\$1,333
Bin Rental \$0.37/bushel					\$37	\$74	\$93	\$148	\$222	\$296	\$296
Trucking \$8.00/bin					\$44	\$89	\$111	\$178	\$267	\$356	\$356
Variable costs Total	\$4,861	\$8,400	\$1,890	\$1,890	\$2,509	\$3,057	\$3,301	\$3,873	\$4,370	\$4,866	\$4,866
Contribution Margin	-\$4,861	-\$8,400	-\$1,890	-\$1,890	\$1,384	-\$807	-\$489	\$627	\$2,380	\$4,134	\$4,134
Fixed Costs											
Taxes	\$28	\$28	\$28	\$28	\$28	\$28	\$28	\$28	\$28	\$28	\$28
Tractor, Equipment, Interest & Depreciation	\$560	\$560	\$560	\$560	\$560	\$560	\$560	\$560	\$560	\$560	\$560
Fixed Cost Total	\$588	\$588	\$588	\$588	\$588	\$588	\$588	\$588	\$588	\$588	\$588

Appendix Chart 3 - Supported Planting 600Trees/acre

	Pre-Plant Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9
Income									
Yield bushels/acre				100	250	350	500	800	800
Revenue Fresh \$12.50/bushel				\$1,688	\$2,813	\$3,938	\$5,625	\$9,000	\$9,000
Total Income				\$1,688	\$2,813	\$3,938	\$5,625	\$9,000	\$9,000
Variable Costs									
Tile Drainage	\$2,000								
Ripping	\$500								
Land Preparation	\$500								
Fumigation	\$1,200								
Soil Testing and Amendments	\$126	\$400	\$400	\$400	\$200	\$200	\$200	\$200	\$200
Cover Crop	\$35								
Tractor & equipment expenses	\$200	\$200	\$200	\$200	\$200	\$200	\$200	\$200	\$200
Labour (Not Harvesting)	\$300	\$1,500	\$1,000	\$1,000	\$1,300	\$1,300	\$1,500	\$1,500	\$1,500
Trees \$11.00/tree		\$6,600							
Tree Support \$4.50/tree		\$2,700							
Pest control and chemical thinning		\$100	\$200	\$400	\$600	\$600	\$600	\$600	\$600
Thinning (Hand)			\$90	\$180	\$180	\$300	\$300	\$300	\$300
Crop Insurance				\$56	\$56	\$56	\$56	\$56	\$56
Pollination				\$25	\$25	\$25	\$25	\$25	\$25
Harvesting Costs \$30/bin				\$167	\$417	\$583	\$833	\$1,333	\$1,333
Bin Rental \$0.37/bushel				\$37	\$93	\$130	\$185	\$296	\$296
Trucking \$8.00/bin				\$44	\$111	\$156	\$222	\$356	\$356
Variable costs Total	\$4,861	\$11,500	\$1,890	\$2,509	\$3,181	\$3,549	\$4,122	\$4,866	\$4,866
Contribution Margin	-\$4,861	-\$11,500	-\$1,890	-\$1,384	-\$369	\$388	\$1,503	\$4,134	\$4,134
Fixed Costs									
Taxes	\$28	\$28	\$28	\$28	\$28	\$28	\$28	\$28	\$28
Tractor, Equipment, Interest & Depreciation	\$560	\$560	\$560	\$560	\$560	\$560	\$560	\$560	\$560
Fixed Cost Total	\$588	\$588	\$588	\$588	\$588	\$588	\$588	\$588	\$588

Appendix Chart 4 - Supported Planting 800Trees/acre

	Pre-Plant	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9
	Year 1								
Income									
Yield bushels/acre				150	350	400	800	800	800
Revenue Fresh \$12.50/bushel				\$1,688	\$3,938	\$4,500	\$9,000	\$9,000	\$9,000
Total Income				\$1,688	\$3,938	\$4,500	\$9,000	\$9,000	\$9,000
Variable Costs									
Tile Drainage	\$2,000								
Ripping	\$500								
Land Preparation	\$500								
Fumigation	\$1,200								
Soil Testing and Amendments	\$126	\$400	\$400	\$400	\$200	\$200	\$200	\$200	\$200
Cover Crop	\$35								
Tractor & Equipment expenses	\$200	\$200	\$200	\$200	\$200	\$200	\$200	\$200	\$200
Labour (Not Harvesting)	\$300	\$1,500	\$1,000	\$1,000	\$1,300	\$1,300	\$1,500	\$1,500	\$1,500
Trees \$11.00/tree		\$8,800							
Tree Support \$4.50/tree		\$3,600							
Pest control and chemical thinning		\$100	\$200	\$400	\$600	\$600	\$600	\$600	\$600
Thinning (Hand)			\$90	\$180	\$180	\$300	\$300	\$300	\$300
Crop Insurance				\$56	\$56	\$56	\$56	\$56	\$56
Pollination				\$25	\$25	\$25	\$25	\$25	\$25
Harvesting Costs \$30/bin				\$250	\$583	\$667	\$1,333	\$1,333	\$1,333
Bin Rental \$0.37/bushel			\$0	\$56	\$130	\$148	\$296	\$296	\$296
Trucking \$8.00/bin				\$67	\$156	\$178	\$356	\$356	\$356
Variable costs Total	\$4,861	\$14,600	\$1,890	\$2,633	\$3,429	\$3,673	\$4,866	\$4,866	\$4,866
Contribution Margin	-\$4,861	-\$14,600	-\$1,890	-\$946	\$508	\$827	\$4,134	\$4,134	\$4,134
Fixed Costs									
Taxes	\$28	\$28	\$28	\$28	\$28	\$28	\$28	\$28	\$28
Tractor, Equipment, Interest & Depreciation	\$560	\$560	\$560	\$560	\$560	\$560	\$560	\$560	\$560
Fixed Cost Total	\$588	\$588	\$588	\$588	\$588	\$588	\$588	\$588	\$588

