

Agricultural Business Profile on Rhubarb

April 1999

This profile has been compiled as a source of information for those who may be considering the production and/or processing of rhubarb as a commercial venture.

The reader is cautioned that the information provided should be considered as a starting point only. It does not substitute for a business plan; a business plan incorporates specific information unique to the investor. The preparation and evaluation of a business plan is a critical step that must be taken before any significant investment is made.

While every effort has been made to ensure the accuracy of the information provided, the reader is further cautioned that information critical to his or her business plan should be verified. Particular attention should be paid to information that may become dated.

Abstract

Rhubarb is a common garden plant that grows well in our maritime climate. It is a good source of Vitamin C, potassium and dietary fibre. Rhubarb is primarily used as a food ingredient but has medicinal characteristics as well. It can be marketed fresh, frozen, processed or as a nutraceutical¹. A commercial sized operation will require capital investment for production and processing equipment. However, it is possible for a farm unit to get into rhubarb production on a small scale and to keep establishment costs relatively low. The harvesting of rhubarb is a labour-intensive business, relying on seasonal manual labour.

Background

Rhubarb is a perennial plant widely adapted to nearly all growing regions. A member of the buckwheat family, the plant is a staple vegetable in many home gardens. Because the leaves contain oxalates which are poisonous, rhubarb leaves should never be eaten.

Rhubarb is 95 percent water and contains a significant amount of potassium. The stalks are rich in Vitamin C, dietary fibre and calcium. One cup of rhubarb contains about 26 calories.

According to the herbalists of Peking, rhubarb was known in China about 2700 B.C. as a medicinal, rather than as a culinary plant. The crop is native to Asia and was brought to North America by the European settlers.

The current acreage of field rhubarb in Canada is

221 hectares². Ninety percent of the Canadian crop is produced in four provinces: Nova Scotia (28 hectares), Ontario (88 hectares), British Columbia (43 hectares) and Quebec (37 hectares).

There are no precise per capita consumption figures for rhubarb in Canada, although it is thought to be approximately 0.14 kg³.

Production

Climatic Requirements: Rhubarb is a cool-season, perennial crop. Temperatures below 4°C are required to break dormancy and to stimulate spring growth. Summer temperatures averaging less than 24°C are best for vigorous vegetative growth. Canada, especially the Maritime provinces with their usual moist spring weather conditions, and the Northern United States are well suited for

rhubarb production.

Cultural Practices: Since no herbicides are registered for use on rhubarb, a clean planting site is essential for cultivation. Small areas with perennial weeds can quickly build up to serious proportions. To prevent this, all perennial weeds should be killed the year before planting. The fields should be cultivated in the spring and after the rhubarb is cut. Hand hoeing may also be necessary. Rhubarb is relatively free of insect and disease problems.

It is important to purchase high quality seed stock from a nursery for commercial production. In the Maritimes, high quality root stock is available through Charles Keddy, Kentville, Nova Scotia. Varieties available from this nursery include: Valentine, German Wine, Canada Red, Sunrise, Sutton and Tilden.

Although rhubarb with deep red stalks is popular among consumers, colour and sweetness are not necessarily related. The colour of the stalk can be determined by the colour of the skin, the colour of the flesh, or a combination of both. Green varieties are often much more productive than red varieties. An established rhubarb crop will yield between 22,000 and 34,000 kgs. per hectare per year, depending on variety, plant health and soil fertility.

Land Suitability: Rhubarb tolerates most soils but grows best on fertile, well-drained soils that are high in organic matter. Loam or heavy clay, provided that it is well-drained, is ideal for rhubarb. The crop is very tolerant to soil acidity but does best in slightly to moderately acid soil. The crop can tolerate soil pH as low as 5.0; however, maximum yields are attained at a pH of 6.0 to 6.8. Since Prince Edward Island soils often have pH levels below 6.0, it is a good policy to correct pH levels before planting.

Fertility: Rhubarb responds well to fertilizers. The quality of the crop harvested depends to a large extent on the care and fertilization received. Commercial growing requires about 1250 kg of 12-24-24 per hectare before planting. Manure is an extremely valuable source of organic matter which helps conserve moisture, preserve soil structure, and make nutrients readily available. Fifteen tonnes of manure should be applied per acre before planting. To avoid possible contamination of the rhubarb stalks, manure should not be applied in a harvest year.

Pest Control: Potential rhubarb insect pests include the Rhubarb Curculio, a rusty or yellowish-coloured snout beetle which bores into stalks, crowns and roots leaving spots. No chemicals are registered to control this insect. Removing and destroying affected plants is the best method to eliminate this pest.

Harvesting Practices: In order to give plants the opportunity to build up food reserves in the root and to produce thick, robust stems, the first harvest is not recommended until after the second year of growth. The harvest season is generally three weeks in length, which in this region typically begins in early June. Growing both early-season and late-season varieties will help to extend the season slightly.

Harvesting rhubarb is labour intensive, relying mostly on seasonal manual labour.

Specialized Equipment Needs: There is little specialized equipment for rhubarb production on the market. However, it may be possible to adapt harvesting equipment from other crops.

Marketing

Markets: Rhubarb can be marketed fresh, frozen, processed or as a nutraceutical. Although much of the rhubarb grown is used in the pie industry, it is also processed into jams, jellies and juice; used as food flavouring and colouring; and its extracts used for industrial products.

The largest commercial users of rhubarb in Canada are processors of pies and pie fillings who often purchase their annual requirements during June and July from wholesalers or food dealers and store it frozen for the rest of the year.

Because rhubarb dehydrates rapidly once harvested, the distance to a freezing facility is an important consideration for growers who plan to contract with a processor. The distance to and the size of the local market are important factors, if growers are considering supplying a fresh market.

Because of its versatility, bulk shipments of individual quick freeze (IQF) rhubarb cut in one inch segments appears to be a product with high market potential.

Food manufacturers often purchase frozen

product in 13.5 kg packages.

The quality requirements of individual markets can vary depending on the end use. As a result, producers and processors need to work closely together to develop quality specifications and identify cultivars to meet the individual markets.

Competition: At one time the United States was a major supplier of fresh and frozen product. Increased processing costs and stiff competition from other producing areas has decreased its competitive edge. North American rhubarb now must compete with Polish product which usually enters the marketplace at a lower price than local product although the quality can be variable.

Presently, Canadian production does not supply the processor's full requirements. The major processor in the region is Sarsfield Foods Inc.⁴ which processes in excess of one million pounds of rhubarb annually. Although its processing plant is located in Kentville, Nova Scotia, products are marketed throughout Canada and, in recent years, sales have expanded into the United States. In the early 1990s the company made a decision to purchase locally and began working with growers to increase the rhubarb acreage in Nova Scotia. It is anticipated that within the next few years all production will be sourced locally.

A number of small processors supply local markets with jam and jelly products as well as pies.

Market considerations: Producers considering growing rhubarb must be prepared to spend significant time researching the market and planning how to access it.

Marketing activities could include:

- making business calls to wholesalers and processors to develop markets;
- providing samples to buyers;
- working with processors to better understand their requirements;
- maintaining contact with existing buyers and developing contacts with prospective buyers;
- assessing and responding to changing consumer demands; and
- dealing with a number of different markets,

each with specific requirements.

Research

Medicinal Uses of Rhubarb: The best known medicinal use of rhubarb was documented in a 1997 University of Alberta study where a daily dose of rhubarb fibre was found to have a cholesterol-lowering effect in men by as much as 15 percent within four weeks. Research now being done on rhubarb has implications on the treatment of a range of chronic and acute illnesses. Therapeutic effects of rhubarb treatment in Asia, as well as in North America, have been observed in chronic renal failure and as an anti-viral agent (herpes simplex virus). A number of animal studies demonstrate the effects of dietary rhubarb on sodium availability, glucose uptake and renal hypertrophy.

Environmental Use Potential: Rhubarb leaves are poisonous because they contain high concentrations of sodium oxalate. A new process has been developed to take the sodium oxalate from rhubarb leaves and use it to degrade chlorofluorocarbons (CFCs). The sodium oxalate breaks down the CFCs, into sodium chloride, sodium fluoride and carbon. Not only can this process reduce the amount of stockpiled CFCs, but it does it without the corrosive by-products and higher costs of other methods. The byproducts themselves are fluorocarbons which have potentially valuable pharmaceutical uses. Sodium oxalate from rhubarb leaves has also been found to be an effective component of a pesticide spray for sucking-insects such as aphids.

Processing

Because limited opportunities exist for fresh product, processing will be essential. Starting as a small cottage industry and expanding over time may be a way to start.

The market potential needs to be established and a profit margin projected before producers commit resources to developing a processing line since high capital investment will be required for equipment..

Freezing Rhubarb⁵: At harvest, the leaves are left in the field and the stalks transported from the field in large tote bins to the processing facility. The stalks are washed as they travel along a conveyer passing under high pressure water sprayers, then

fed to a transverse slicer for cross-cutting into one inch slices.

The cut slices are conveyed into a tank of agitated water for a preliminary wash and are spray rinsed. The washed pieces are run over sorting belts where decayed, cut, and broken pieces are removed.

For longer storage life and packing considerations, steam blanching is recommended. The cut rhubarb is mixed with sugar in the proportion of six parts rhubarb to one part sugar. The mixture is either individually frozen (IQF), put into containers and vacuum-packed, or the sugar-rhubarb mixture is put into containers and plate frozen. Professional advice on the exact process should be sought from the Prince Edward Island Food Technology Centre.

Other factors to be considered are: microbiological testing; nutrition-labeling and using the advice of food scientists to pilot the process before scaling up to a commercial size.

Estimated new equipment costs⁶:

| | |
|-----------------------------------|----------|
| High pressure spray washer | 5,000 |
| Transverse slicer | 3,500 |
| Agitated water wash spray- rinsed | 5,000 |
| Sorting belt (size and colour) | 6,000 |
| Batch blancher (bakery proofer) | 10,000 |
| Trays and racks | 2,000 |
| Batch blast freezer (IQF) | 35,000 |
| Hopper, shaker & scales | 7,000 |
| Vacuum sealer | 12,000 |
| Total | \$85,500 |

Standard packaging is 454 kg. cardboard pallet boxes with plastic liners or 13.5 kg. freezer bags and boxes.

Other processed products should be considered for the same or similar processing venture to help cover the overhead of an investment in equipment.

It is suggested that this crop and its products be considered by a business with a current investment in the production and/or processing capacity and not as a stand-alone venture.

Examples of valued added products⁷:

- pie - rhubarb alone or in combination with other fruit (strawberries);

- muffins and bread products;
- fruit cup: rhubarb and strawberry combination, hot filled into individual 110 g containers;
- jam and jelly; and
- candy-type products.

Products requiring specialized processing:

- alcoholic and non-alcoholic beverages (examples include: sparkling "Alcopop," recently introduced in Australia; and "Rhubarb Rhubarb," a fermented product made in the United Kingdom with lime and thyme)
- herbal extract from Rhubarb root
- food additives, such as: replacement for Ascorbic acid in the production of un-clarified apple juice; bulking material for sausages and cookies; dehydrated powder or paste; flavour enhancing, emulsifyin, homogenizing, and thickening agent; and syrup and ice cream filler
- a source of fibre for further processing; for example, surimi and meat or vegetable protein based products

Human Resources

Labour skills needed for the harvest are the ability to work quickly and efficiently in a physically demanding job. Workers must be able to identify stalks that meet market requirements. Some workers may need tractor and truck driving skills. Typical wage rates are in the range of \$6 to \$8 per hour.

The availability of labour could be an issue. The need for a large number of harvest labourers for a short but critical period of time has often been a concern for other agricultural businesses. If the farm grows another crop that needs a similar labour force just prior to, or after, the time when the crew is needed for rhubarb, the two crops could complement each other.

In addition to the base pay, labour costs include the employer's contributions to Canada Pension Plan (CPP) and Employment Insurance (EI). While participation in the Worker Compensation

Plan (WCP) is optional for workers involved in primary production, an employer should consider WCP coverage. The costs for vegetable farm workers under WCP is currently \$3.78 per \$100 of payroll.

The standard management skills necessary in all small businesses are needed by the manager of a rhubarb enterprise. For further information on this topic, see [CFBMC Canadian Framework for Effective Farm Business Management Practices](#), available from the Canadian Farm Business Management Council.

Regulatory Issues

There are no regulatory issues that apply specifically to rhubarb. A prospective investor should be aware of a number of Acts which apply to agriculture.

Pesticides Control Act - Anyone wishing to purchase and/or apply any pesticides, with the exception of domestically labelled products, must be certified under this Act.

Environmental Protection Act - Anyone planning to irrigate or to draw water from a watercourse or well must have a permit under this Act. Also, if a stream crossing is required to access a field or property, a permit must be obtained under this Act.

Roads Act - Anyone who intends to install a new highway access or to change an existing access to a field requires a permit under this Act.

Canada Agricultural Products Act - Anyone planning to market fresh produce inter-provincially must be in compliance with this federal Act with respect to grades and standards.

Food and Drug Act - Anyone selling rhubarb should be concerned with this Canada Act with respect to agricultural chemical residues, food additives, labelling and processing.

Occupational Health and Safety Act - At the present time, farming operations which are located on property that qualifies for a farm assessment under the *Real Property Assessment Act* are not subject to the requirements of the Occupational Health and Safety Act and Regulations. However, the Act and Regulations can provide excellent guidance on worker health and safety issues.

Manure Spreading Guidelines - While not covered by an act or regulations, guidelines have been established in *Guidelines for Manure Management for Prince Edward Island* published in 1999.

Development Costs

Development costs include land, land improvements, buildings, and machinery.

The cost of land will depend on the location and circumstances of the existing business. If rhubarb is a secondary enterprise to an established farm, the only cost is the investment cost associated with owning the land. On the other hand, if land must be purchased, the capital cost will probably vary from \$2,500 to \$10,000 per hectare, depending on a number of factors. Because of the wide range of potential scenarios, land costs have not been included in the costs shown in Table 2. This cost would be included in a business plan.

Land improvement costs are generally limited to the initial preparation of the land for planting and an application of glyphosate (Round-Up) for weed control. These costs are included in Table 3.

A building may be needed on-site for handling product for the fresh market. A water source will be needed for washing the product.

Machinery and equipment needs are listed in Table 2. The costs shown are for the purchase of new equipment; costs for used equipment would be less.

If the rhubarb enterprise is added to an existing farm no additional investment in machinery may be required.

Potential Returns and Expenses

There is little existing information on the returns and expenses for rhubarb production on Prince Edward Island. Prospective growers must be prepared to research and carefully estimate start-up costs, operating expenses and market prices. The time required from planting until the crop

revenue begins is two years. Details are shown in Table 3.

As with other crops, key factors to profitability will be prices for product, yield, and quality, as well as controlling investment costs.

The budgets presented combine costs derived from basic crop recommendations and producer information meetings.

The budget in Table 1 is for an established crop.

Table 1

| Established Rhubarb | | | |
|------------------------------|----------------|-------------|-----------------------|
| Income | | | |
| | Yield kg/ha | Price \$ | Income \$/hectare |
| Processing | 27500 | 0.45/kg | 12,400 |
| Direct Expenses | | | |
| | Units | Price \$ | Expense \$/hectare |
| Fertilizer | | | |
| 12-24-24 | 1250 kg | 0.40/kg | 500 |
| 34-0-0 | 450 kg | 0.40/kg | 180 |
| Labour | | | |
| weeding | 12.5/hr | 8.00/hr | 100 |
| harvesting | 27500 kg | 0.15/kg | 4125 |
| Trucking | 27500 kg | 0.07/kg | 1925 |
| Total Direct Expenses | | | \$6,830 |
| Contribution Margin | | | \$5,570 |

Table 2 indicates requirements for machinery and buildings and are listed as estimated costs. Current availability of these items will influence start-up costs. In the budgets, the costs of start-up have been minimized by opting for some custom work. Building and cooling facility requirements will be determined by the scale of operations and the distance to markets.

Table 2

| Machinery and Buildings | |
|---|-----------------|
| Potential Requirements (at cost) | |
| Tractor (45 hp) | \$ 24,000 |
| Fertilizer spreader (3 pt) | 900 |
| Harrows | 800 |
| Wagons (2) | 3,300 |
| Tote boxes (8) | 440 |
| Pallet Jack | 600 |
| Truck | 20,000 |
| Building / Cooling Facility | 15,000 |
| Misc. Handling equipment | 2,500 |
| Total | \$67,540 |

The budget in Table 3 illustrates some of the basic expenditures in establishing and growing one acre of rhubarb.

Table 3

| Rhubarb Establishment | | | | | | |
|---|-----------------------------|----------------------------------|---------------------------------|----------------------------------|----------------------------------|----------------------------------|
| Years to Full Production | | | | | | |
| | <u>Land</u> <u>Prep.</u> | <u>Year 1</u> <u>Planting</u> | <u>Year 2</u> <u>Growing</u> | <u>Year 3</u> <u>1st Crop</u> | <u>Year 4</u> <u>2nd Crop</u> | <u>Year 5</u> <u>3rd Crop</u> |
| Income | | | | | | |
| Yield (kg/hectares) | 0 | 0 | 0 | 17,500 | 22,500 | 27,500 |
| Price (\$/kg) | <u>\$0.00</u> | <u>\$0.00</u> | <u>\$0.00</u> | <u>\$0.45</u> | <u>\$0.45</u> | <u>\$0.45</u> |
| Total Income | \$0 | \$0 | \$0 | \$7,875 | \$10,125 | \$12,375 |
| Direct Expenses | | | | | | |
| Rhubarb roots (12,500 @ \$1) | | 12500 | | | | |
| Lime (5t bagged price) | 512 | | | | | |
| Manure (37.5 t @ \$15 spread) | 562 | | | | | |
| Fertilizer - spring | | 500 | 500 | 500 | 500 | 500 |
| - summer | | | 180 | 180 | 180 | 180 |
| Herbicides - Roundup in the fall | 50 | | | | | |
| Hired Labour : | | | | | | |
| - planting (75 hrs @ \$8.00) | | 600 | | | | |
| - hand weeding (12.5 hrs @ \$8.00) | | 100 | 100 | 100 | 100 | 100 |
| - harvesting (by weight @ \$0.15) | | | | 2625 | 3375 | 4125 |
| Custom work : | | | | | | |
| - plow | 50 | | | | | |
| - disc (2 times) | | 75 | | | | |
| - harrow (2 times) | | 60 | | | | |
| - spraying | 37.5 | | | | | |
| - transportation (by weight @\$0.07) | _____ | _____ | _____ | <u>1225</u> | <u>1575</u> | <u>1925</u> |
| Total Direct Expenses | \$1,212 | \$13,835 | \$780 | \$4,630 | \$5,730 | \$6,830 |
| Contribution Margin | (\$1,212) | (\$5,527) | (\$301) | \$1,349 | \$1,758 | \$2,218 |
| <p>This budget is provided as a guideline only. Interested growers must develop their own set of figures for business planning purposes. The Contribution Margin must provide funds for interest, overhead and other indirect expenses as well as for living expenses, loan repayments and future investment in the business. In this budget, a negative Contribution Margin indicates the need for additional income or financing during the establishment period.</p> | | | | | | |

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Key Management Issues⁸

If you continue to investigate this agricultural business opportunity, it is essential that you are able to answer the following questions concerning production, marketing and management.

Planning - Are you prepared to develop a complete business plan for a rhubarb enterprise and to test this plan on a scale that you can afford?

Knowledge - Are you prepared to learn all you can about rhubarb production and marketing by visiting existing operations, attending workshops and reading all you can about production and marketing?

Markets - Have you clearly defined the market(s) and the buyer(s)? Have you clearly defined the marketing activities for each specific market segment?

Production - Have you clearly defined the production practices you will need to implement in order to produce the quality of product required by your markets?

Time - Are you aware of the amount of time you will have to devote to continuously marketing your product and improving your production performance?

Costs - Are you aware of the resources required to establish a rhubarb enterprise and the returns that can be expected?

Risk - Are you prepared to take the risks associated with rhubarb production?

Resources

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Farm Business Management

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Canada/Prince Edward Island Business Services Centre

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Atlantic Canada Opportunities Agency - PEI

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Agriculture and Agri-Food Canada

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Business Planning for Agriculture Ventures

1-888-322-2728
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Vegetable Crops - Guide to Pest Management

- Publication 1400A
Agdex 250

The Rhubarb Compendium -

<http://www.clark.net/pub/dan/rhubarb/rhubarb.htm>

Sources of Information

Vegetable Production Guide for the Atlantic

Provinces - Publication 1400, Agdex 250

Endnotes

1. Nutraceutical- a food or food ingredient which has health benefits
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