The Demand for Tray Grown Processing Tomato Transplants

and the

Financial Viability of Producing them Domestically

Commissioned by the Ontario Seedling Growers Marketing Board

1987

H. Vander Pol
# Table of Contents

- Executive Summary .................................................. 1
- Table 1 ......................................................................... 2
- Introduction ................................................................. 4
- Statement of Purpose ..................................................... 6
- Analysis .......................................................................... 7
  - The Market .................................................................... 7
- Investment Analysis ....................................................... 15
  - Alternative A ............................................................. 16
  - Alternative B ............................................................ 18
  - Alternative C ............................................................ 19

## Appendix

- Alternative A .............................................................. 21
- Alternative B .............................................................. 27
- Alternative C .............................................................. 31
- Questionnaire ............................................................. 36
This project was undertaken to assess the demand for and
the viability of producing tray grown tomato transplants in Ontario
to replace the traditional southern grown transplant as a source
of plants for Ontario processing tomato growers.

The survey of a selected cross-section of tomato growers and
processors who had an opportunity to use this type of transplant
in 1987 clearly indicates that a large potential market exists
for domestically grown tray plants, provided the quality standards
can be maintained at levels that currently exist. The enthusiasm
expressed, almost without reservation, would indicate that provided
sourcing can be achieved, a significant amount of the several million
dollars worth of annual imports can be replaced in the near future.

Sourcing of transplants domestically will depend on the development
and construction of facilities which currently are not available in
sufficient quantity to have a meaningful impact on supply.
Table 1

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity of 1000's of plants</td>
<td>1,100</td>
<td>4,200</td>
<td>12,600</td>
</tr>
<tr>
<td>Capital Investment</td>
<td>62,100</td>
<td>225,500</td>
<td>512,000</td>
</tr>
<tr>
<td>Variable Cost/1000 plants</td>
<td>5.36</td>
<td>4.97</td>
<td>4.60</td>
</tr>
<tr>
<td>Contribution to capital cost per 1000 plants</td>
<td>15.70</td>
<td>16.09</td>
<td>16.46</td>
</tr>
<tr>
<td>Payback Period in Years</td>
<td>4.21</td>
<td>3.74</td>
<td>2.88</td>
</tr>
<tr>
<td>Present Value of the 8 year Earnings Stream</td>
<td>74,700</td>
<td>301,991</td>
<td>887,761</td>
</tr>
</tbody>
</table>

The financial viability of investment in such facilities is highlighted in Table 1 which depicts three possible investment scenarios (Alternatives A, B, and C) and their most likely outcomes. Willingness to invest in potential new projects such as these is a function of the individual's alternative investment opportunities and his assessment of the risk benefit trade-off. The transplant production units depicted by alternatives A and B on a stand-alone basis do not meet what can be considered acceptable levels of return. They do lend themselves to becoming part of an integrated tomato production unit which can maximally be expected to achieve...
Alternative C appears to be the only one that has the opportunity of becoming a "stand-alone" investment opportunity. To put a unit the size of alternative C in perspective it is noteworthy to indicate that 20 units of this size could and would supply the total requirements for transplants generated by the Ontario processing tomato industry.
For many years the Canadian processing tomato industry has relied almost exclusively on the southern states of the U.S. (Georgia and North Carolina) as its source of supply for transplants. Ontario imports 5 to 6 million dollars worth of tomato transplants annually from these sources. In addition, a significant quantity of other types of vegetable transplants such as peppers, cabbage, and cauliflower are also sourced from the south.

This study was initiated to quantify the market for, and the economics of growing a substantial number of these transplants domestically using high density plug plant technology similar to what has been developed and is being used in the Great Lakes states, most notably Michigan and Ohio.

A significant amount of work by numerous researchers has gone into the adaptation of this technology for our Canadian conditions and climate. This work has involved itself with the growing of the plants, and the mechanical transplanting of this type of plant.
viability and the acceptance of the product produced by this new system of producing tomato transplants.
STATEMENT OF PURPOSE

The purpose of this study is twofold:

(1) To establish the acceptability of plug plants as an alternate source of transplants for the commercial processing tomato grower.

(2) To evaluate the economic viability of three different sized transplant growing facilities given that there is a market for the product.
By virtue of the dual purposes expressed above, this analysis will have two separate and distinct components to it. First, it will deal with the acceptability of the product that will be produced in the facilities that will be evaluated in the second portion of this study.

THE MARKET

In order to appraise the marketability of tray grown tomato transplants, a survey was undertaken by telephone and personal interview by the author contacting over 50% of the known users of plug transplants in 1987. These tomato growers obtained their plants from a number of different domestic sources. The 1987 crop year was the first tomato growing season that a significant number of tomato growers had an opportunity to use this type of plant in their operations. It was felt essential to contact as many of these users as possible to get their reactions to the product, and in the process establish what the market for such a product might be given that the competition is the dry root southern grown transplant which is at the moment the only alternative product that appears likely to be
In Ontario, the industry's processors are an integral part of the the sourcing process for tomato transplants. Historically, processors, by industry-wide agreement, have taken on the responsibility of contracting in the south for transplants, providing transportation to Ontario and distributing them to growers. Additionally, they have taken on the obligation of financing these activities until sufficient tomatoes are delivered to deduct these costs from the tomato grower's account. This system has evolved for many reasons, not the least of which has been the necessity for continuity and security of supply.

Because of this intimate involvement by the processors in the procurement of transplants it was felt necessary to obtain as representative an opinion as possible, from this component of the industry, with regard to their assessment of this potential new alternative source of transplants. To do this, the processors who were known to have utilized plug plants to some degree in 1987 were interviewed in a fashion similar to the tomato growers previously interviewed to.
The surveys were conducted during the late summer and early fall of 1987. Tomato growers who grew their own transplants were excluded from the survey, because it was felt by the steering committee that commissioned this study that the likely further development of a transplant growing industry in Ontario would focus primarily on commercially sized transplant growers, who have as their business objective the growing and sale of transplants to vegetable growers.

The tomato growers interviewed, without exception, were enthusiastic about the domestic product when comparing it to the competition, which is the southern produced bare root transplant. In spite of this enthusiasm, it is fair to say that as in any system where a product is bought and sold, the potential buyers expressed concern that they have an opportunity to buy "quality" plug plants. The message to potential domestic plug plant growers clearly is that in order for them to be successful they must consistently produce a uniformly high quality transplant. The technology is available to do this and any compromise of this objective will without question seriously affect the long-term potential of this potential new industry.
The viability of a future dryland industry in southern Australia depends on its currently perceived ability to produce a superior product. The objective must be to turn this perception to a long-term reality.

The processing tomato growers interviewed were most enthusiastic about the better plant stands achieved with plug plants. The cost savings accruing from the elimination of the need to strip small plants of green tomatoes as is the case with many southern transplants also being a significant consideration. Most tomato growers felt strongly about the savings that result from the elimination of the need to sort and grade plug plants as compared to southern plants.

Some tomato growers feel that this component of the transplanting activity can add up to as much as 30% of the total labour cost in traditional transplanting operations.

Tomato growers interviewed expressed delight at how their labour force accepted the plug plants. Almost with exception, employees much preferred planting plug plants over southern dry root plants. There was a variance of opinion as to whether or not plug plants could be planted more quickly. This varied is evidently
of experience the grower has had with plug plants and his willingness to adapt and adjust his conventional planting equipment to accommodate plug plants. All growers interviewed are attempting to use conventional transplanters during this exposure phase of the industry’s development. In order that the full benefits of the plug plants be realized it will be necessary that the buyers of these plug plants avail themselves of the new planting technology that is available commercially. The obvious ultimate goal must be fully automated transplanting. This goal is not unrealistic and should be achievable in the foreseeable future; however, in the short and intermediate term tomato growers have an opportunity to acquire transplanters designed specifically for plug plant transplanting operations. These transplanters will reduce the labour input required for the transplanting function by at least 50%, thus accruing significant savings to tomato growers. More important though, is the reduction in the number of people required to perform this operation, from two per row to only one, thereby reducing the need for this type of short-term seasonal employee, which is often
On the question of competitive values and price, tomato growers appear willing to pay premiums at least equal to those in position at this time for domestic ground bed grown plants. The question that obviously remains is, will they continue to pay a price similar to 1987 prices if the price of southern transplants declined significantly? To obtain a meaningful answer to this question it will be necessary, it appears, to have a significantly better assessment of the reliability of supply and predictability of quality of plug plants. If plug plant growers produce consistently high quality plants it is not unreasonable to expect tomato growers to be willing to compensate their suppliers for this quality and predictability of supply at premium levels higher than what is currently the case.

When tomato growers were asked if they would continue to use and in fact increase the use of plug plants if a reliable quality source was available, they responded very affirmatively. Therefore, it is abundantly clear that Ontario processing tomato growers who used plug plants in 1987, in general, are very anxious to expand their use of these plants in the future. They spoke of using plug
It is recognized that as in all surveys there could be and most certainly is room for some variation in interpretation of responses to individual questions; however, in this case it appears that a strong case can be made for minimum chance of this occurring, primarily because of the use of follow-up questioning during the interviews. Also the sample was sufficiently large to achieve a high degree of comfort that the conclusions drawn are in fact appropriate.

It is clear that there is a significant potential market for "quality" tray grown transplants, whether these are sourced domestically or imported will depend on whether the domestic plant grower can be competitive on quality, timeliness and price. It is this challenge that mandated the second component of this study.

As previously stated, Ontario tomato processors are an integral part of the transplant procurement process. There is every reason to believe that they intend to continue to play a similar role in the future. As a matter of fact this desire to remain involved
The objective as an industry is clear and must be recognized when assessing the future development of the industry.

Representatives of the processing industry were as enthusiastic as were tomato growers about the potential of plug plants; however, they expressed a concern about the rate of adaptation the industry should embark on. Several processors expressed concern that a cautious approach to growth in volume of domestically produced plug plants be adopted, citing the need to develop experienced plant growers as well as the need to develop a system of producing "insurance" plants in case of a disaster in the tomato fields after the plants have been transplanted. Others expressed a need for further "adaptation" work in the handling and transporting and storage of plants on the tomato growers farms.

The final concern expressed was the financial impact of changing sources. This concern relates to the recovery of potential processor revenue foregone by sourcing domestically. This concern and the impact of it must be worked out among industry representatives and
From a market perspective then, it is abundantly clear that a
large enough potential market exists for quality domestically grown
tomato transplants. There is sufficient enthusiasm among the
potential customers (both processors and tomato growers) to actively
pursue the determination of the economic viability of producing
such transplants commercially in Ontario.

INVESTMENT ANALYSIS

The economic analysis that follows were all done on the basis
of total investment, no consideration was given to the possibility
of utilizing existing facilities for all or part of the plant
growing process. Obviously, using resources already in place would
change the payback and present value analysis depending on what values
are attached to existing facilities or the use of them. Where possible
actual cost data was used in the analysis; where this was not possible
extrapolations were done to approximate the most likely costs and
revenues using Alternative B information as a base line.
This alternative was sized to satisfy the needs of what is likely to be a very limited clientelle, in as much as most industry representatives expressed a desire to have their transplant growing done by commercial transplant growers. However, because there was some interest in determining the economics of what is essentially a vertically integrated unit, that is, a tomato grower who grows his own transplants - 1,000,000 plants will provide sufficient plants for a tomato grower growing approximately 100-115 acres (40 - 45 hectares) of processing tomatoes, which is a commercially viable unit. Because of this it was felt that this alternative would provide useful information as a reference for this type of potential transplant grower as well as for an analysis of the economics of scale that appear to be inherent in this industry.

Alternative A requires a forecasted investment of $62,000.00 to produce 1.1 million tomato plants annually in 288 plug trays.

The projected variable cost of producing these is $5.36 per thousand plants with a contribution to fixed costs at $15.70 

Demand at 1977 selling price of $2.10 is 100%...
A breakdown of costs appears in the appendix of this study. The contribution to fixed costs allows for a payback period of 4.21 years and a present value of eight year earnings stream of 1.20 times the initial investment using a 12% per annum discount factor.

On the basis of these measures the investment is not attractive or acceptable by traditional investor standards. A case can be made however that when combined with the benefits that accrue from the adaptation of new transplanting technology and the subjective benefits of reduced labour requirements and greater control over one's enterprises it can be argued that synergy may exist to the extent that these levels of payback and present value may in fact be acceptable to potential investors in transplant growing facilities for captive plant production.

As the rest of the analysis will show, Alternative A is the least attractive from an investment point of view, in fact, as a stand-alone investment it appears to be unacceptable; however, it opens a window on the economics of scale that potentially exist and that must be taken advantage of if this industry is to be competitive.
Alternative B

As an intermediate step between the small Alternative A and commercially sized Alternative C, Alternative B was analyzed. A detailed look at this alternative clearly indicates that as a commercial unit it lacks the volume necessary to fully exploit the benefits that could accrue from the upfront overhead manifest in the form of fixed costs that are necessary for this size of operation. Alternative B can produce plants for a slightly lower variable cost i.e., $4.97 per 1000 versus $5.36 for Alternative A with the resultant marginally higher contribution to fixed cost per 1000 now totalling $16.09. However, even though the total investment cost per 1000 plants produced is lower than in Alternative A ($56.45/1000 plants for Alternative A versus $53.57/1000 plants for Alternative B) the level of investment and level of contribution to fixed cost of this Alternative still don't appear to be attractive enough from an investment point of view. A payback period of 3.74 years and a payback value of 5.14 from the cash-in after 5 years.
investment interest. It appears that in order to in fact attract investment interest the industry will have to focus on units larger than the one depicted in Alternative B. There may however be a limited demand for this size of unit as a component of a very large processing tomato production system in a manner similar to the possibilities presented for Alternative A, except that in this instance the size of the tomato production unit would have to be one that would require 3.5 to 4.0 million transplants annually. This would be a tomato grower using high density transplanting i.e. 13,000 to 14,000 plants per acre growing 250 to 275 acres (100 to 110 hectares annually).

There are very few operations of this size currently in existence in Ontario.

Alternative C

As a final alternative the economics of a large transplant growing operation was analysed. Alternative C is sized to produce 12,600,000 plants annually. On the basis of the projected costs and revenues for an operation of this size it appears possible that, given the current...
In order to make a decision, one should be aware of potential risk factors in the projected earnings stream to attract investment capital if there is a market available for the products to be produced. A payback period of 2.88 years and a present value of the 8 year earnings stream of 1.73 times the initial investment given the risks that are identifiable should meet the investment criteria of sufficient potential new investors.

One significant consideration not provided for in this analysis is the availability of capital for a project of this magnitude. Alternative C will require access to close to 600,000 dollars for capital and operating purposes. This level of financial commitment obviously will require some form of term commitment from the potential customers for the product to be produced; these commitments would and should be subject to normal performance limits; however, since any facilities constructed would have limited alternative uses, it would appear essential that some type of term agreement should form an integral part of any development in this direction.
Alternative A is designed and sized to grow a total of 1.1 million plug transplants in 288 trays.

This will require a greenhouse of approximately 8000 square feet.

Estimated Capital Costs

A. Growing Area

2, 135' x 30' self standing greenhouses $24,750.00
heating equipment for above 2,500.00
watering (manual) 500.00
racks to set plug trays on 3,750.00
trays 4,000 at .65 2,600.00

Total 34,100.00

B. Header House

building 10,000.00
electrical 5,000.00
water & heating 1,000.00
germination facility 6,000.00

Total 22,000.00

C. Seeding Equipment

seeder 2,000.00
conveyors, skids, supplies 1,000.00

Total 3,000.00

D. Land

Total 3,000.00

Total Estimated Capital Costs $62,100.00
Cost of Production per 1,000 Plants for 1,100,000 Plants per Year

<table>
<thead>
<tr>
<th>Labour</th>
<th></th>
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<tbody>
<tr>
<td>Install and remove plastic</td>
<td>$ .04</td>
</tr>
<tr>
<td>Preparing, seeding and setting</td>
<td>.80</td>
</tr>
<tr>
<td>Growing Crop</td>
<td>1.25</td>
</tr>
<tr>
<td></td>
<td>2.09</td>
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</table>

<table>
<thead>
<tr>
<th>Inputs</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>soilless mix and vermiculite</td>
<td>.65</td>
</tr>
<tr>
<td>fertilizer</td>
<td>.06</td>
</tr>
<tr>
<td>fungicide</td>
<td>.04</td>
</tr>
<tr>
<td>water</td>
<td>.13</td>
</tr>
<tr>
<td>seed (open pollinated)</td>
<td>.56</td>
</tr>
<tr>
<td>heat</td>
<td>.92</td>
</tr>
<tr>
<td>electricity</td>
<td>.16</td>
</tr>
<tr>
<td>insurance</td>
<td>.18</td>
</tr>
<tr>
<td>property taxes</td>
<td>.00</td>
</tr>
<tr>
<td>plastic, 3 yrs. expected life</td>
<td>.31</td>
</tr>
<tr>
<td>plastic plug trays</td>
<td>.26</td>
</tr>
<tr>
<td></td>
<td>3.27</td>
</tr>
</tbody>
</table>

Total Variable Costs: $5.36

Expected Revenue 21.06 per 1,000 plants
Less: Variable Costs 5.36

Contribution to Fixed Cost $15.70
Notes on Financial Analysis

Cost of Production

Labour

Labour inputs for this alternative have been adjusted from the 4,200,000 plant alternative actuals, to reflect expected added costs due to the lack of economies of scale.

Inputs

The slightly higher insurance and plastic costs per 1000 plants reflect the higher investment per 1000 plants as well as the additional space required to utilize manual watering of the trays.
CASH FLOW ANALYSIS

BASIS  |  GROW  |  1,100,000
       | CONTRACT |  1,000,000
       | SELL    |  1,000,000
       | CO-DP   |   100,000

Income

1,000,000 plug plants @ 21.06  $21,060.00
1,000 @ 10.50  1,050.00

22,100.00

Expenses

1,100,000 plug plants @ 5.36  5,896.00

$16,204.00

Adjustments to Cash Flow for Payback and Net Present Value Calculations

1. Effective income tax rate - 25%
2. Federal investment tax credit - 5% (1987)
3. Depreciation for tax purposes 20% declining balances

* It is assumed that 10% more plants will be grown than constructed, on an option basis, or whenever an option or a generator...
Payback period non discounted and tax adjusted is 4.21 years.

Present Value of the 8 year earnings stream is $74,700 calculated on the basis of 6% discount rate for year 1 and 12% for each subsequent year. It is assumed that the useful life of the overall investment can be expected to be 8 years. No salvage value has been assumed.

The present Value is 74,700

\[ \frac{74,700}{62,100} = 1.20 \] times the initial investment

The federal income tax credit in year 1 assumes that the investor will have sufficient other taxable income to take full advantage of this credit. If this is not the case, the unused credit can be carried forward; if this is necessary, minor variations in the present value calculations will occur.

For purposes of this analysis, it was assumed that the full 20% depreciation rate could be applied in year 1 even though federal income tax law only allows 1/2 the regular rate in year 1. The justification for taking this approach lies in the difficulty of quantifying the effect of construction timing and tax year end timing and the impact of these on depreciation allowances. It may well be that the 1/2 allowance can be charged against other income in year (-1) if this project is an adjunct to another profitable business.
Cost of Production per 1,000 Plants for 4,200,000 Plants per Year

Labour

- Install and remove plastic $ .04
- Preparing, seeding and setting $ .72
- Growing Care $ 1.00
- $ 1.76

Inputs

- soilless mix and vermiculite $ .65
- fertilizer $ .06
- fungicide $ .04
- water $ .13
- seed (open pollinated) $ .56
- heat $ .92
- electricity $ .16
- insurance $ .15
- property tax, 1987 onward $ .00
- plastic, 3 yrs. expected life $ .28
- plastic plug trays $ .26
- $ 3.21

Total Variable Costs: $ 4.97

Expected Revenue 21.06 per 1000 plants
Less: Variable Costs 4.97

Contribution to Fixed Cost $16.09
Alternative B is designed to grow a total of 4,200,000 plants in 288 trays.

Estimated Capital Costs

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Growing Area</td>
<td></td>
</tr>
<tr>
<td>Greenhouse, gutter connected multi-bay</td>
<td>$95,000.00</td>
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<tr>
<td>24,000 sq. ft.</td>
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<tr>
<td>heating</td>
<td>9,000.00</td>
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<tr>
<td>watering equipment (automatic)</td>
<td>15,000.00</td>
</tr>
<tr>
<td>racks</td>
<td>15,000.00</td>
</tr>
<tr>
<td>plug trays</td>
<td>11,000.00</td>
</tr>
<tr>
<td></td>
<td>145,000.00</td>
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<tr>
<td>B. Header House</td>
<td></td>
</tr>
<tr>
<td>Building</td>
<td>18,000.00</td>
</tr>
<tr>
<td>electrical</td>
<td>12,000.00</td>
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<tr>
<td>water &amp; heating</td>
<td>14,000.00</td>
</tr>
<tr>
<td>germination facility</td>
<td>10,000.00</td>
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<tr>
<td></td>
<td>54,000.00</td>
</tr>
<tr>
<td>C. Seeding Equipment</td>
<td></td>
</tr>
<tr>
<td>seeder</td>
<td>9,000.00</td>
</tr>
<tr>
<td>tray filling and watering</td>
<td>9,500.00</td>
</tr>
<tr>
<td>misc., skids</td>
<td>3,000.00</td>
</tr>
<tr>
<td></td>
<td>21,500.00</td>
</tr>
<tr>
<td>D. Land</td>
<td></td>
</tr>
<tr>
<td></td>
<td>250,000.00</td>
</tr>
</tbody>
</table>
Notes on Financial Analysis

Cost of Production

Labour

Labour inputs are actual experience in terms of real time 1986-87 at expected industry rates. i.e. 7.25 for installing and removing plastic and 6.00/hr. for seeding and 8.00/hr. for growing.

Inputs

Input costs per 1000 plants reflect actual experience with the exception of the plastic plug tray assessment which was calculated in the following manner.

4 trays/1000 plants = 2.60 = 0.26/yr. for 10 years
## CASH FLOW ANALYSIS

<table>
<thead>
<tr>
<th>BASIS</th>
<th>PLANT</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>GROW</td>
<td>4,200,000</td>
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<tr>
<td>CONTRACT</td>
<td>3,800,000</td>
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<td>SELL</td>
<td>4,000,000</td>
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<tr>
<td>CO-OP</td>
<td>200,000</td>
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</tbody>
</table>

### Income

- 4,000,000 plug plants @ 21.06 $84,240.00
- 200,000 @ 10.50 $2,100.00

**Total Income:** $86,340.00

### Expenses

- 4,200,000 plug plants @ 4.97 $20,874.00

**Total Expenses:** $20,874.00

For the applicable adjustments to cash flow see explanations given under Alternative A.
<table>
<thead>
<tr>
<th>Year</th>
<th>Cash Flow</th>
<th>Deprec'n</th>
<th>Taxable Cash Flow</th>
<th>Income Tax</th>
<th>Adjusted Cash Flow</th>
<th>Discounted Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>65,466</td>
<td>44,100</td>
<td>21,366</td>
<td>(5,684)</td>
<td>71,150</td>
<td>67,094</td>
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<tr>
<td>2</td>
<td>65,466</td>
<td>35,280</td>
<td>30,186</td>
<td>7,546</td>
<td>57,920</td>
<td>48,774</td>
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<td>3</td>
<td>65,466</td>
<td>28,224</td>
<td>37,242</td>
<td>9,310</td>
<td>56,156</td>
<td>42,205</td>
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<td>4</td>
<td>65,466</td>
<td>22,579</td>
<td>42,887</td>
<td>10,721</td>
<td>54,745</td>
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<td>5</td>
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<td>18,063</td>
<td>47,043</td>
<td>11,760</td>
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<td>6</td>
<td>65,466</td>
<td>14,450</td>
<td>51,016</td>
<td>12,754</td>
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<td>7</td>
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<td>8</td>
<td>65,466</td>
<td>9,248</td>
<td>56,218</td>
<td>14,054</td>
<td>51,412</td>
<td>21,913</td>
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Payback period non discounted and tax adjusted is 3.74 years.

Present Value of the 8 year earnings stream is $301,991 calculated on the basis of 6% discount factor for year 1 and 12% for subsequent years. If it is assumed that the useful life of the investment as a whole is 8 years, and no salvage value is assumed, the Present Value of the investment is:

\[ \frac{301,991}{225,500} = 1.34 \text{ times the initial investment} \]

The federal income tax credit in year 1 assumes that the investor will have sufficient other taxable income to take full advantage of this credit. If this is not the case, the unused credit can be carried forward; if this is necessary, minor variations will occur in the present value calculation. The payback period will not be affected.

For purposes of this analysis, it was assumed that the full 20% depreciation rate could be applied in year 1 even though federal income tax law only allows 1/2 the normal rate of depreciation in the first year. The justification for taking the above approach in this analysis is that more than likely a significant portion of the first year's depreciation could be assessed against year (-1) at least until tax reform is consumated. The usefulness of this approach lies in the assumption that a transplant growing operation of this size is an adjunct to another profitable business.
Alternative C is designed and sized to grow 12,600,000 transplants in 288 trays using approximately 72,000 sq. ft. of greenhouse space.

Estimated Capital Costs

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A. Growing Area</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Greenhouse, gutter connected multi-bay</td>
<td>$266,000.00</td>
</tr>
<tr>
<td></td>
<td>heating</td>
<td>25,000.00</td>
</tr>
<tr>
<td></td>
<td>watering equipment (automatic)</td>
<td>45,000.00</td>
</tr>
<tr>
<td></td>
<td>racks</td>
<td>45,000.00</td>
</tr>
<tr>
<td></td>
<td>plug trays</td>
<td>33,000.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>414,000.00</strong></td>
</tr>
<tr>
<td><strong>B. Header House</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Building</td>
<td>18,000.00</td>
</tr>
<tr>
<td></td>
<td>electrical</td>
<td>12,000.00</td>
</tr>
<tr>
<td></td>
<td>water &amp; heating</td>
<td>14,000.00</td>
</tr>
<tr>
<td></td>
<td>germination facility</td>
<td>10,000.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>54,000.00</strong></td>
</tr>
<tr>
<td><strong>C. Seeding Equipment</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>seeders</td>
<td>18,000.00</td>
</tr>
<tr>
<td></td>
<td>tray filling and watering</td>
<td>9,500.00</td>
</tr>
<tr>
<td></td>
<td>misc., skids</td>
<td>6,500.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>34,000.00</strong></td>
</tr>
<tr>
<td><strong>D. Land</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>50,000.00</strong></td>
</tr>
</tbody>
</table>
Cost of Production per 1,000 Plants for 12,600,000 Plants per Year

---

**Labour**

- Install and remove plastic: $0.04
- Preparing, seeding and setting: $0.60
- Growing Care: $0.85
- **Total:** $1.49

---

**Inputs**

- Soilless mix and vermiculite: $0.65
- Fertilizer: $0.06
- Fungicide: $0.04
- Water: $0.13
- Seed (open pollinated): $0.56
- Heat: $0.85
- Electricity: $0.16
- Insurance: $0.12
- Property tax, 1987 onward: $0.00
- Plastic, 3 yrs. expected life: $0.28
- Plastic plug trays: $0.26
- **Total:** $3.11

---

**Total Variable Costs:** $4.60

---

Expected Revenue 21.06 per 1000 plants
Less: Variable Costs 4.60

**Contribution to Fixed Cost:** $16.46
Notes on Financial Analysis
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Cost of Production
-------------------

Labour
------

Labour inputs are actual experience in terms of real time 1986-87 (basis 4.2 million plants) adjusted for expected economies of scale.

Inputs
------

Input costs per 1000 plants reflect actual experience adjusted for incremental volume (basis 4.2 million plants) with the exception of plastic tray assessment which is on the same basis.
### CASH FLOW ANALYSIS

<table>
<thead>
<tr>
<th>BASIS</th>
<th>$</th>
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</thead>
<tbody>
<tr>
<td>GROW</td>
<td>12,600,000</td>
</tr>
<tr>
<td>CONTRACT</td>
<td>11,400,000</td>
</tr>
<tr>
<td>SELL</td>
<td>12,000,000</td>
</tr>
<tr>
<td>CO-OP</td>
<td>600,000</td>
</tr>
</tbody>
</table>

**Income**

- 12,000,000 plug plants @ 21.06 per 1000 plants: $252,720.00
- 600,000 @ 10.50 per 1000 plants: $6,300.00

**Expenses**

- Total: $57,960.00

**Expected Net Cash Flow before income tax:** $201,060.00

For purposes of analysing Alternative C cash flow it is assumed that, in fact, this venture stands completely on its own merit for investment and tax purposes and thus only 1/2 the normal rate of depreciation will be assessed in year 1. All other assumptions are consistent with those used in Alternatives A and B.
<table>
<thead>
<tr>
<th>Year</th>
<th>Cash Flow</th>
<th>Deprec.</th>
<th>Taxable Cash Flow</th>
<th>Income</th>
<th>Adjusted Cash Flow</th>
<th>Discounted Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>201,060</td>
<td>51,200</td>
<td>149,860</td>
<td>11,865</td>
<td>189,195</td>
<td>178,410</td>
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<tr>
<td>2</td>
<td>201,060</td>
<td>90,360</td>
<td>110,700</td>
<td>27,675</td>
<td>173,385</td>
<td>146,007</td>
</tr>
<tr>
<td>3</td>
<td>201,060</td>
<td>72,288</td>
<td>128,772</td>
<td>32,068</td>
<td>160,992</td>
<td>127,009</td>
</tr>
<tr>
<td>4</td>
<td>201,060</td>
<td>57,831</td>
<td>143,229</td>
<td>35,807</td>
<td>163,253</td>
<td>110,953</td>
</tr>
<tr>
<td>5</td>
<td>201,060</td>
<td>46,264</td>
<td>154,796</td>
<td>38,699</td>
<td>162,361</td>
<td>97,375</td>
</tr>
<tr>
<td>6</td>
<td>201,060</td>
<td>37,012</td>
<td>164,048</td>
<td>41,012</td>
<td>160,048</td>
<td>85,575</td>
</tr>
<tr>
<td>7</td>
<td>201,060</td>
<td>29,609</td>
<td>171,451</td>
<td>42,862</td>
<td>158,193</td>
<td>75,634</td>
</tr>
<tr>
<td>8</td>
<td>201,060</td>
<td>23,687</td>
<td>177,373</td>
<td>44,343</td>
<td>156,717</td>
<td>66,798</td>
</tr>
</tbody>
</table>

Payback period non discounted and tax adjusted is 2.88 years.

Present Value of the 8 year earnings stream is $887,761. Calculated on the same basis as Alternatives A and B.

The Present Value of the investment, assuming a useful life of 8 years with no salvage is:

\[
\frac{887,761}{512,000} = 1.73 \text{ times the initial investment}
\]
QUESTIONNAIRE  RE: DOMESTIC PLUG SEEDLINGS

Tomato Grower: Name:

Address:

Telephone no.:

1. Number of years plug plants have been utilized

2. Number of plug plants planted in 1987

3. Were any plug plants replanted? If yes, how many and why?

4. Percentage of total plant requirements supplied by plug plants

5. How do the stands of Southern (S.) compare with plug plants (P.P.)?

6. Was there any discernable difference in growth patterns to maturity between (S.) and (P.P.) plantings?
7. Can any difference in yield be expected between (S.) and (P.P.) plantings of the same varieties?

8. Was it necessary to remove small green tomatoes from any (P.P.) If so, what percentage as compared to (S.) plantings?

9. What was your experience in transplanting plugs? Comment on:
   (a) Ease or difficulty of handling P.P.  
   (b) Changes and adaptations to planting equipment  
   (c) Type of transplanter used  
   (d) System used to handle trays

10. Are there extra costs or savings associated with (P.P.) as compared to (S.) ?
   Comment on:
   (a) Labour  
   (b) Sorting and grading plants  
   (c) Handling plants (supplier to farm)  
   (d) Water and fertilizer

11. Attempt to quantify the above in monetary values. What are the extra savings or costs per 1000 plants estimate?
12. In your estimation is there a quality difference between (P.P.) and (S.) and if so can you establish a value for this difference?

13. Would you increase the number of (P.P.) used if they were available; if No, ask 14?

14. Would you increase the number of (P.P.) used if they were available and competitively priced?

15. Would you be prepared to provide your own specialized transportation for tray plants?