

THE UNIVERSITY OF MANITOBA
THE MARKET POTENTIAL
FOR GREENHOUSE TOMATOES IN MANITOBA

by

WINSTON RUTHVEN RUDDER

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES
IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE
OF MASTER OF SCIENCE

DEPARTMENT OF AGRICULTURAL ECONOMICS

WINNIPEG, MANITOBA

May 1972



ABSTRACT

MARKET POTENTIAL FOR GREENHOUSE TOMATOES IN MANITOBA

by

Winston Ruthven Rudder

The market for fresh vegetables in Manitoba, particularly fresh tomatoes, is almost exclusively served by imports from the United States and Mexico. It is conceivable, though, that many of these vegetables can be profitably grown in greenhouses to ensure year round supplies in this province. However, there is a serious lack of the basic information needed for planning and decision making in regard to the establishment of a greenhouse industry. The present investigation is undertaken with a view to satisfying this deficiency. More specifically, the objectives of the study are to derive the demand function for fresh tomatoes in Manitoba; to use this function as a basis for projecting consumption of fresh tomatoes in Manitoba in 1980; to provide estimates of the demand for greenhouse tomatoes; and to evaluate the feasibility of a greenhouse tomato industry in Manitoba.

The basic model used is of the Cobb-Douglas form:

$$Q_t = \alpha X_{1t}^{\beta_1} X_{2t}^{\beta_2} X_{3t}^{\beta_3} \dots X_{n-1t}^{\beta_{n-1}} \epsilon \dots \quad (1)$$

Per capita consumption (Q_t) is regarded as dependent on real retail price (X_{1t}), disposable income (X_{2t}), real prices of related commodities (X_{3t}, \dots, X_{n-1t}) and consumers' preference. The alpha (α) coefficient is a constant; ϵ represents the true error, and the beta (β) values denote the elasticities with respect to the independent variables.

The demand function thus derived forms the basis for projecting the demand for fresh tomatoes to 1980. Whereupon, estimates of the market share available to greenhouse producers are made on the assumption of an unaltered seasonal consumption pattern of fresh tomatoes in Manitoba. The major sources of imported field tomatoes are identified, and the potential competition from similar industries in other provinces is evaluated. A review of price developments, together with an assessment of production costs and consumer preference for greenhouse tomatoes, provides the basis for determining the economic viability of a greenhouse tomato industry in Manitoba.

The results indicate that, if the assumptions hold true, total demand for fresh tomatoes in Manitoba is expected to decline by approximately 6.0 percent from 13.3 million pounds in 1969 to 12.5 million pounds by 1980. This implies that the greenhouse tomato industry in Manitoba must develop within a relatively stable fresh tomato market. Nevertheless, the possibility of expansion in greenhouse tomato production appears great since the present share of the total market is so small. In fact, it is estimated that the projected greenhouse tomato market will support an industry of approximately 10 acres.

Fresh tomato prices are depicted as being higher in the spring and fall months (which periods correspond to the marketing seasons of greenhouse tomatoes). This is encouraging to potential greenhouse operators. Moreover, as experience elsewhere in Canada (particularly Southern Ontario) indicates, it seems likely that by adopting vigorous effective merchandising practices, including packaging for retail and consumer information and education, the existing market for higher quality tomatoes may be substantially expanded.

On the basis of cost projections for Manitoba conditions and likely selling prices, it is demonstrated that there is potential for the development of a viable greenhouse tomato industry in Manitoba.

There is need, however, for adequate planning with a view to organizing the marketing functions in order to:

- (i) enlarge the market for the higher priced, higher quality greenhouse tomatoes by undertaking promotional programs;
- (ii) disseminate information to growers on selecting proper varieties and adequately preparing fruits for marketing;
- (iii) ensure the stability of prices; and
- (iv) reduce likely inefficiencies in the distribution system.

ACKNOWLEDGEMENTS

The author wishes to acknowledge his indebtedness to the many individuals whose efforts were invaluable in the preparation of this dissertation.

Sincere appreciation is extended to his academic adviser, Dr. Norman J. Beaton, for his counsel and advice throughout the study and during the author's entire graduate program at the University of Manitoba. For his invaluable suggestions and constructive criticisms, the author expresses his gratitude to Dr. M. H. Yeh. The assistance and technical advice provided by Dr. J. D. Campbell is also gratefully acknowledged.

The author is also grateful to the government of Canada for the financial support provided, through the Canadian International Development Agency, during his period of study at the University of Manitoba.

Finally, the author expresses his appreciation to Mrs. Betty Anne Ross whose arduous task it was to type the preliminary drafts of this thesis, and to Mrs. A. Sutton who typed the final draft.

TABLE OF CONTENTS

	Page
LIST OF TABLES	ix
LIST OF FIGURES	x
 Chapter	
I. INTRODUCTION	1
Tomatoes	2
CONSUMPTION, PRODUCTION, AND IMPORT TRENDS OF FRESH TOMATOES	3
Canada	3
Manitoba	4
THE CASE FOR GREENHOUSE TOMATO PRODUCTION IN MANITOBA . . .	7
OBJECTIVES AND SCOPE OF THE STUDY	9
Limitations	10
HYPOTHESES AND ASSUMPTIONS	11
Hypotheses	11
Assumptions	11
ORGANIZATION OF THE STUDY	12
II. THE GREENHOUSE VEGETABLE INDUSTRY IN CANADA AND MANITOBA . .	14
SIZE AND LOCATION	14
Growth and Significance of the Industry	14
NATURE OF THE GREENHOUSE VEGETABLE INDUSTRY	16
Some Technological Aspects	19
Greenhouse Tomato Production	20
Marketing Greenhouse Vegetables in Canada	20

Chapter	Page
The Effect of the Tariff Structure	22
THE GREENHOUSE VEGETABLE INDUSTRY IN MANITOBA	24
Interest in Greenhouse Vegetable Production	26
III. THEORETICAL FRAMEWORK	28
THE CONCEPT OF A DEMAND CURVE	28
Early Statement of the Law of Demand	28
Law of Demand Restated	29
The Utility Concept	30
Modern Development of Demand Theory	34
Hick's Contribution	34
Samuelson's Approach	36
THE STATISTICAL DERIVATION OF DEMAND CURVES	38
Conceptual Problems	38
Time Series Analysis	40
Family Budget Studies	41
Aggregation	42
Random Disturbances	43
The Regression Approach	43
Methodological Developments in Demand Analysis	49
IV. MODEL FORMULATION AND METHOD OF ANALYSIS	55
CHOICE OF VARIABLES	55
Sources of Data	56
Explanation of Variables and Adjustment of Data	57
Data Limitations	60
THE MODEL	62
THE METHOD OF ANALYSIS	65

Chapter	Page
V. INTERPRETATION AND EVALUATION OF RESULTS	68
ANALYSIS OF DEMAND FOR FRESH TOMATOES IN MANITOBA	68
PROJECTION OF FRESH TOMATO DEMAND TO 1980	73
Assumptions for Prediction	76
Statistical Predictions	76
MARKET POTENTIAL FOR GREENHOUSE TOMATOES	78
FEASIBILITY OF A GREENHOUSE TOMATO INDUSTRY IN MANITOBA	82
VI. SUMMARY, IMPLICATIONS AND RECOMMENDATIONS	94
Summary	94
Implications	98
Recommendations	100
BIBLIOGRAPHY	102
APPENDIX	106

LIST OF TABLES

Table	Page
I. Annual Imports of Selected Vegetables Competing with Canadian Production 1960-65	2
II. Apparent per Capita Domestic Disappearance of Tomatoes Canada 1959-69	4
III. Fresh Tomato Imports into Canada 1959-69	5
IV. Fresh Tomato Production in Manitoba 1959-69	6
V. Imports of Fresh Tomatoes into Manitoba 1959-69	7
VI. Area Under Glass and Plastic (square feet) 1959-69	15
VII. Number of Greenhouse Operators According to Size (square feet) Manitoba, 1970	26
VIII. Regression Coefficients, Standard Errors and Other Statistical Results for Demand Functions for Fresh Tomatoes in Manitoba 1954-69	69
IX. Percentage Fresh Tomatoes Imported Each Quarter Manitoba 1959-69	79
X. Fresh Tomato Imports Into Manitoba, April-June and October-December 1959-69	84
XI. Market Share of United States and Mexico Imports, April-June and October-December in Manitoba 1959-69	85
XII. Major Sources of Fresh Tomato Imports Into Manitoba, April-June and October-December 1959-69	87
XIII. Truck Freight Rates on Fresh Tomatoes Unloaded at Winnipeg as a Percentage of Retail Price (1968)	87
XIV. Market Share of British Columbia and Ontario Greenhouse Tomatoes in Manitoba 1959-69	89

LIST OF FIGURES

Figure	Page
1. Number of Firms in the Greenhouse Industry Canada 1955-69 . . .	17
2. Types of Greenhouse Operations in Manitoba	27
3. Hicks' Compensating Income Variation	36
4. The Method of Cost Difference	38
5. Scatter Diagram of Monthly Tomato Consumption and Retail Price (Hypothetical)	45
6. Relationship between True and Estimated Regression Lines . . .	47
7. Per Capita Consumption of Fresh Tomatoes in Manitoba: Actual and Predicted Quantities (1954-69)	74
8. Monthly Average Retail Prices of Fresh Tomatoes Winnipeg 1965-69, 1968, 1969	91

Chapter I

INTRODUCTION

The observation has been made that the demand for fruit and vegetables has been a somewhat neglected area of research in Canada. Further, the little attention so far focussed on this topic has dealt with the demand of fruit and vegetables in the aggregate.¹ Yet it is upon the information provided by this type of analysis that governments and other planning agencies concerned with the development or improvement of the fruit and vegetable industry largely depend. This study is undertaken with the aim of partially bridging this information gap. An estimate of the current demand for fresh tomatoes in Manitoba is made, as well as the projected level of demand for 1980.

Vegetable production is not a major enterprise for most Canadian crop producers. The proportion of cash income derived from the sale of fruit and vegetables to total cash farm income varied between 3.7 and 4.1 percent during 1965 to 1969. The bulk of the domestic vegetable production is utilized for processing, as much as eighty-five percent in the case of tomatoes.²

Another important feature is that domestic consumption depends

¹Kulshrestha, S.N., "The Demand for Major Fruits and Vegetables in Canada", Canadian Journal of Agricultural Economics, No. 2, Vol. XVIII (July, 1970), p. 52.

²Ibid. p. 53.

heavily upon foreign supplies. An examination of the pattern of imports of a number of vegetables during the Canadian season reveals an interesting state of affairs. For the years 1965 to 1969 approximately 23.7 percent of the annual imports of tomatoes (twenty-five percent for all vegetables) entered during the Canadian field tomato production season (TABLE I).

TABLE I

ANNUAL IMPORTS OF SELECTED VEGETABLES
COMPETING WITH CANADIAN PRODUCTION
1965-69

	1965	1966	1967	1968	1969	Average (1965-69)
	(percent of annual import volume competing with Domestic Production)					
Cucumber	35.2	51.5	38.1	39.1	38.4	40.5
Lettuce	23.7	28.5	27.2	22.3	25.1	25.4
Field Tomatoes	23.9	24.8	23.4	21.9	24.3	23.7
Beans (Green)	11.9	12.8	14.2	9.6	9.4	11.6
Average Total	23.7	29.4	25.7	23.2	24.3	

Sources: CDA Crop and Seasonal Price Summaries. DBS Trade of Canada.
Adapted from H. Blum. Marketing of Ontario's Greenhouse
Vegetables in Competition with Imports from Mexico. p. 21.

Tomatoes

Tomatoes are a very popular vegetable in North America and in many parts of the world. It is generally believed that the wild species probably originated in South America around Peru, Ecuador and Bolivia. They were cultivated during the Aztec Empire.

Although botanically a fruit, the tomato was classified by the

United States Supreme Court (1893) as a vegetable for commercial purposes because of its common use for salads. The fruits vary in size from one half inch to four inches and more, and are usually red, scarlet or yellow with variations in white, pink or purple. They provide an excellent source of vitamins A and C.¹

CONSUMPTION, PRODUCTION AND IMPORT
TRENDS OF FRESH TOMATOES

Canada

In Canada, tomatoes are a most favoured vegetable, being consumed mainly in processed form. TABLE II indicates the annual consumption of tomatoes and tomato products. Fresh tomato consumption in 1959 was the highest on record during the observed period. Apparent per capita consumption steadily declined from 18.1 pounds in 1959 to 9.2 pounds in 1969. Meanwhile, consumption of tomato products maintained a remarkably stable level.

Tomatoes, like most other vegetables, are consumed in Canada in fresh and processed form on a year round basis. Imports of fresh tomatoes from the U.S.A. and Mexico are large and constituted an import value of about \$22 million in 1969. Tomatoes occupy first place among imports of fresh vegetables.

Total shipments of fresh tomatoes into Canada increased from 156 million pounds in 1959 to 214 million pounds in 1969. (TABLE III). In most years, United States and Mexican imports accounted for close to 99 percent

¹Blum, H., Marketing of Ontario's Greenhouse Vegetables in Competition with Imports from Mexico, (Farm Economics and Statistics Branch, Ontario Dept. of Agriculture and Food, May 1969), p. 27.

TABLE II

APPARENT PER CAPITA DOMESTIC DISAPPEARANCE
OF TOMATOES, CANADA
1959-69

Year	Fresh Tomatoes	Processed Tomatoes	Total
	(pounds)		
1959	18.1	42.6	60.7
1960	17.6	41.7	59.3
1961	17.8	40.8	58.6
1962	16.8	42.8	59.6
1963	13.4	47.8	61.2
1964	13.4	40.4	53.8
1965	12.4	48.5	60.9
1966	11.7	43.2	54.9
1967	12.3	47.3	59.6
1968	11.3	49.2	60.5
1969	9.2	45.8	55.0

Source: DBS Catalogue. 32-226

of the total shipments. The Bahamas, Cuba, Spain and the Netherlands occasionally ship smaller quantities of fresh tomatoes into the country.

Over the same period, production of fresh tomatoes, which stood at one hundred and thirty-five million pounds in 1959, peaked at 145 million pounds in 1961, thereafter falling continuously until by 1969 production was a mere 84 million pounds. Except for 1965 when the value of fresh tomato production soared to \$16 million, the annual value of tomato production has tended to remain relatively stable. This figure was \$5.8 million in 1959 and \$6.2 million in 1969.

Manitoba

There is heavy reliance on imports to satisfy the demand for fresh

TABLE III

FRESH TOMATO IMPORTS INTO CANADA
1959-69

Year	Mexico -000 lbs.	Percent Mexico	U.S.A. -000 lbs.	Percent U.S.A.	Total -000 lbs.	Percent Total
1959	63,454	40.5	92,487	59.1	156,487	99.6
1960	75,897	48.7	78,094	50.1	155,891	98.8
1961	49,739	30.6	106,784	65.6	162,756	96.2
1962	56,922	35.5	101,556	63.3	160,349	98.8
1963	53,613	31.7	114,948	68.0	169,144	99.7
1964	52,840	31.3	115,179	68.3	168,560	99.6
1965	56,151	32.9	113,508	66.5	170,689	99.4
1966	67,364	36.3	117,628	63.5	185,497	99.7
1967	75,391	39.1	114,764	59.5	192,822	98.6
1968	67,972	35.0	125,259	64.5	194,197	99.5
1969	104,992	49.0	107,166	50.1	213,837	99.1

Source: DBS publication Trade of Canada, Imports.

tomatoes throughout the year in Manitoba. Domestic field production of tomatoes in this province, as for the rest of the country as well, is restricted to the short summer months. Local supplies usually disappear from the market by late September. Even so, during the domestic field production season, supplies must be supplemented by U.S. field producers.

As TABLE IV illustrates, annual field production in Manitoba fluctuates tremendously. The 1959 crop yielded 824,000 pounds valued at \$42,000. This represented 19.5 percent of the total amount of fresh tomatoes consumed in the province during the domestic season. During the observed period, production peaked at 3,380,000 pounds in 1963, and after a series of fluctuations slumped to 1,127,000 pounds in 1969, valued at \$113,000. The 1969 crop accounted for 24.8 percent of the fresh tomatoes consumed during the domestic season. It is quite noticeable that the per

TABLE IV

FRESH TOMATO PRODUCTION IN MANITOBA
1959-69

Year	Yield -000 lbs.	Acreage	Farm Value -\$000
1959	824	150	42
1960	2,070	100	99
1961	3,360	140	188
1962	2,460	120	144
1963	3,380	130	220
1964	1,560	130	105
1965	2,835	140	208
1966	2,835	135	227
1967	2,700	135	235
1968	1,296	135	98
1969	1,127	120	113

Source: DBS Catalogue 22-003.

acre value of tomatoes increased by 236 percent from \$280 in 1959 to \$942 in 1969.

Annual shipments of fresh tomatoes into Manitoba, as indicated in TABLE V, have tended to remain fairly stable over the period 1959 to 1969. This may be attributable to the fact of the relatively slow increase in population growth (10%) over the period. As is true for the country as a whole, the bulk of the annual imports was made up of shipments from the U.S.A. and Mexico. Imports from Mexico accounted for 41.9 percent of annual imports of fresh tomatoes in 1969. The Mexican shipments appear on the market from December to June. United States supplies, which constituted 58.1 percent of annual imports in 1969, are unloaded throughout the year. Florida is the main source of United States supplies during the winter and spring seasons, while California shipments predominate during the summer

TABLE V
 IMPORTS OF FRESH TOMATOES INTO MANITOBA
 1959-69

Year	United States -lbs.-	Mexico -lbs.-	Total -lbs.-
1959	6,357,438	4,405,067	10,762,505
1960	5,468,638	5,566,383	11,035,021
1961	7,302,025	3,990,401	11,294,016
1962	6,060,275	4,897,364	10,957,639
1963	5,162,278	4,461,772	9,624,050
1964	6,798,262	4,390,609	11,188,871
1965	6,569,645	4,389,537	10,959,182
1966	6,292,156	4,225,590	10,517,746
1967	4,652,318	5,152,343	9,804,661
1968	6,300,936	4,527,767	10,828,703
1969	6,357,000	5,847,032	12,204,032

Source: DBS unpublished data.

and fall.

As TABLE V indicates, the total demand for fresh tomatoes in Manitoba has been remarkably stable. While, at present, most of the Province's needs are supplied by imports from Ontario, the United States and Mexico, there is evidence to indicate that this crop may be produced economically in local greenhouses.¹

THE CASE FOR GREENHOUSE TOMATO PRODUCTION IN MANITOBA

Tomatoes produced in greenhouses will not compete effectively with

¹Beaton, Norman J., "Economic Aspects of Greenhouse Tomato Production in Manitoba", (paper presented at the Fourth Annual Manitoba Horticultural Council Meeting, December 7, 1971, Agricultural Auditorium, University of Manitoba).

domestically grown field crops, thus production should not coincide when locally field grown tomatoes are on the market. However, the production of greenhouse tomatoes during the winter months is favored because of their superior freshness and more delicate flavour compared with post ripened imported field tomatoes. Indeed, tomatoes grown in greenhouses can valuably contribute to the fresh vegetable diet of Manitobans during the winter months.

As an indication of the potential economic significance of greenhouse tomato production, it should be pointed out that during 1969 greenhouse tomato production accounted for more than sixteen percent of tomatoes available for the fresh market in Ontario.¹ Meanwhile in Nova Scotia, growers produce almost 100 percent of the required tomatoes and export from 40 to 60 percent of their production, depending on seasonal demand, to other Maritime Provinces.² The Ontario and Nova Scotia experience should serve as a guide to the likely performance of a greenhouse tomato industry in Manitoba.

Satisfactory price quantity relationships are fundamental to decision making in regard to the establishment of a greenhouse tomato industry in Manitoba. Producers need this information to determine the feasibility of undertaking such an enterprise.

¹Calculations based on CDA publication Annual Unload Report Fresh Fruits and Vegetables, 1969.

²Nova Scotia, Department of Agriculture and Marketing, The Greenhouse Industry in Nova Scotia, 1970.

OBJECTIVES AND SCOPE OF THE STUDY

The overall objective of this study is to determine whether the potential exists for the establishment of a greenhouse tomato industry in Manitoba. The approach taken is to, first of all, ascertain the extent of the demand for fresh tomatoes in this province. On the basis of this demand, some estimate of a greenhouse industry's likely share is determined.

The specific objectives of the thesis are:

1. To study the demand and price structure for fresh tomatoes in Manitoba.
2. To estimate the present and future demand for fresh tomatoes in Manitoba.
3. To provide statistical estimates of the demand for greenhouse tomatoes.
4. To evaluate the feasibility of a greenhouse tomato industry in Manitoba.

The study is largely a statistical analysis determining the feasibility of establishing a greenhouse tomato industry in Manitoba. Cursory projections indicate that the market area which could be practically served from Manitoba consists of Thunder Bay to the eastern border of Alberta.¹ However, the analysis is confined to the province of Manitoba since complicated data problems are otherwise anticipated.

¹Manitoba, Department of Industry and Commerce, Food Production Branch, An Opportunity for the Commercial Growing of Greenhouse Tomatoes and Cucumbers, Nov. 1970, p. 4.

The scope of the study is limited to:

1. Determining the demand for fresh tomatoes in the seasons which make greenhouse production a viable enterprise.
2. Determining the major extra-provincial sources of imports of fresh tomatoes during the likely greenhouse season.
3. Ascertaining for each major source the production, transportation, and storage costs and the tariff rates. Given these, comparisons are made with greenhouse production costs in Manitoba which will provide certain policy implications.

Limitations

One limitation of this study is the fact that annual rather than monthly (or even quarterly) data are utilized in the demand analysis. It is preferable to estimate seasonal demand functions (rather than an annual function) for fresh tomatoes in Manitoba. Such functions facilitate a clearer understanding of the market conditions prevailing during the domestic production seasons of greenhouse tomatoes. However, reliable monthly or quarterly data are not available. Consequently, the function derived does not take explicit account of the seasonal fluctuations in demand for fresh tomatoes.

Another shortcoming arises out of the fact that there is very little information available on consumer preference for greenhouse tomatoes in Manitoba. In this study, therefore, it is assumed that consumers in Manitoba react equally favorable to greenhouse tomatoes as those in Ontario and the United States. To the extent that research in this area proves otherwise, the conclusions arrived at will need to be modified.

HYPOTHESES AND ASSUMPTIONS

Hypotheses

The basic hypotheses underlying the procedures to be adopted in this study are:

1. The quantity of fresh tomatoes consumed and its price are inversely related.
2. The quantity of fresh tomatoes demanded and disposable income are inversely related.

Assumptions

The assumptions upon which the empirical analysis is based are:

1. There exists a routine in the demand behavior of human beings. This implies that over the period covered by the data there have been no significant changes in the tastes and desires of consumers so that the demand function formulated holds for the entire period. Moreover, this assumption provides the rationale for utilizing the basic demand function thus formulated for making projections. The occurrence of any abrupt, significant changes in tastes and desires of consumers will cause any projections based on the demand function to be misleading.
2. Retail prices, disposable income, population growth and the decreasing purchasing power of money are the most influential quantifiable variables reflecting changes in consumer demand. The latter two variables may be explicitly introduced by incorporating them into the quantity, price and income variables. This assumption is basic to any attempt to derive demand curves from statistics. It implies not only the existence of a routine in consumer demand but also the absence of a single equilibrium

position which is maintained throughout the period under consideration. If this were the case, then the data would not provide sufficient observations on the demand function to determine its probable shape.

3. The third assumption is that the unknown theoretical demand function can be approximated by the statistically derived curve. This requires that the demand curve and its derivatives be continuous within the range investigated. This assumption is necessary to validate the statistical procedures used.

4. The fourth assumption is that the demand for fresh tomatoes is relatively stable whereas supply is variable. This ensures that over time a clearly defined demand relationship may be identified for study.

ORGANIZATION OF THE STUDY

The study consists of three main sections. The first section provides a descriptive analysis of the greenhouse industry in Canada and Manitoba. The size, location and growth of the industry are indicated. The nature and significance of the industry are also discussed, emphasis being placed on greenhouse tomato production. It is important to have a good overview of the nature of the greenhouse industry, and to understand the level of technical knowledge required; this, in the first instance, provides the initial interest for a greenhouse industry.

The major concern of the second section is to develop a statistical model to determine the demand for fresh tomatoes in Manitoba. Here the important variables affecting consumer behavior are outlined. This model provides the basis upon which the projected demand to 1980 is made.

The final section deals with the evaluation of the feasibility of a greenhouse industry in Manitoba. Comparisons are made of costs of production between Manitoba and the major competing sources of fresh tomatoes. Transportation and storage costs together with tariff rates are also analysed.

The remainder of the study is organized as follows: Chapter II provides general background information of the greenhouse industry in Canada and Manitoba. Chapter III deals with the relevant economic and statistical theory used in formulating the demand model and making the projections. An analysis of demand theory is undertaken and the operations of the multiple regression technique are described.

Chapter IV provides a description of the data. The choice of variables and the formulation of the model are discussed. The analysis of demand for fresh tomatoes in Manitoba follows in Chapter V. Here the feasibility study of a greenhouse tomato industry is also undertaken.

Chapter VI sets forth the conclusions and implications of the study. Recommendations are also put forward in this chapter.