

THE UNIVERSITY OF MANITOBA

AN ANALYSIS OF FAMILY FARM GROWTH  
IN WESTERN MANITOBA - A SYSTEMS APPROACH

by

D. C. GALAPITAGE

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

99433

WINNIPEG, MANITOBA

February, 1977

## ABSTRACT

This study deals with the process of family farm growth in Western Manitoba. Many people believe that the long run objective of Canadian agriculture should be the development of rural communities based upon the maintenance of the economically viable family farms. The means of achieving this objective are influenced by the technological changes in agriculture. The technological changes and increased use of machinery have changed the internal dimension of family farming. The present study attempts to identify these changes and provide a guideline to achieve the objective of maintaining the economically viable family farm.

Several studies have been done in the area of farm growth using various methods. These can be grouped into three, namely; traditional theory of the firm, behavioural theory of the firm, and systems approach. Present study takes the systems approach to study the process of growth of the family farm system. The system view is an overall view which implies that an isolated study of the parts of system will not be adequate to understand the complete system. A system is a set of components that works together for achieving the overall objective of the system. The components of the system are linked in an interchanging manner, therefore, a study of the isolated parts would not provide a complete view of the system.

The growth of the net-worth is taken as the performance measure of the system. The major components of the family farm system, which affects the growth, are production and consumption. These two components compete for the available resources. Within the production component, crop and livestock operations compete for the resources. Production generates income which is available for consumption and re-investment for future production. The allocation of resources among consumption and investment is one of the major factors which decide the growth rate and therefore, the viability and competitiveness of family farms. The other factor which is affected by this allocation decision is the standard of living of the farm family. These interrelations between standard of living, investments, growth and therefore, future production and future standard of living make it difficult to understand the system by studying the parts of the system.

An econometric model was formed on the basis of systems approach to study the system. The model consists of three estimated equations for production, consumption and investment. An equation of performance measure, or of growth, is formed combining the models of production, consumption and investment. This combined equation links the production and consumption components and investment pattern of the system. The Solow's model is used to determine the technological change in Western Manitoba agriculture.

The data for the study were taken from 23 members of the Western Manitoba Farm Business Association. The analysis of data shows that the farmers have increased production by expanding the size of operations and increasing the use of machinery and material inputs. The growth of net-worth in 1961-69 period in terms of current dollar value was 184 percent. The major factors affected by this high rate of growth are increased use of factor inputs including land and extensive use of credit.

The econometric results and a significant test with 99 percent probability indicate that the industry was at constant return to scale during 1961-69 period. The farmers have carefully expanded the size and increased the use of machinery and material inputs during 1961-67 period. These inputs have been used productively in this period. However, the results indicate that the heavy investments on land and machinery in 1968 have not been productive. The material inputs have been used productively almost throughout the period, however, the labour was not used productively. The analysis of MVP/Price of input ratios indicates that the farmers were not able to coordinate resources to obtain the maximum possible net income from the operations.

The analysis of performance measure shows a 118.2 percent growth of net-worth during 1962-69 period, in terms of 1961 constant dollar value. This is an average rate of 14.78 percent per year. The major factors that influenced

this high rate of growth are expanded operations, increased use of factor inputs and extensive use of credit. The analysis of technological change shows an increase in technological index from 1 in 1961 to 1.8773 and 1.5228 in 1969 in net and gross measures respectively.

The analysis is extended to 1974 by means of forecasting. The forecasting results have shown that the model has a good forecasting power. The 1974 values of the economic variables show an increase in production and factor inputs used. However, these values include the price hikes experienced in 1973-74 period. The rate of growth of net-worth is a result of high production and low consumption.

The overall analysis of 23 Western Manitoba farms has shown that the solution to the problem of poverty among farmers is the expansion of the size of operations. The programmes for improving managerial ability of farmers would be helpful in achieving the objective of a viable competitive farming industry.

## TABLE OF CONTENTS

	<u>Page</u>
LIST OF TABLES	
CHAPTER I	1
INTRODUCTION .....	1
The problem .....	3
Objectives of the study .....	7
CHAPTER II	
REVIEW OF LITERATURE IN THE AREA OF FARM FIRM GROWTH .....	9
Gillis .....	10
Patrick and Eisgruber .....	15
Eisgruber and Lee .....	19
Conceptual considerations .....	22
CHAPTER III	
CONCEPTUAL FRAMEWORK AND THEORETICAL CONSIDERATIONS .....	25
Systems approach .....	25
The system .....	26
The objectives - performance measure of the system .....	28
Environment of the system .....	31
Resources of the system .....	34
Components of the system .....	36
The management of the system .....	38
Growth .....	39
Competition .....	41

Page

Credit utilization ..... 97

Consumption expenditure ..... 99

## CHAPTER VI

ECONOMETRIC RESULTS AND INTERPRETATIONS 104

Production function ..... 106

Technological change ..... 107

Consumption function ..... 129

Investment function ..... 137

The growth process ..... 143

## CHAPTER VII

EVALUATION OF THE FORECASTING RESULTS .... 149

Production ..... 150

Consumption ..... 155

Investment ..... 156

Farm growth ..... 160

Economic aspects of farms in 1974 ..... 161

## CHAPTER VIII

SUMMARY AND CONCLUSION ..... 164

Implications ..... 171

Suggestions for further research ..... 175

BIBLIOGRAPHY ..... 177

## APPENDICES

I THE INTERCORRELATION COEFFICIENTS ..... 179

II THE METHOD OF ESTIMATING SHARES OF CAPITAL, MATERIAL INPUTS AND TECHNOLOGY IN LABOUR PRODUCTIVITY ..... 188

## Appendices (cont.)

	<u>Page</u>
III TEST OF CONSTANT RETURN TO SCALE .....	190
IV ESTIMATION OF THE AVERAGE INCREASES IN NET- WORTH PER YEAR DURING 1962-69, 1962-65 AND 1966-69 PERIODS .....	192
V THE ESTIMATED CONSUMPTION EXPENDITURE FOR THE YEARS 1973 AND 1974 .....	196