

UNIVERSITY OF MANITOBA

AN ECONOMIC ANALYSIS OF CROP INSURANCE OPTIONS
IN MANITOBA

by

Paul Swain Westdal

A THESIS

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

Department of Agricultural Economics

Winnipeg, Manitoba

November 1975

"AN ECONOMIC ANALYSIS OF CROP INSURANCE OPTIONS
IN MANITOBA"

by

PAUL SWAIN WESTDAL

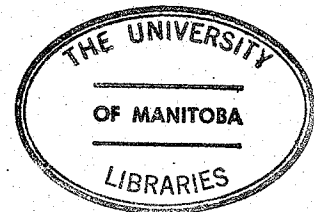
A dissertation submitted to the Faculty of Graduate Studies of
the University of Manitoba in partial fulfillment of the requirements
of the degree of

MASTER OF SCIENCE

© 1975

Permission has been granted to the LIBRARY OF THE UNIVER-
SITY OF MANITOBA to lend or sell copies of this dissertation, to
the NATIONAL LIBRARY OF CANADA to microfilm this
dissertation and to lend or sell copies of the film, and UNIVERSITY
MICROFILMS to publish an abstract of this dissertation.

The author reserves other publication rights, and neither the
dissertation nor extensive extracts from it may be printed or other-
wise reproduced without the author's written permission.



ACKNOWLEDGEMENT

The author is indebted to Dr's. J. C. Gilson and W. J. Craddock under whose supervision this research was conducted. Their advice, constructive criticism and encouragement are appreciated.

Meaningful contributions to the study were made by other people who the author would like to recognize and have recorded his appreciation for their efforts.

Firstly the author would like to record his appreciation for the financial assistance provided by the Manitoba Crop Insurance Corporation for this study. Personnel of the Corporation, notably Messrs. Tolton, McRitchie and the late Percy Ford, were instrumental in supplyingg essential information and guidance necessary to the study.

Dr. Glen Findlay and Mr. Hayden Tolton, members of the thesis committee, took the time necessary to read and evaluate the report.

Mrs. June McDonald and Miss Valerie McKinnon expertly typed the many drafts and prepared the tables in the report.

To my wife Charlotte I am particularly indebted for her encouragement and patience throughout the duration of this study.

Finally the keen interest in this study of my grandfather, the late Mr. Paul Johnson Westdal, who as one of the original Canadian pioneers helped to establish the agricultural fact in Western Canada should be recorded.

ABSTRACT

AN ECONOMIC ANALYSIS OF CROP INSURANCE OPTIONS IN MANITOBA

by

Paul Swain Westdal

Interest in this study arose from a concern on the part of research scientists and the Manitoba Crop Insurance Corporation that the current Manitoba program meet its intended objective of investment protection at the lowest possible cost. The central role played by the crop insurance program in ameliorating the negative impact of variable farm income in Manitoba underscored the importance of the study. The fact that the current program deviated significantly from the model originally offered emphasized the need for a comprehensive evaluation of the program's ability to fulfill its central objective.

Specifically in this study an attempt was made to establish whether or not the crop insurance options available in the current program offered producers in Manitoba a level of coverage sufficient to meet annual out of pocket costs for their wheat, oats, and barley enterprises. A similar comparison was conducted using the

now defunct Improved Practices program. A related investigation was conducted to determine what additional costs, depreciation and consumption, might be covered by the higher coverage options where coverage surpluses were generated in excess of out of pocket costs. Finally the effect on the performance of crop insurance options of providing coverage using a five year moving average trend yield method was examined.

The study begins with a comprehensive examination of the crop insurance options available in the current Manitoba Crop Insurance Corporation program. The options selected for analysis are defined and an illustrative example of each presented. The historical evolution of the selected options is traced in detail from the original test area program through to its present multiple crop province wide format. The modifications and refinements introduced over the life of the crop insurance program in Manitoba are recorded together with a discussion of the rationale for these adjustments.

An examination of the major theoretical dimensions of the crop insurance concept is presented. These include a review of the normal curve method of rate making, the nature of risk and uncertainty, the law of large numbers, and the function of crop insurance in a micro-economic environment. A complete discussion

of the manifestation of these considerations in the Manitoba Crop Insurance Corporation's program ensues.

Annual out of pocket costs for six case farms in the Carman district of Manitoba were determined for the years 1960 through 1975 for their individual wheat, oats, and barley crops. These costs together with appropriate premiums were then compared with coverage levels provided by the selected options, to determine the adequacy of the options in meeting the specified investment protection objective of the Corporation. Where coverage surpluses were generated an attempt was made through the calculation of depreciation and consumption costs assignable to these crops to determine what additional costs the higher coverage level options could meet. A similar comparative analysis of out of pocket costs versus coverage was conducted using the now defunct Improved Practices Program and the proposed five year moving average coverage adjustment system. The effect of zero versus existing equity ratios on the performance of the options available in the current Manitoba Crop Insurance Corporation (MCIC) program was also examined.

The analysis suggested that the present program of the MCIC is less than adequate in terms of its ability to protect out of pocket costs even at the highest coverage level option (70 per

cent of the Long Term Average Yield, high price.) Coverage was equal to or greater than out of pocket costs in only 28 of 36 case farm years in this case. Coverage under the current program of costs additional to out of pocket costs namely depreciation and consumption, was notably unsuccessful having registered a respective performance record of 11 on 36 and 4 on 36 at the highest coverage option (70 per cent Long Term Average Yield, high price.)

Analysis of the Improved Practices Program indicated that success in meeting out of pocket costs, which included additional expenses for fertilizer in this program, was greater than that recorded under the current MCIC program. Adjustment of out of pocket costs to a zero equity level demonstrated that attainment of coverage sufficient to meet amended out of pocket costs was virtually impossible, none of the present options available being successful.

Utilization of the five year moving average system of coverage determination resulted in a substantial improvement in meeting out of pocket costs over the current MCIC program.

Basis this analysis, it is therefore recommended that the MCIC reexamine the relationship between its current coverage levels and out of pocket costs with a view to the serious consideration of introducing a higher coverage level option, 80 per cent of

the Long Term Average Yield, especially for producers with large annual cash requirements. It is further suggested that another possible solution area to the problem of deficit coverage for some producers may be provided by the incorporation of a trend yield factor in the basic program.

TABLE OF CONTENTS

	Page
LIST OF TABLES	xiii
LIST OF APPENDIX TABLES	xvi
LIST OF APPENDIX FIGURES	
 CHAPTER	
I. INTRODUCTION	1
A. PROBLEMATIC SITUATION	1
B. OBJECTIVES.	5
C. GENERAL PROCEDURE.	6
D. ORGANIZATION OF THE STUDY	7
II. MANITOBA CROP INSURANCE OPTIONS	10
A. OPTION DEFINED	10
B. MANITOBA CROP INSURANCE OPTIONS	11
C. THE OPTIONS SELECTED.	13
D. ILLUSTRATIVE EXAMPLE	16
III. HISTORICAL EVOLUTION OF THE OPTIONS	20
A. THE INITIAL PROGRAM.	20
B. THE SIXTY PER CENT OPTION	26

CHAPTER	Page
C. SEPARATE INSURANCE CONTRACT . . .	43
D. SEVENTY-FIVE PER CENT DOLLAR COVERAGE	44
E. SEVENTY AND EIGHTY PER CENT OPTIONS	46
F. BASE CHANGE 35 TO 25 YEARS	49
G. TWO PRICE SELECTIONS	55
H. THE IMPROVED PRACTICES PROGRAM	57
I. COVERAGE OPTION CHANGE FROM 60, 70, 80 PER CENT LTAY TO 50, 60, 70 PER CENT LTAY	58
J. GOOD EXPERIENCE DISCOUNTS AND COVERAGE ADJUSTMENT FACTOR	59
K. SUMMARY	62
IV. SOME THEORETICAL DIMENSIONS	63
A. TIME	63
B. RISK AND UNCERTAINTY	65
C. INSURANCE ROLE	70
D. INSURANCE CONCEPT	71
E. THE MANITOBA CROP INSURANCE CORPORATION'S INTERPRETATION. . . .	74
1. The Form	74
2. The Purpose.	77

CHAPTER	Page
3. The Means of Uncertainty Reduction	81
a. The Insured	81
b. Reduction of Uncertainty by the Insurer	84
1. A Properly Defined Population	88
2. Randomness	90
3. Homogeneity	92
4. Independence	94
5. Mass	96
6. Interest of the Insured	97
7. Nature of the Insured's Hazard	98
8. Offer of the Insurer	100
F. SUMMARY	102
V. EMPIRICAL ANALYSIS	104
A. HYPOTHESES	104
B. THE METHOD	105
C. DETERMINATION OF OUT OF POCKET COSTS	108
D. PREMIUMS AND COVERAGE	112
E. COMPARATIVE ANALYSIS - COMMON PRACTICES PROGRAM	114

CHAPTER	Page
F. DEPRECIATION OF BUILDINGS AND MACHINERY	122
G. CONSUMPTION ALLOWANCE.	124
H. THE IMPROVED PRACTICES PROGRAM.	137
I. EQUITY MODIFICATION	145
J. FIVE YEAR MOVING AVERAGE ADJUSTMENT	148
K. SUMMARY	161
VI. THE MANITOBA CROP INSURANCE CORPORATION PROGRAM - A SYNOPSIS	162
A. SUMMARY AND CONCLUSIONS	162
1. Historical Evolution	165
2. The Theoretical Framework	169
3. Empirical Analysis	171
B. CONCLUSIONS	174
1. Common Practices Program	174
2. Depreciation and Consumption Allowance	178
3. Improved Practices Program.	180
4. Equity Modification	183
5. Five Year Moving Average System	184
C. RECOMMENDATIONS	185

	Page
APPENDIXES	187
A. ACREAGE OF PRINCIPAL CROPS IN MANITOBA . . .	187
B. SIGNIFICANCE OF INSURANCE WRITTEN ON WHEAT, OATS AND BARLEY AND COMBINED ACRES EXPRESSED AS A PER CENT OF TOTAL INSURED ACRES IN MANITOBA FROM 1969 TO 1973	188
C. A COMPARISON OF LONG TERM AVERAGE YIELDS, COVERAGE AND PREMIUMS BASED ON 35 YEAR LTAY CALCULATIONS VERSUS 25 YEAR LTAY CALCULATIONS BY RISK AREA	189
D. SELECTED PRICE INDEXES EMPLOYED FOR UPDATING PROCEDURE 1968 THROUGH 1975 . . .	194
E. THE MANITOBA CROP INSURANCE CORPORATION 1975 RATES AND COVERAGES	195
F. MANITOBA CROP INSURANCE CORPORATION INSURED PRICE LEVELS FOR WHEAT, OATS AND BARLEY 1960 - 1975	199
G. THE CALCULATION OF ANNUAL OUT OF POCKET COSTS	200
H. A PRESENTATION OF MINIMUM ACCEPTABLE ANNUAL INCOME LEVELS IN 1968 EMPLOYED IN THE DETERMINATION OF A CONSUMPTION SUPPORT FACTOR IN THIS STUDY.	213
I. CALCULATED FIVE YEAR MOVING AVERAGE FOR WHEAT, OATS AND BARLEY IN RISK AREA TWELVE BASIS MANITOBA CROP INSURANCE CORPORATION REPORTED MEAN YIELD DATA. . .	214
J. MANITOBA CROP INSURANCE CORPORATION COVERAGE ADJUSTMENT FACTOR BY SOIL TYPE TO BE APPLIED TO BASIC COVERAGE FOR RISK AREA TWELVE.	215

APPENDIXES	Page
K. METHOD USED TO DETERMINE THEORETICAL LOSS COST PER ACRE	216
L. REGRESSION ANALYSIS DATA BASED ON FIVE YEAR MOVING AVERAGE TECHNIQUE	234
M. ANNUAL OUT OF POCKET COSTS FOR WHEAT, OATS AND BARLEY ENTERPRISES	237
N. IMPROVED PRACTICES PROGRAM ADDITIONAL EXPENDITURE REQUIRED TO MEET RECOMMENDED RATES OF FERTILIZER APPLICATION	249
O. GRAPHICAL PRESENTATION METHOD OF CALCULATION FOR FIVE YEAR MOVING AVERAGE ADJUSTMENT	250
P. PERFORMANCE RECORD OPTIONS ONE THROUGH EIGHT, COMMON PRACTICES PROGRAM, OUT OF POCKET COSTS PLUS PREMIUMS VERSUS COVERAGE	251
Q. PERFORMANCE RECORD OPTIONS ONE THROUGH EIGHT, IMPROVED PRACTICES PROGRAM, OUT OF POCKET COSTS PLUS PREMIUMS PLUS FERTILIZER ADJUSTMENT VERSUS COVERAGE .	259
R. PERFORMANCE RECORD OPTIONS ONE THROUGH EIGHT, FIVE YEAR MOVING AVERAGE SYSTEM, OUT OF POCKET COSTS PLUS PREMIUMS VERSUS COVERAGE	267
S. A CHRONOLOGICAL SUMMARY OF MAJOR CROP INSURANCE EVENTS IN MANITOBA	275
BIBLIOGRAPHY.	276

LIST OF TABLES

Table		Page
II - 1	A Definition of the Options Selected for Wheat, Oats and Barley by Variable Per Cent of Long Term Average Yield and Price Selection	15
II - 2	Coverage Per Acre in Bushels of Wheat for Farm "F" in 1975 Based on MCIC Coverage Levels	16
II - 3	Premium and Coverage Per Acre, Farm "F", Risk Area 12, Soil C12	17
II - 4	Total Premium and Coverage, Farm "F", Risk Area 12, Soil C12	18
III - 1	Annual Out of Pocket Cost Elements Selected for Analysis Assignable to Wheat, Oats and Barley Acres on Six Case Farms in Carman, Province of Manitoba.	41
III - 2	Insured Price Level in 1975, Wheat, Oats and Barley	57
V - 1	Annual Out of Pocket Cost Items Calculated for Wheat, Oats and Barley Enterprises for All Case Farms	109
V - 2	Calculated Premium Per Acre for 80 Per Cent Options Compared with Established 1975 MCIC Premiums for the 60 Per Cent Options in Risk Area Twelve	113
V - 3-8	Comparative Summary of Out of Pocket Costs Including Premiums Versus Coverage Levels of the Selected Options, Under the Common Practices Program of the Manitoba Crop Insurance Corporation, on Farms A through F.	116-121

Table		Page
V - 9-14	Comparative Analysis of Options in Which Coverage Exceeded Out of Pocket Costs plus Premiums in the Common Practices Program	127-136
V - 15-20	Comparative Summary of Out of Pocket Costs Including Premiums Versus Coverage Levels for the Selected Options Under the Improved Practices Program for the Manitoba Crop Insurance Corporation on Farms A through F	139-144
V - 21	Comparative Analysis Common Practices Program at Zero Versus Present Equity Levels for 1975	147
V - 22	Coverage Factor, Five Year Moving Average Adjustment	152
V - 23	A Comparison of Premium Rates Expressed in Dollars Per Acre of Rates Based on the Current MCIC Program Versus Rates Based on the Revised Five Year Moving Average Technique	153
V - 24-29	Comparative Summary of Out of Pocket Costs Including Premium Versus Coverage Levels for the Selected Options Under Revised Five Year Moving Average System on Farms A through F	155-160
VI - 1	Comparative Summary of Success Ratios of Common Practices Program Versus Five Year Moving Average Program by Option by Farm.	177

Table	Page
VI - 2	Performance Record Option Six, 70 Per Cent High Price, Common Practices Program, Out of Pocket Costs plus Premiums plus Depreciation versus Coverage 178
VI - 3	Performance Record Option Eight, 80 Per Cent High Price, Common Practices Program, Out of Pocket Costs plus Premiums plus Depreciation versus Coverage 179
VI - 4	Comparative Summary of Success Ratios of Improved Practices Program by Option by Case Farm. 182

LIST OF APPENDIX TABLES

Table		Page
A	Acreege of Principal Crops in Manitoba . .	187
B	Significance of Insurance Written on Wheat, Oats and Barley and Combined Acres Expressed as a Per Cent of Total Insured Acres in Manitoba from 1960 to 1973	188
C1 - C3	A Comparison of Long Term Average Yields, Coverage, and Premiums Based on 35 Year LTAY Calculations Versus 25 Year LTAY Calculations By Risk Area	189-191
C4	Per Cent Change in 25 Year Bushel Coverage at 60 Per Cent LTAY Compared with 35 Year Bushel Coverage at 60 Per Cent LTAY By Risk Area	192
C5	Comparison Long Term Average Yield for Wheat, Oats and Barley - 35 Year Versus 25 Year Basis	193
D	Selected Price Indexes Employed for Updating Procedure 1968 through 1975	194
F-1	Manitoba Crop Insurance Corporation, Insured Price Levels for Wheat, Oats and Barley 1960 - 1975	199
G-1	A Description of Machines and Efficiency Criteria together with Calculated Hourly Variable Cost Changes Used in this Study	208

Table		Page
G-2	Machines Selected for Field Operations by Size	209
G-3	Hourly Machinery Depreciation Charges	210
H	A Presentation of Minimum Acceptable Annual Income Levels in 1968 Employed in the Determination of a Consumption Support Factor in this Study	213
I	Calculated Five Year Moving Average for Wheat, Oats and Barley in Risk Area Twelve, Basis Manitoba Crop Insurance Corporation Reported Mean Yield Data	214
J	MCIC Coverage Adjustment Factor by Soil Type to be Applied to Basic Coverage for Risk Area Twelve	215
L	Regression Analysis Data Based on Five Year Moving Average Technique.	236
M1 - M6	Annual Out of Pocket Costs for Wheat, Oats and Barley Enterprises, Farms A through F . . .	237-248
N	Improved Practices Program, Additional Expenditures Required to Meet Recommended Rates of Fertilizer Application	249
P1 - P8	Performance Record of Options One through Eight, Common Practices Program, Out of Pocket Costs plus Premiums Versus Coverage	251-258

Table	Page
Q1 - Q8 Performance Record of Options One through Eight, Improved Practices Program, Out of Pocket Costs plus Premiums plus Fertilizer Adjustment Versus Coverage	259-266
R1 - R8 Performance Record of Options One through Eight, Five Year Moving Average System, Out of Pocket Costs plus Premiums Versus Coverage	267-274

CHAPTER I

INTRODUCTION

A. Problematic Situation

The story of agriculture in Western Canada has been essentially the tale of a boom and bust economy. Income stability from year to year has not been a central element in the farm economy in aggregate, and more specifically the incomes of individual producers have been exposed to a wider fluctuation between years than the farm economy as a whole. In this regard, historically, the farm economy of the prairie region contrasts with the more stable performance of most other sectors of the Canadian economy.

Income instability in Western Canada stems from man's basic inability to control the weather and hence the level of production of agricultural commodities. The effects of this phenomenon are felt on both the price and quantity components of the total revenue equation. Annual global production of agricultural products exerts a very direct and dramatic influence on the prices received for agricultural commodities by Western producers and hence on individual producer incomes. Producers in countries other

than Canada who produce the majority of agricultural commodities in the western world have been protected to some extent from the traditionally violent fluctuations of international prices for agricultural commodities through government sponsored support and subsidy programs. In this regard producers in Western Canada have been unique in their singular exposure to the gyrations of the international marketplace.

Equally responsible for the instability of income in Western Canadian agriculture is the wild fluctuation of production levels from year to year across the prairies generally and on individual farms in particular. The production of agricultural commodities in Western Canada takes place in an environment of uncertainty. Annually, the vagaries of the weather preclude the enactment of certain production planning, which is essential to the optimization of economic activity and a proper allocation of resources. Hazards such as drought, flood, insects, hail, plant diseases and frost may visit the production unit singularly or in combination and thus conspire to thwart the best laid plans of mice and men. The occurrence of any of these perils may have disastrous implications for income levels achieved by individual producers in Western Canada and for the economy of the region as a whole.

In an effort to contend with the vexing problem of unstable income in Western Canada, policy makers sought to reduce the

impact of wild fluctuations in production, namely, variable yield per acre through the introduction of the device of insurance.

The program of the Manitoba Crop Insurance Corporation represents that province's attempt to reduce the impact of variable yield per acre and the consequent vulnerability of its agricultural economy. Begun in 1959 as a small scale experiment involving a few producers in four risk areas in the province, the Corporation's program, which was the first all risk crop insurance scheme launched in Canada, has now grown into a multi-million dollar province wide operation, serving producers of most agricultural commodities with a comprehensive all risk and hail insurance scheme. Through a system of premium and indemnity payments based for the most part on the 25 year long term average yield for insurable crops in the sixteen risk areas covering the province, the Corporation provides basic protection on the bottom end of the crop. It thereby assures participating producers that they will not have to absorb the devastating loss on initial bushels of production required to cover immediate costs and preserves the farm unit.

From its inception, the program of the Manitoba Crop Insurance Corporation has been considered an experimental program and has, therefore, been subject to a continuous process of evaluation and modification. Combined and individual insurance schemes were offered originally. New contracts are now limited to individual

crops: Formerly, insurance contracts were restricted to operating producers. They have now been extended to cover landlords. Initially, indemnities were payable and premiums collected on the basis of a single price per bushel established by order-in-council. Now two price levels are offered.

The original crop insurance program which covered only wheat, oats, and barley crops has been expanded to its present format in which some 15 crops are eligible for insurance protection. The actuarial base of the Corporation's operations has been changed from a 35 to 25 year long term average yield concept which saw the elimination of the disastrous yield experience of the 1930's in the calculation of premiums and indemnities. A special program for progressive producers following recommended cultural practices was implemented and later dropped from the Corporation's activities. A spot loss hail insurance scheme separate from the all perils program has been initiated. In addition to these program modifications, insurance has been offered over the years at coverage levels ranging from 50 per cent to 80 per cent of the 25 year long term average yield. The present program offers insurance protection at 50, 60, and 70 per cent of the long term average yield on wheat, oats, and barley. The net result of this evolutionary program has been to create a set of optional insurance programs from which a producer may select a package most suitable to the requirements of his operation.

B. Objectives

The objective of this study is to evaluate the ability of the options available for wheat, oats, and barley crops offered by the Manitoba Crop Insurance Corporation to meet the basic objective of the Corporation, which is to protect out of pocket expenses associated with investment in the crop on farms in Manitoba. This study will be confined to an examination of the present options available for the insurable wheat, oats, and barley crops including 50, 60, and 70 per cent of the LTAY¹ and the high and low price provisions. Additionally, the Improved Practices Program recently removed by the Corporation will be examined together with a hypothetical 80 per cent of long term average yield option. The central hypothesis of this study is that the 60 per cent of LTAY, low price, option is adequate to cover "out of pocket" operating expenses for the majority of² farms producing wheat, oats, and barley in Manitoba. An ancillary hypothesis is that the Improved Practices Program option is necessary to cover out of pocket expenses on farms where recommended cultural practices are in force. In addition to testing the central hypothesis it was

¹ The term LTAY is used in this study as an abbreviation for long term average yield.

² "Majority" in this study is defined as 75 per cent or more of the case farm years under examination.

decided to examine corollary hypotheses in an effort to determine what cost items might be expected to be covered at the higher range of coverage levels associated with the basic options considered. It was therefore hypothesized that: (2) the 70 per cent of LTAY, high price option is adequate to cover out of pocket expenses plus depreciation on buildings and machinery; and (3) the 80 per cent of LTAY, high price option is adequate to cover out of pocket expenses plus depreciation on buildings and machinery and a minimal consumption allowance.

C. General Procedure

To test the central and corollary hypotheses, six case farms of varying size and description were selected from the records of the Carman District Farm Business Association. Out of pocket expenses, depreciation and consumption expenses were calculated for each of the six case farms over the eight year period 1960 to 1967 for which continuous records were available. These items were subdivided by enterprise and allocated proportionately to the wheat, oats, and barley crops. For the more recent years, 1968 to 1975, cost data reported for 1967 were updated through the application of index values of prices paid for agricultural inputs, farm machinery, construction materials, and consumer goods. The level of expenditure associated with the central and corollary hypotheses was then compared with the coverage level achieved by the six basic options.

To test the ancillary hypothesis, a similar comparison was effected using the Improved Practices coverage levels generated by the six basic options together with out of pocket expenses based on recommended rates of application of fertilizer.

D. Organization of the Study

The study is organized into six major sections excluding the Appendix. To the maximum extent possible, statistics and supporting data have been confined to referenced appendices which follow the text. Chapter one comprises the introduction.

In Chapter two the opening section discusses in detail the concept of crop insurance options offered by the Manitoba Crop Insurance Corporation and defines them. An attempt is made to develop a rationale for the option selected for the purposes of this study. An illustrative sample is presented for each of the basic options thus selected.

Chapter three deals exclusively with the historical evolution of the crop insurance program in Manitoba and traces the development of the options selected for this study over time. The initial combined insurance program is first examined, followed by the sixty per cent option, separate insurance contract, seventy-five per cent dollar coverage, seventy and eighty per cent options, the 35 to 25 year LTAY base adjustment and the high and low price

provision. Two of the more recent modifications to the basic crop insurance program, which have been applied by the Corporation are examined. These are the Improved Practices Program and the reduction in basic coverage from the 60 to 80 per cent foundation to a 50 to 70 per cent base.

In the fourth Chapter, an attempt is made to delineate the conceptual framework for the study. The insurance phenomena is placed in a temporal economic framework and an effort made to demonstrate its function in terms of the economic environment into which it is introduced. An exploration of the Manitoba Crop Insurance Corporation's application of the insurance concept follows a basic discussion of the concept itself.

Chapter five outlines in detail the empirical method followed in the study to test the selected hypotheses. The component elements of the central and corollary hypotheses were developed on an enterprise basis and refined to meet the requirements of the study. Actual recorded cost data and synthetic data were identified. A tillage sequence was adopted and machinery assigned to suit the practical environment of the case farms included. A consumption support factor attributable to the crop enterprises was developed to accommodate the third hypothesis. The central and corollary hypotheses were then tested against coverage levels determined by application of the 1975 premium and coverage rates of the Manitoba Crop Insurance

Corporation. The Improved Practices coverage levels were calculated on the basis of the Manitoba Crop Insurance Corporation's 1975 program, and compared with out of pocket expenses adjusted to incorporate costs associated with the pursuit of recommended cultural practices. Finally, the central hypotheses was reexamined on the basis of a revised long term average yield generated by a multiple regression analysis incorporating five year moving average data over twenty years.

In Chapter six a summary statement of the study is presented together with a discussion of the results of the empirical analysis conducted. The central and corollary hypotheses are evaluated. Finally, recommendations for modification to the existing Manitoba Crop Insurance Corporation program are presented for consideration based on the results of the study.

CHAPTER II

MANITOBA CROP INSURANCE OPTIONS

The present program of the Manitoba Crop Insurance Corporation represents a rather ambitious undertaking for the province that initially made Canadian wheat famous throughout the world. Not only is insurance coverage available on some fifteen insurable crops in the province but also, various levels of bushel coverage and insurable prices are offered on most crops. In this chapter, an attempt is made to define the concept of a crop insurance option, and to outline the scope of the Manitoba Crop Insurance Corporation's 1975 program. The specific options on wheat, oats, and barley selected for this study, are examined in detail. Finally, an illustrative example of each option selected is presented.

A. Option Defined

Implicit in the meaning of the word option is the concept of selection from alternatives. The program of the Manitoba Crop Insurance Corporation (MCIC) embraces this phenomenon in that alternative levels of bushel coverage and price selection are available for most of the crops it insures. The terms and conditions of a crop insurance contract require that a particular level of bushel coverage